SRNT 2023

29th Annual Meeting

Abstracts

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SRNT

CONTENTS

2023 SYMPOSIA 1

PAPER SESSIONS

Podium Presentation 1 23
Paper Session 1: Under the Influence: Consequences of Tobacco and E-Cigarette Marketing
Paper Session 2: Tobacco Retailer Location Restrictions: Evaluating Impact
Paper Session 3: Chronic Disease: Tobacco Treatment Engagement, Development, and Outcome
Paper Session 4: Training the Trainers: Perspectives and Utilization of Champions to Provide Tobacco Cessation Interventions
Rapids Session 1: Rapid Response Podium Session 1

Podium Presentation 2 33
Paper Session 5: Trends in Smoking and E-Cigarette Use
Paper Session 6: Change Due to Policy: Estimating Real and Potential Effects
Paper Session 7: Emerging Issues in Nicotine Pouch Research
Paper Session 8: Why is It So Hard to Stay Abstinent?: Factors Promoting or Counteracting Cessation Efforts
Paper Session 9: Developmental Efffects of Tobacco and Nicotine Exposure

Podium Presentation 3 44
Paper Session 10: E-Cigarettes for Smoking Cessation
Paper Session 11: Equity-Focused Approaches to Investigating Commercial Tobacco Product Appeal, Toxicant Exposure, and Sensory Experiences
Paper Session 12: Exploring the Complex Relationships between COVID-19, Nicotine Use, and Health
Paper Session 13: Varenicline: New Applications and Effects
Paper Session 14: Tobacco Control Policies in LMIC
Paper Session 15: Breathing It In: Impact of Nicotine and Constituents on Lung and Blood Health
Rapids Session 2: Rapid Response Podium Session 2

Podium Presentation 4 58
Paper Session 16: Illicit Trade and Smuggling
Paper Session 17: The Driving Factors: Neurobiological Mechanisms Underlying Drug Use and Novel Therapeutic Approaches
Paper Session 18: Novel Treatments for Smoking Cessation
Paper Session 19: Mechanisms for Community Engagement in Commercial Tobacco Use and Dependence Research
Paper Session 20: From Margin to Center: Sexual and Gender Minority Health in Nicotine and Commercial Tobacco Research

Podium Presentation 5 69
Paper Session 21: Patterns, Prevalence, and Impact of Flavored E-Cigarettes and Tobacco Products
Paper Session 22: Tobacco Cessation and Challenges in Psychiatric Populations
Paper Session 23: Mechanisms of Health Warning Delivery and Alternative Use by Industry
Paper Session 24: Tax Policy and Pricing: Interaction with Policy and Effect on Cigarette, Heated Tobacco, and E-Cigarette Use
Paper Session 25: Profiling Toxic Product Emissions and Impact on Health Outcomes
Paper Session 26: Cigars: From Exposure to Policy

POSTER SESSION 1: Poster Session 1 83

POSTER SESSION 2: Poster Session 2 115

POSTER SESSION 3: Poster Session 3 147

POSTER SESSION 4: Poster Session 4 178

AUTHOR INDEX 210

2023 SYMPOSIA

SYM1

POLYSUBSTANCE ABUSE INVOLVING NICOTINE AND TOBACCO

Brandon J. Henderson, PhD. Marshall University.

Nicotine is often co-used with other frequently consumed substances of abuse. Furthermore, the likelihood of using an illicit drug is higher in those who already smoke cigarettes than those who have never smoked. Tobacco and nicotine addiction exert a significant negative impact on the health and economic systems of society, making drug dependence an issue of eminent concern, and the condition of co-use increases negative health consequences. Our ultimate goal is to showcase the translational impact basic nicotine research can have across many disciplines. In highlighting preclinical research involving polysubstances from researchers in the basic science network (BSN), we intend to ensure an up-to-date and methodical presentation of observed interactions between the use of tobacco products and other addictive substances. Of particular interest will be nicotine co-use with alcohol, cannabis, and opioids as well as the impact of a history of exposure to drugs on nicotine dependence. This topic is of great importance due to the sheer number of reported incidences of polydrug-use in nicotine-dependent individuals. This is especially true given the increasing rate of co-use of cannabis and nicotine with e-cigarettes. The dangers and risks involved are heightened due to the intensification of the effects combining drugs has compared to that of individual drug-use. That being said, the effects of polydrug-use depend greatly on the types and amounts of drugs mixed. This symposium brings together a diverse group of pre-clinical scientists to present their work on the impact of polydrug use involving nicotine. Dr. Shahrdad Lotfipour will present data on the impact of cocaine, fentanyl, and methamphetamine with nicotine. Dr. Jibran Khokar will present data on the impact of alcohol with nicotine. Dr. Valeria Lallai will present data on the impact of THC/Cannabis with nicotine. Dr. Brandon Henderson will present data on the impact of morphine with nicotine. Together, these presentations will highlight the fact that other drugs of dependence can alter nicotine reward, nicotine reinforcement, and anxiety-related behaviors.

SYM1-1

NICOTINE ENHANCEMENT OF COCAINE, FENTANYL, AND METHAMPHETAMINE INTRAVENOUS SELF-ADMINISTRATION IN SPRAGUE DAWLEY RATS

Shahrdad Lotfipour, PhD. UC Irvine.

Introduction: Adolescent nicotine exposure has risen at alarming rates in recent years. One of the consequences of adolescent nicotine exposure is the enhancement of subsequent substance use. The goal of this presentation is to highlight our work testing this hypothesis in adolescent and adult Sprague Dawley rat lines. Methods: We used a well-established 4-day nicotine pretreatment paradigm, where adolescent and adult Sprague Dawley rats were pretreated with saline or nicotine (2x30 µg/kg/injections) across four days (adolescent: postnatal day (PN) 28-31, adult: PN 86-89). On the subsequent day, animals were assessed for cocaine (500 µg/kg/infusion), fentanyl (2.5 µg/kg/ infusion), or methamphetamine (20 µg/kg/infusion) intravenous self-administration. Results: Our data illustrate adolescent nicotine enhancement of intravenous cocaine, fentanyl, and methamphetamine self-administration in male Sprague Dawley rats. These effects are not observed in adult male rats, highlighting unique age and nicotine pretreatment effects for all three self-administered drugs. For methamphetamine, adult females illustrate nicotine-induced drug self-administration, which was not observed in adolescents. Conclusions: Our results demonstrate unique age, sex, and nicotine pretreatment effects on the enhancement of subsequent drug self-administration. The findings are important given the escalating rates of electronic nicotine use in the human population. Our findings provide a method for evaluating the mechanisms and consequences of assessing age- and sex-dependent nicotine pretreatment effects on the enhancement of subsequence substance use.

FUNDING: Academic Institution

SYM1-2

ALCOHOL AND VAPORIZED NICOTINE CO-EXPOSURE DURING ADOLESCENCE CONTRIBUTE DIFFERENTIALLY TO SEX-SPECIFIC BEHAVIORAL EFFECTS IN ADULTHOOD

Jibran Y. Khokhar. Western University.

Introduction: Co-occurrence of e-cigarette use and alcohol consumption during adolescence is frequent. Here, we examined whether adolescent co-exposure to alcohol drinking and vaporized nicotine would impact reward- and cognition-related behaviors in adult male and female rats during adulthood. Aims and methods: Four groups of male and female Sprague Dawley rats (n = 8-11/group/sex) received either nicotine (JUUL 5% nicotine pods) or vehicle vapor for 10 minutes daily between postnatal days 30-46, while having continuous voluntary access to ethanol and water during this time in a two-bottle preference design. Upon reaching adulthood, all rats underwent behavioral testing (ie, Pavlovian conditioned approach testing, fear conditioning and a two-bottle alcohol preference). Sex differences in nicotine vapour pharmacokinetics were also assessed after adolescent exposure. Results: Male rats exposed to vaporized nicotine with or without alcohol drinking during adolescence exhibited altered reward-related learning in adulthood, evidenced by enhanced levels of sign-tracking behavior. Male rats that drank alcohol with or without nicotine vapor in adolescence showed deficits in associative fear learning and memory as adults. In contrast, these effects were not seen in female rats exposed to alcohol and nicotine vapor during adolescence. Female adolescent rats showed higher plasma nicotine and metabolite levels compared to male adolescent rats. Conclusions: The present study provides evidence that co-exposure to alcohol and vaporized nicotine during adolescence in male, but not female, rats produces long-term changes in reward- and cognition-related behaviors.

FUNDING: Federal

SYM1-3

VAPING FOR TWO: MULTIFACETED IMPACT OF NICOTINE AND THC IN UTERO EXPOSURE

Valeria Lallai, PhD. UCI.

Introduction: Exposure to nicotine-containing smoke during pregnancy remains a substantial problem worldwide despite there has been a decrease in the prevalence of use of tobacco-containing substances. Indeed, with the recent escalation in the use of e-cigarettes and the legalization of cannabis, it has become essential to understand the effects of co-exposure to nicotine and cannabinoids during the early stages of development. Methods: Wistar rats were used to study the effects of nicotine and THC exposure on maternal behaviors recording the mothers with their offspring for seven days after being exposed to vaporized nicotine and/or edible THC during pregnancy. Furthermore, adolescent offspring were then tested in the prepulse inhibition test, novel object recognition task, and novelty suppressed feeding task. Results: Nicotine vape and THC exposure alone and nicotine and THC co-exposure during pregnancy resulted in fewer events observed for licking and grooming the pups. No significant differences were found in the total time of other observed behaviors. In the offspring, prenatal nicotine vape exposure and nicotine and THC co-exposure resulted respectively in enhanced sensorimotor gating in the prepulse inhibition in females, and in significant deficits in males. Deficits in short-term memory were also found in males prenatally exposed to THC, either alone or with nicotine co-exposure, and in females exposed to THC alone. Finally, in males, a modest increase in anxiety-associated behaviors was found with THC or nicotine exposure in the latency to approach a novel palatable food. Conclusions: Collectively, our results show that exposure to nicotine, THC, or co-exposure during pregnancy can have a behavioral impact in maternal care and on cognitive function during adolescence in the offspring, with differing effects within male and female subjects.

FUNDING: Federal

SYM1-4

MORPHINE EXPOSURE REDUCES NICOTINE-INDUCED UPREGULATION OF NICOTINIC RECEPTORS AND ALTERS NICOTINE SELF-ADMINISTRATION IN A MOUSE MODEL

Brandon J. Henderson, PhD, Pharmacology. Marshall University.

Introduction: Nicotine addiction remains a primary health concern. Despite decades of knowing the negative health consequences, smoking remains the number one cause of preventable death in America at ~480,000 each year. At the same time America is still facing the threat of the opioid epidemic. One feature that connects opioid use and nicotine is the high rates of smoking among those that use opioids. While the prevalence of smoking combustible cigarettes or electronic nicotine delivery systems (ENDS) in the USA varies between 12–35%, the smoking rates among the OUD population is 85-100% 1We examined changes in brain reward mechanisms in which co-use of nicotine and opioids may result in enhanced reward and/or reinforcement. Methods: Adult male and female a4-mCherrya6-GFP mice (C57BL/6J) were used in conditioned place preference and microscopy (CPP) assays to examine reward-related behavior and nicotinic acetylcholine receptor (nAChR) upregulation following treatments with

saline, nicotine, morphine, or nicotine plus morphine. Following this, separate mice were trained in e-Vape® self-administration assays to examine morphine's impact on nicotine reinforcement. Results: We observed a sex-specific (female only) effect of morphine combined with nicotine exhibiting greater reward-related behavior when compared to nicotine-alone in CPP assays. We observed morphine co-exposure reduced nicotine-induced upregulation of nAChRs on VTA dopamine and GABA neurons. Finally, we observed that concurrent morphine exposure reduced nicotine self-administration in female mice. Conclusions: While nicotine use is high among OUD individuals, it appears it is not due to an enhancing effect of brain reward circuitry but may instead be due to avoiding withdrawal-related symptoms of opioid dependence.

FUNDING: Federal; E-cigarette/Alternative nicotine products Industry

SYM2

ENVISIONING AN EQUITABLE COMMERCIAL TOBACCO ENDGAME

Michael Tynan[1], Amanda Y Kong, PhD, MPH[2]. [1]Centers for Disease Control and Prevention, [2]University of Oklahoma Health Sciences Center.

Globally, the tobacco control community has made a call for novel and innovative commercial tobacco endgame strategies to end the tobacco use epidemic. As such, several countries have set endgame goals to reduce smoking prevalence to 5% or lower. Despite progress in reducing commercial tobacco use, inequities remain for some population groups as do gaps in current tobacco control policy adoption and implementation, hindering an equitable endgame.As communities, sub-national jurisdictions, and nations discuss, design, and implement endgame strategies, health equity must be centered. The tobacco control community must continue to critically measure and track tobacco-related inequities and investigate how interventions can be designed with communities to reach those that may not otherwise be fully benefiting from tobacco prevention and control strategies.This panel will address how interventions must prioritize health equity to achieve an equitable endgame. After a brief introduction on tobacco prevalence, inequities, and policies in the United States by the moderator (Mr. Michael Tynan), each panelist will cover a different but related issue to realizing an equitable endgame. First, Dr. Carrie Rosario will highlight the need for tobacco control to move beyond race to structural measures and interventions that address racism as a fundamental cause of disparities. Next, Dr. Amanda Kong will discuss how place-based and retail-focused strategies must be considered to achieve an equitable endgame. Then, Mr. Waa will discuss Aotearoa/New Zealand's pioneering approach to the endgame and how their policies to create a smokefree generation are founded on principles of equity and indigenous rights. Finally, Mr. Chris Bostic will discuss the human rights case for the endgame and the role that governments have in protecting populations from tobacco marketing. After these presentations, the discussants (Ms. Kristy Marynak and Dr. Pebbles Fagan) will respond to the presentations, and the panel will discuss issues such as the changes needed in surveillance systems to identify and address inequities, and the role of health systems and cessation interventions in achieving an equitable endgame.

SYM2-1

PRO-EQUITY INCLUDES ADDRESSING RACISM, RIGHT?: A SCOPING REVIEW OF TOBACCO CONTROL

Carrie Rosario, DrPH, MPH. University of North Carolina at Greensboro.

Significance: Progress in tobacco control remains inequitable, despite designating tobacco-related health disparities as a priority two decades ago. Pro-equity approaches require an intentional commitment to addressing interlocking systems of inequity, including racism. Therefore, we conducted a scoping review to identify how tobacco control has centered addressing racism to advance health equity. Methods: Following PRISMA-ScR guidelines, we conducted a systematic search of databases (e.g., PubMed, Scopus, Google Scholar) and tobacco specific journals for articles published January 2000 – July 2020. Articles were included if related to health equity, in English, and tobacco and race/racism were important to the study. Reviewers screened article titles and abstracts, followed by full-text reviews (n=180). Data extraction integrated a critical race lens to capture the area of tobacco (e.g., use, policy), level of racism (e.g., institutional), how racism was salient to the study context, conceptualization and measurement of the relationship between tobacco and racism, and level of implications/tobacco control actions (e.g., individual, structural). Results: The final sample included 140 articles. Tobacco product use and cessation were the most frequent focal areas. A focus on race as a 'characteristic' frequently obscured the underlying (historic and current) role of racism in patterning persistent inequities. While few studies included a measure of racism, relationships between tobacco and racism were primarily assessed at the interpersonal/personally-mediated level. Articles focused on institutional/structural racism frequently highlighted neighborhood effects, targeted marketing, and regulatory policies. Some articles noted racism as a system of power and driver of tobacco use; however, 'pro-equity' approaches and recommendations infrequently targeted racism or race-related resources. Conclusion: Advancing health equity is a central goal of tobacco control. However, findings from this study highlight the need for tobacco control to move beyond race to structural measures and interventions that address racism as a fundamental cause of disparities.

FUNDING: Academic Institution; Nonprofit grant funding entity

SYM2-2

INTERVENING ON THE TOBACCO RETAIL ENVIRONMENT TO PROMOTE AN EQUITABLE ENDGAME

Amanda Y. Kong, PhD, MPH. University of Oklahoma Health Sciences Center.

The retail environment has increasingly become an important setting for the tobacco industry to sell and market its products, and it is the main channel for tobacco industry marketing. As such, brick-and-mortar retailers are the primary source for tobacco product purchasing for adult tobacco users and a key source for youth. Multiple empirical reviews indicate that exposure to retail marketing is associated with both adult and youth tobacco use behaviors. Additionally, living near a tobacco retailer or in a neighborhood with high availability of tobacco retailers is associated with tobacco use behaviors, and among adults, some tobacco-related health outcomes. This presentation will briefly examine tobacco industry documents to demonstrate how the tobacco industry has capitalized on racialized and economic segregation to target its products to some minoritized communities. Dr. Kong will summarize the literature indicating the relationships between the retail environment and tobacco use and will discuss studies documenting long-standing inequities in the marketing and retail availability of tobacco products. Dr. Kong will then discuss several strategies to reduce the oversupply of retail tobacco products (e.g., limiting the commercial sales of tobacco products; the age of sales restrictions; prohibiting tobacco retailers near schools) while offering a critical examination of how these policies may reduce, eliminate, or unintentionally exacerbate inequities. To achieve an equitable tobacco endgame, multilevel interventions are needed: given persistent racialized and socioeconomic inequities in the availability of tobacco retailers, the retail environment is an essential point of intervention.

FUNDING: Federal; State

SYM2-3

ELIMINATING SMOKING INEQUITIES BY PURSUING AN END FOR COMMERCIAL TOBACCO: THE EXPERIENCE OF NEW ZEALAND MAORI

Andrew Morehi Waa, B.Soc.Sc., MPH. University of Otago.

The Aotearoa/New Zealand Government is committed to achieving a smokefree goal of less than 5% smoking prevalence for all population groups. A key step towards this goal is introducing legislation that aims to: make cigarettes non-addictive; drastically reduce retail access to tobacco; and create a smokefree generation. Aotearoa's smokefree goal has its roots in Maori (the Indigenous peoples of Aotearoa) advocacy during the early 2000's. This was in response to persisting smoking inequities for Maori, despite a comprehensive tobacco control programme being in place for many years. At this time Maori advocated for a shift from individualised approaches to tobacco control to focus instead on the tobacco industry and the products they sell. This presentation will start with an overview of Aotearoa's path to developing its smokefree legislation and then reflect on how it is founded on principles of equity and Indigenous rights. This will be followed by presenting new survey research that has found strong support for key measures in the legislation among Maori who smoke. Findings from a modelling study will also be presented that demonstrates the remarkable potential of these measures to all but eliminate smoking inequities in the short term and significantly reduce all cause mortality inequities in the longer term. The presentation will conclude with a summary of key factors that have contributed to Aotearoa's Smokefree goal, its focus on inequities and its recognition of Indigenous rights.

FUNDING: Academic Institution; Nonprofit grant funding entity

SYM2-4

THE HUMAN RIGHTS CASE FOR TOBACCO ENDGAME

Chris Bostic, MSFS, JD. Action on Smoking and Health.

For decades the tobacco industry has questioned the right of governments to regulate tobacco, particularly through litigation. The question of this sovereign right is now largely resolved in favor of public health. But there is a growing understanding that local and state as well as the federal government have a legal obligation to seek to end the tobacco epidemic. The basis for this duty is most concrete under international human rights law.This presentation will examine the tobacco epidemic through the lens of human rights law, with particular foci on the right to health and the Ruggie Principles on Business and Human Rights. The presenter argues that governments have failed in their obligation to protect the right to health, as well as other recognized human rights, of its citizens from violations by the tobacco industry. Using the same framing, the presenter will make the case that the marketing and sale of tobacco products, even in the absence of further legal malfeasance, is itself a violation of basic human rights. Taking these two conclusions together, it will be made clear that government obligations vis-à-vis tobacco include implementing endgame policies.

FUNDING: Unfunded

SYM3

INNOVATIVE APPROACHES IN REMOTE BIOCHEMICAL VERIFICATION IN TOBACCO RESEARCH? LESSONS LEARNED AND FUTURE DIRECTIONS.

Johannes Thrul[1], Roger Vilardaga[2]. [1]Johns Hopkins University, [2]Duke University.

Remote clinical trials are becoming increasingly important to ensure the size and representativeness of our clinical samples, and to reach priority populations. However, rigorous collection of surrogate endpoints (or biomarkers) of smoking cessation can be a challenge in remote trials. In this symposium the authors will introduce (1) different biochemical verification approaches utilized in their clinical trials and their key advantages and challenges; (2) new biochemical verification methods to address the increasing levels of poly-tobacco use; (3) new digital tools to aid biochemical verification; and (4) user-centered design and mixed-methods strategies to address both human and health equity factors in smoker's larger societal and cultural context. A special emphasis will be paid throughout the symposium to health equity considerations, including access to technology, as well as acceptability of and engagement in procedures in remote biochemical confirmation studies among disadvantaged groups. Speakers represent multiple academic institutions across the US (e.g., University of Oklahoma, Medical University of South Carolina, University of Arizona, Brown, Duke, Johns Hopkins), as well as industry (IntelliQuit). The discussant, co-chair Dr. Thrul, will summarize and discuss contributions against the backdrop of a recently conducted scoping review of remote biochemical verification studies (currently in revision at Nicotine and Tobacco Research).

SYM3-1

MOBILE ASSESSMENT OF SMOKING STATUS IN COMBINATION WITH IDENTITY VERIFICATION AND AUTOMATED INCENTIVE PAYMENTS

Darla E. Kendzor, PhD. University of Oklahoma Health Sciences Center.

Incentive-based interventions are highly effective for smoking cessation. Typically, participants have been required to attend in-person office visits to provide a breath sample for carbon monoxide testing to verify smoking abstinence and earn incentive payments. However, in order to increase the availability and reach of incentive-based interventions, methods to remotely verify abstinence and identity and automate incentive payments are needed. In particular, remote methods may address barriers to treatment access among socioeconomically disadvantaged individuals and those living in rural areas. Ideally, such methods would be low-burden for both participants and those who oversee treatment delivery. In collaboration with the Stephenson Cancer Center Mobile Health Shared Resource, this investigative team has combined technologies, including 1) portable and inexpensive carbon monoxide monitors (Bedfont iCO/iCOquit) that connect with smartphones to remotely verify abstinence, 2) facial recognition software (Microsoft Face API) to confirm identity during breath sample submissions, and 3) automated delivery of incentives to a credit card (Greenphire ClinCard) triggered by biochemical confirmation of abstinence and identity verification. These technologies have been integrated within the Insight™ Mobile Health Platform. Specifically, the Insight™ web-based Content Management System allows investigators to tailor their smartphone-based assessments and interventions to the needs of their study. Study apps can then be made available for download through the app store. Innovative aspects of this smartphone-based system include the ability to verify participant identity during breath sample submissions, and automated payments to a credit card which reduces the need for staff review. The findings of two pilot/feasibility studies to develop and evaluate this automated smartphone-based biochemical verification system will be described, including lessons learned and refinements. The current methods used by this investigative team in a full-scale NCI-funded nationwide trial among low-income adults will be shared. Challenges to abstinence verification such as non-combustible tobacco use and combusted cannabis use will be discussed. The remote biochemical verification methods described in this presentation have particular utility for contingency management interventions, but are broadly relevant for studies that require remote biochemical verification of abstinence.

FUNDING: Federal; State

SYM3-2

DEVELOPMENT AND EVALUATION OF AN INTEGRATED SYSTEM ("COAST") TO REMOTELY BIOCHEMICALLY VERIFY SMOKING STATUS LEVERAGING REDCAP

Jennifer Dahne, PhD. Medical University of South Carolina.

Remote collection of expired-air carbon monoxide (CO) is a non-invasive approach that can be used to verify smoking and abstinence. Yet, several issues remain unresolved. Most critically, remote CO collection must be: 1) integrated in real-time with patient-reported or other research outcomes, 2) valid, and 3) feasible. Accordingly, the purpose of this study was to 1) develop a remote CO data capture system through which a smartphone-enabled CO monitor, the iCO™, is integrated with REDCap and 2) examine validity of and compliance with this system. Previously (SRNT 2020), our team demonstrated the functionality of the integrated iCO™/REDCap system (called "COast"). Herein, Dr. Dahne will present data from a remote trial evaluation speaking to validity of this system as compared to gold standard (but still remote) approaches for biochemical verification and compliance with remote CO capture using COast. Smokers (N=142, current enrollment=103), were mailed a kit containing: 1) an iCO™, 2) a gold-standard CO monitor, and 3) saliva collection tubes. Upon receipt, participants completed a baseline session via video and provided a CO sample via each monitor as well as a saliva sample, which was subsequently assayed for cotinine, for validity testing. To examine compliance as pertinent to a variety of trial designs, participants were randomized to receive prompts to provide CO either once per week or once per day for a period of four weeks. Study participants were recruited nationwide with methods in place to prevent fraudulent trial entry. Enrolled participants included a diverse group of smokers (64% female, 30% non-White). Early compliance (through three weeks) has been strong, though variable, among both those randomized to weekly CO collection (82-86% submission rate) and daily CO collection (59-86% submission rate). Compliance generally was higher among those randomized to weekly collection. After three weeks, compliance decreased in both groups (Weekly: 55%, Daily: 57-68%), suggesting that shorter durations of CO monitoring may be associated with highest compliance. Descriptive analyses will be presented regarding compliance across demographic and smoking groups as well as validity. In sum, results of this trial have the potential to inform the adoption of remote biochemical verification of smoking status using the COast system.

FUNDING: Federal; Nonprofit grant funding entity

SYM3-3

USE OF DRIED BLOOD SPOTS IN REMOTE TOBACCO-RELATED RESEARCH

Alicia Allen, PhD, MPH. University of Arizona.

Introduction: Dried blood spots (DBS) are droplets of blood collected on filter paper that can be analyzed for over 60 biomarkers, including nicotine and cotinine. DBS are ideal for remote biochemical verification of smoking status given the ease of self-collection, stability of the sample (e.g., six-week shelf life at room temperature with cotinine) and compact size making them ideal for shipping via mail. However, they have not been well utilized in tobacco-related research to date. The goal of this session is to explain the DBS self-collection protocol, as well as lessons learned that may be used to improved compliance. Methods: To date, we have utilized DBS in six different tobacco-related studies; including cross-sectional and prospective cohort designs, as well as smoking cessation trials. Studies have used either exclusively remote data collection methods or a hybrid of in-person and remote data collection efforts. For the purposes of this presentation, we have computed descriptive statistics to examine the feasibility and acceptability of

using DBS in remote settings utilizing data from all six of these studies. Results: Overall, a total of 376 participants have completed DBS self-collection. Participants reported a high level of willingness to collect DBS again with >90% reporting "agree" or "strongly agree." Less than 10% of the participants reported that the sample collection process was "extremely" burdensome. Of the samples requested, we received 57-95%, which the lowest return rates observed in the smoking cessation trial (57%) and highest return rate observed in prospective cohort trial (95%). Of the DBS samples received, >90% were deemed "useable" by the laboratory staff. Most recently, we compared DBS by study visits completed in-person or via Zoom and observed similar compliance rates (82% versus 78%, respectively). Finally, compensation can be used to increase compliance by providing an adequate amount, delivering funds quickly, and paying participants for interim steps (e.g., paying upon receipt of a picture of the sample and at time of receipt).Discussion: Study participants are, overall, willing to self-collect DBS samples and they also produce useable results. However, there are some challenges in receiving samples. Our observations suggest that adequate compensation that is delivered at interim steps yields increased compliance rates.

FUNDING: Federal; Nonprofit grant funding entity

SYM3-4

A MOBILE APP FOR THE REMOTE MEASUREMENT OF TOTAL NICOTINE EQUIVALENTS

Matthew Bars, MS CTTS NCTTP. IntelliQuit/ FDNY Tobacco Treatment Prog.

Background:Total Nicotine Equivalents (TNEs) and expired breath carbon monoxide (EtCO) measures all sources of nicotine. We describe development of a mobile app that allows in-office or remote quantitative measurement of nicotine consumption in 15 minutes. We further describe an algorithm to differentiate combustible versus non-combustible sources of nicotine. Methods: TNE and EtCO are the 2 most common measures of biochemical tobacco consumption. While EtCO can only measure combustible tobacco, TNEs report all forms of nicotine consumption. The Konig reaction of the nicotine metabolite-related ubiquitous pyridine ring produces an increasingly reddish-pink colored product, directly proportional to nicotine consumption. Every color can be described mathematically as Red, Green & Blue (RGB) from 0 to 255, producing over 16 million potential colors. We developed a mobile app and algorithm that determined the relationship between 2 nicotine reference laboratories measures of urinary TNEs and the colors produced by a nicotine test strip. Utilizing the colorimetric paper assay of unprocessed urine, computer vision, and neural network architecture-generated algorithms, the mobile app returns a quantitative laboratory value in nanomoles per milliliter in 15 minutes to the user's smartphone. The app can be used in-office or via remote patient monitoring and telehealth interventions. Results: Examining over 100,000 images we found a R2 of 0.980 and a RMSE of 8.52 nanomoles per milliliter between the reference laboratories and the nicotine urine test strip. At the Fire Department of New York City (FDNY) tobacco treatment program remote monitoring, in-office assays and medication titration empowers a biochemically confirmed long-term quit rate of ~70%. Conclusions: Mobile app based in-office and remote monitoring of Total Nicotine Equivalent measurements of tobacco consumption can increase study reliability.

FUNDING: Unfunded; Other

SYM3-5

REMOTE BIOCHEMICAL VERIFICATION IN A MULTIPLE HEALTH BEHAVIOR CHANGE INTERVENTION STUDY

Cara Murphy. Brown University School of Public Health.

Due to the synergistic effects of smoking-related and obesity-related morbidity, the life expectancy of individuals with obesity who smoke cigarettes is considerably shorter than that of normal weight individuals who smoke cigarettes. Multiple health behavior change interventions may be a promising way to help reduce health risks among individuals with obesity who smoke cigarettes. Additionally, remotely delivered intervention research may allow for greater reach and the ability to include individuals who may be otherwise unable to participate. Nonetheless, remotely delivered smoking cessation intervention research creates several important considerations for study inclusion criteria and remote assessment of study outcomes. This symposium will discuss the use of remote biochemical verification of tobacco use/abstinence in an ongoing NIDA-funded study aimed to test the feasibility and acceptability of a multiple health behavior change intervention. The methods used to verify cigarette smoking and abstinence from smoking among individuals with obesity who smoke cigarettes (n=65) will be discussed. Remote procedures and costs associated with the assessment of nicotine and tobacco will be reviewed. This will include using the NicoTests® cotinine (nicotine metabolite) saliva test and the iCOquit® Smokerlyzer® breath test carbon monoxide monitor. Challenges, advantages, disadvantages, and participant acceptability will be discussed. Although remote biochemical verification of tobacco use can bring challenges and costs such as the need to replace lost or broken devices and difficulties pairing Bluetooth technology, participants generally find the procedures to be acceptable. The ability to biochemically verify tobacco use remotely may eliminate barriers associated with in-person research and allow for a more representative sample and greater assurance of study outcomes than could be achieved using self-reported tobacco use only.

FUNDING: Federal

SYM3-6

METHODOLOGICAL AND HEALTH EQUITY CONSIDERATIONS RELATED TO THE COLLECTION OF REMOTE BIOMARKERS IN DIGITAL THERAPEUTICS RESEARCH

Roger Vilardaga. Duke University.

In a recent narrative review of the literature, we identified 13 studies that utilized several different procedures to collect biomarkers of tobacco use in remote clinical trials. This review also examined challenges outlined in the larger scientific literature focused on the remote collection of vital signs (e.g., blood pressure, oxygen). Based on our review we identified key methodological considerations that might benefit tobacco researchers in the design and implementation of their own biomarker collection procedures. First, informed by the Purpose-Guided Trial Design framework (2020, Freedland et al.) and stage models of treatment development research (e.g., ORBIT) we will discuss methodological considerations involved in the choice of a specific remote biomarker or procedure. Second, we will discuss the potential of user-centered design research not only to design digital interventions, but also to examine the design and evaluation of human factors involved in remote collection of biomarkers. Relatedly, we will discuss examples of the application of user-centered design methods to collect remote biomarkers in the larger literature. Finally, we will discuss the importance of mixed methods research to rigorously address health equity factors in the use of remote biomarkers in priority populations. In doing so we will highlight a series of social, cultural, and systemic factors (e.g., digital divide, technological literacy, cultural fit) that may contribute to inequities in the collection of biomarkers, and to which the application of objective measurement of biomarkers are not immune. These two methodologies (user-centered design and mixed methods research) have the potential to reveal key factors affecting the acceptability of remote biomarkers by their recipients and inform the implementation of these biomarkers in their larger societal and cultural context. Overall, this presentation will highlight methodological approaches and considerations in the collection of remote biomarkers that may inform future research.

FUNDING: Federal; Other

SYM4

COMMUNICATING TOBACCO PRODUCT RELATIVE RISK AND EXPOSURE: RESEARCH TO INFORM POLICY AND PRACTICE

Andrew Seidenberg, Truth Initiative.

Tobacco and e-cigarette companies have introduced a variety of non-combustible tobacco products, which may pose less harm compared to combustible cigarettes. Moreover, there is growing interest around the world (using different regulatory approaches) in communicating tobacco product relative risk information to the public. Research is needed to understand how relative risk messages affect public perceptions, knowledge, and behaviors to help assess their potential benefits (e.g., harm reducing behaviors) and potential harms (e.g., initiation among youth). This symposium will share recent research evaluating responses to tobacco product relative risk and exposure messaging. First, Dr. Carla Berg will present findings from an online experiment testing how modified risk and exposure messages for IQOS affected perceived harm and use intentions among US and Israeli adults. Next, Dr. Alex Liber will share results from a difference-in-difference analysis examining how the authorization of a modified risk claim for General Snus affected snus sales in the United States. Dr. David Hammond will then provide an overview of Health Canada's development and pre-testing of relative risk statements for e-cigarettes. Next, Dr. Sharon Cox will share results from an eye tracking experiment testing a reduced risk message for e-cigarettes, nicotine warning, and neutral e-cigarette information among a sample of adults from the United Kingdom. Lastly, Dr. Lucy Popova (Discussant) will summarize the key take aways from each presentation and discuss implications for tobacco control policy and practice. Featuring research from several countries, different tobacco product types, and using multiple research methods and data sources, findings from this symposium will help inform tobacco regulatory decisions and public communication strategies.

SYM4-1

IMPACT OF DIFFERENT HEALTH WARNING LABEL MESSAGES AND HEALTH-RELATED AD MESSAGES IN IQOS ADS ON PERCEPTIONS: AN EXPERIMENT AMONG US AND ISRAELI ADULTS

Carla J. Berg, PhD, MBA. George Washington University.

Background. Heated tobacco products (HTPs; e.g., IQOS) are advertised as safer than cigarettes or as an alternative, yet required health warning labels (HWLS) in many countries, including the US and Israel, do not consider the extent to which ad messages undermine HWLs, particularly those that do not explicitly address HTPs. Methods. In a 2021 sample of 2,222 US and Israeli adults, we conducted a randomized 4 x 3 factorial experiment examining IQOS ads with differing: 1) HWLs (i.e., risks of smoking, prompt to quit smoking, HTP-specific, control); and 2) ad messages (i.e., slight distancing: "cigarette-like satisfaction but no odor", clear distancing: "looking for an alternative?", control). Participants then reported perceived relative harm, exposure, and disease risk and likelihood of trying or suggesting IQOS to smokers. Ordinal logistic regression examined message effects, adjusted for covariates. Results. We found one HWL effect: risk (vs control) led to greater perceived relative harm (aOR=1.21, CI=1.03-1.41) and exposure (aOR=1.22, CI=1.04-1.42) and lower likelihood of trying IQOS (aOR=0.82, CI=0.69-0.97). Regarding ad messages, relative to control, both slight and clear distancing led to lower perceived harm (aOR=1.18, CI=1.03-1.34; aOR=0.63, CI=0.55-0.72, respectively) and greater likelihood of suggesting IQOS to smokers (aOR=1.23, CI=1.07-1.41; aOR=1.28, CI=1.11-1.47); slight distancing led to lower perceived disease risk (aOR=0.85, CI=0.75-0.97); and clear distancing led to lower perceived exposure (aOR=0.73, CI=0.64-0.83). Clear (vs slight) distancing led to lower perceived relative harm (aOR=0.74, CI=0.65-0.85) and exposure (aOR=0.82, CI=0.71-0.93). One interaction effect was found: viewing the quitting HWL and clear distancing led to particularly low perceived relative harm (aOR=0.63, CI=0.43-0.93). Also, Israeli (vs US) participants, cigarette users (vs nonusers), and men reported lower relative harm and greater likelihood of suggesting IQOS to smokers. Conclusions. Ad messages are powerful influences on consumer perceptions and can undermine HWLs. Regulatory agencies must monitor ad messages and their impact, and reconsider HWL content.

FUNDING: Federal

SYM4-2

HOW DID MRTP CLAIM AUTHORIZATION AFFECT SALES OF GENERAL SNUS IN THE US?

Alex C. Liber, PhD. Georgetown University.

INTRODUCTION: The 2009 Tobacco Control Act granted FDA regulatory authority over tobacco products, including the ability to authorize modified risk tobacco product (MRTP) claims. In October of 2019, FDA authorized the first-ever MRTP claim for General Snus, which allowed the product to be marketed with a reduced risk (relative to cigarettes) MRTP claim. This study examined the effect of this MRTP claim authorization on US snus sales.METHODS: We used logged brand-level per-capita unit sales from Nielsen ScanTrack divided into four-week periods between March 2017 and November 2021 and summed from 19 US states representing 70% of the country's population. To limit brand entry and exit effects, we limited inclusion to 81 brands that registered sales in all 61 study periods. We performed difference-in-difference analyses using a two-way fixed-effects doubly robust estimator comparing (1) General snus sales to other snus brands (Skoal and Camel) and (2) General snus sales to all non-snus smokeless tobacco brands and (3) all snus brand sales to non-snus smokeless brands. Standard errors were clustered at the brand level.RESULTS: We found that snus sales were flat, while other smokeless product sales declined. Compared to other snus brands, General Snus sales did not significantly change after MRTP authorization (8.98% decrease, 95% CI -19.6%–1.64%, p=0.098). However, compared to all non-snus smokeless brands, we found that General Snus sales increased by 14.7% (95% CI 5.23%–24.2%, p=0.002) after MRTP authorization. MRTP authorization coincided with a significant increase in all snus brand sales (20.7%, 95% CI 7. 94%–33.5%, p=0.001). CONCLUSION: MRTP authorization for General Snus was associated with increased sales of all snus brands relative to other smokeless tobacco products. MRTP authorization of one product could boost sales not only for brands that receive the designation but also for other similar products.

FUNDING: Federal

SYM4-3

CANADA'S PROPOSAL FOR RELATIVE RISK STATEMENTS FOR E-CIGARETTES

David Hammond, PhD. University of Waterloo.

Most countries restrict health claims for e-cigarettes, including statements regarding relative risks and smoking cessation. Perceptions of relative harm and cessation efficacy have the potential to influence the use of e-cigarette, including as a means of targeting e-cigarettes to adults seeking to quit smoking. Health Canada has proposed regulations that would permit vaping manufacturers and retailers to convey harm reduction messages without seeking approval for specific products. The current talk will provide an overview of Health Canada's development and pre-testing of relative risk statements, including a summary of findings from qualitative research. The presentation will also discuss broader considerations regarding principles for communicating relative risk and existing practices in other jurisdictions.

FUNDING: Unfunded

SYM4-4

ATTENTIONAL ALLOCATION TO E-CIGARETTE WARNING LABELS/ CLAIMS AMONGST SMOKERS AND NEVER-SMOKERS

Sharon Cox, PhD. University College London.

Significance: The EU Tobacco Products Directive (TPD) e-cigarette warning label highlights the addictive potential of e-cigarette products. This may dissuade smokers from trying e-cigarettes as one key reason cited by smokers for not switching to e-cigarettes is fear of swapping one addiction for another. Around one-third of smokers have not yet tried an e-cigarette, development of alternative labels may encourage use of e-cigarettes. If developed, smokers need to attend to these messages. The aim of this study was to measure attention allocation to e-cigarette warning labels amongst smokers and never-smokers. Methods: A 2 (smoking status) x 3 (message type) mixed experimental design. Twenty never-smokers and nineteen smokers completed a lab-based eye-tracking study including dot probe task, viewing e-cigarette packaging that contained the TPD warning label, a 'reduced risk' message developed by our team that compared relative risks of tobacco smoking and e-cigarettes or neutral messages, with factual information about e-cigarettes. The dependent factors were total dwell time and time to first fixation on each message type. Participants were asked about e-cigarette harms, intentions to use and beliefs around efficacy as a quit aid. Results: Never-smokers dwell time on warning messages (mean = 1976msec, SD = 143.3) was longer than smokers (mean = 1290msec, SD = 143.3) for all three message types (main effect of smoking status, F (1,36) = 11.436, p = 0.011). Never-smokers visual attention was captured by the messages sooner (mean = 1409msec, SD = 115.2) than smokers (mean = 1831msec, SD = 118.3; F(1,36) = 6.535, p = 0.015). There were no interactions between message type and smoking status for eye movement measures (p's > 0.198) For smokers only, the amount of time spent viewing the reduced risk messages was associated with the belief that e-cigarettes are an effective method for quitting smoking (r = 0.470, n = 19, p = 0.042). Conclusions: Never-smokers were quicker to look at and spent longer viewing all three types of messages than smokers. This may be due to habituation to the appearance of warning labels or a reluctance to attend to them amongst smokers. Previous research has found an increased intention to use e-cigarettes amongst smokers who viewed the reduced risk version, these may have the potential to influence beliefs about e-cigarettes if smokers pay attention to them.

FUNDING: Academic Institution

SYM5

COMPLEMENTARY APPROACHES TO EXAMINING RELATIONSHIPS BETWEEN E-CIGARETTES AND SMOKING: NOVEL DATA FROM THE US

Matthew J. Carpenter, Medical University of South Carolina.

The relationship between e-cigarettes and smoking is complex and variable. Most but not all studies suggest that e-cigarette use can lead to smoking cessation, at least for some smokers under some conditions. Among the strongest evidence to date are studies conducted outside the US. Given country-specific regulatory environments and public perception of e-cigarettes, it is critical to test whether and how e-cigarettes lead to smoking cessation within the US. The proposed symposium will present novel data to address this question. Our first two presenters will each present results from RCTs that directly test the impact of e-cigarettes on smoking and smoking cessation.

These two trials are some of the first of their kind in the US. Dr. Carpenter will present results from a large-scale nationwide trial that examined the causal effect of naturalistic and non-prescriptive e-cigarette 'sampling,' assessed among a group of smokers with varied motivation to quit. Outcomes focus on changes in smoking, including quit attempts and smoking cessation. Dr. Wagener will present outcomes from a quitline study in which smokers with a recent failed quit attempt were given standard cessation treatment (NRT) or e-cigarette. Preliminary results suggest the potential for increased cessation among smokers given pod-based e-cigarette, at least in the short term. As the literature on e-cigarettes evolves, it is equally important to understand whether attempts to quit using e-cigarettes lead to relapse among former smokers. Dr. Klemperer will present PATH data that examines this relationship, providing guidance for any forthcoming e-cigarette cessation strategies. Importantly, future research on the relationship between e-cigarettes and smoking cessation must consider mechanisms of product switching, particularly in terms of relative appeal and use patterns. Dr. Foulds will compare the addictive potential of cigarettes and e-cigarettes, contrasting patterns of use and dependence which may underlie product transitions. Dr. David Ashley serves as Discussant, offering his view of the landscape that covers the link and mechanisms by which e-cigarette use (or cessation) impacts smoking behavior. As e-cigarette use prevalence continues to grow, there is continuing need to understand how such use is or is not related to changes in combustible cigarette smoking. It is equally important to do so within the US, providing much needed regulatory guidance for both products.

SYM5-1

COMPLEMENTARY APPROACHES TO EXAMINING RELATIONSHIPS BETWEEN E-CIGARETTES AND SMOKING: NOVEL DATA FROM THE US

Matthew J. Carpenter[1], Amy Wahlquist[2], K. Michael Cummings[1], Tracy Smith[1]. [1]Medical University of South Carolina, [2]East Tennessee State University.

Introduction: Recent evidence has suggested associations between e-cigarette use and subsequent smoking cessation. However, most of this evidence comes from a limited number of observational/cohort studies, and an even fewer number of randomized studies. Among the existing trials to date, most have been conducted beyond the US, and primarily focused on instructive; i.e., purposeful and often guided e-cigarette use with aim to achieve smoking cessation. Complementing this existing literature, we herein present forthcoming results from a recently concluded RCT conducted nationwide in the United States (N=638) that examined the naturalistic impact of e-cigarette sampling among current cigarette smokers with minimal e-cigarette experience. Methods: Participants were randomized in a 2:1 fashion to either receive (or not) an NJOY e-cigarette and a 4-week supply of pods in multiple flavor options, with minimal instructions on use, nor any requirement to change smoking. Participants completed daily electronic diaries of tobacco use for 4 weeks, and regular phone assessments for 6 months. Final enrollment concluded 2/2022, and final follow-up is scheduled for 8/2022, precluding inclusion of primary outcomes herein. Results: The final sample was demographically diverse: 53.6% female, 68.5% White (18.5% Black; 14.1% Hispanic), 30.9% <= HS education, mean age 42.3 (SD=11.5), and moderately dependent (mean HSI=14.8; SD=7.2) with limited interest in quitting smoking (mean motivation to quit on 0-10 VAS=4.3; SD=3.2; 24.1% making quit attempt in prior yr). Interim results from 6month follow-up suggest a 2-fold increase in ability to achieve 50% reduction in CPD among e-cigarette (vs. control) participants. Full results will be available for conference presentation, focusing on between-group comparisons of the following prospective outcomes: a) incidence and duration of quit attempts, b) point prevalence abstinence, and c) smoking reduction. Additional outcomes include changes in cigarette/e-cigarette dependence, independent purchase of e-cigarettes (i.e., product adoption beyond sampling), and/or attitudes towards e-cigarettes. Conclusions: Complementing the existing literature that focuses on prescriptive e-cigarette use with goals of smoking cessation among treatment seeking smokers, the current trial will demonstrate the naturalistic impact of e-cigarette use; focusing on self-determined use and goals. Trial results will offer both clinical and regulatory significance.

FUNDING: Federal

SYM5-2

E-CIGARETTES VERSUS COMBINATION NICOTINE REPLACEMENT THERAPY DELIVERED THROUGH STATE QUITLINES ON SMOKING ABSTINENCE FOLLOWING A RECENT FAILED QUIT ATTEMPT: A RANDOMIZED TRIAL

Theodore Wagener, PhD[1], Laura Beebe[2], Michael Businelle[2], Matthew Carpenter[3], Alice Hinton[1], Jonathan Hart[2], Katrina Vickerman[4]. [1]Ohio State University, [2]University of Oklahoma Health Sciences Center, [3]Medical University of South Carolina, [4]Optum Center for Wellbeing Research.

Significance: Current smoking cessation products and counseling are not effective for all smokers, and most smokers fail to quit on their first attempt. For those smokers, switching to e-cigarettes (EC) may offer a significant harm reduction. Few randomized trials have examined the efficacy of EC on smoking abstinence, and no studies have examined their efficacy in the context of a recently failed quit attempt nor delivered through a state tobacco quitline (QL). Methods: Smokers who recently received state QL smoking cessation services but were still smoking (N=196) were randomized (1:1) to receive additional QL telephone counseling and either 8 weeks of EC (JUUL: 5% nicotine, tobacco or menthol flavor) or combination nicotine replacement therapy (NRT; nicotine patch and lozenge). Participants completed daily electronic momentary assessments of tobacco use, exhaled carbon monoxide (eCO) to confirm smoking abstinence (=8ppm), and phone assessments at baseline, end of treatment (EOT; 8 weeks), and 12-weeks. Final study enrollment concludes October 2022; results reported below were conducted at study mid-point (N=196 of 372). Results: The overall sample was 61.3% female, 71.6% White, with a mean age of 54.3 years (SD=22.3) and reported smoking an average of 16.9 cigarette per day (SD=8.0) at baseline. At EOT, there was a non-significant trend (p=.07) for greater eCO-verified 7-day point prevalence smoking abstinence (ppa) for EC (19.8%) vs. NRT (10.5%). At 12-weeks, differences between groups were attenuated (p=.77) with 13.8% of EC and 12.4% of NRT participants having eCO-verified 7-day ppa. Among continued smokers, there were no significant differences between groups in number of 24-hour quit attempts over the 12 weeks. Cigarettes per day and cigarette dependence decreased significantly (p<.001) from baseline to 12-weeks, with no significant differences between groups. Use of EC and NRT was high with 87.0% and 78.7%, respectively, of participants reporting continued use at EOT. Conclusions: Among smokers who recently failed to quit smoking, EC delivered through a state QL and accompanied by counseling were effective at reducing smoking and cigarette dependence. While EC may be more effective than combination NRT in the short-term for smoking abstinence, they were similarly effective in the longer-term. These findings are critical as the FDA continues to evaluate the potential harms and benefits for EC on public health.

FUNDING: Federal

SYM5-3

E-CIGARETTE CESSATION AMONG DUAL USERS AND FORMER SMOKERS IS NOT ASSOCIATED WITH COMBUSTED TOBACCO SMOKING STATUS: LONGITUDINAL FINDINGS FROM THE US FDA PATH STUDY

Elias M. Klemperer, BA[1], Janice Bunn[1], Amanda Palmer[3], Tracy Smith[3], Benjamin Toll[3], K. Michael Cummings[3], Matthew J. Carpenter[3]. [1]University of Vermont, [2]Medical University of South Carolina.

Introduction: Electronic cigarettes (e-cigarettes) can help people quit smoking combusted tobacco products (CTP), but most current and former smokers who use e-cigarettes also intend to quit e-cigarettes. It remains unclear whether e-cigarette cessation is associated with relapse back to smoking CTP among former smokers or prolonged CTP smoking among current smokers. This analysis evaluated whether e-cigarette cessation among current and former CTP smokers is associated with subsequent CTP smoking or abstinence. Methods: We analyzed data from a US nationally representative cohort from Waves 4 (W4) and 5 (W5) of the Population Assessment of Tobacco and Health Study (December 2016-November 2019). Adult respondents (N=1525) who reported W4 current or former use of =1 CTP and reported either currently using e-cigarettes or quitting e-cigarettes in the past year were included. The primary outcome was W5 CTP abstinence. Logistic regressions were performed to examine W4 e-cigarette cessation (quitters versus users) and a W4 e-cigarette cessation-by-CTP smoking status (current versus former) interaction as predictors of W5 CTP abstinence, controlling for demographic characteristics. Results: Among W4 current CTP smokers (n=988), 15.1% (95% CI=12.8, 17.5) were e-cigarette quitters and 84.9% (95% CI=82.5, 87.2) were e-cigarette users. Among W4 former CTP smokers (n=537), 18.0% (95% CI=13.4, 22.6) were e-cigarette quitters and 82.0% (95% CI=77.4, 86.6) were e-cigarette users. Quitting versus continuing e-cigarettes at W4 was not associated with CTP smoking abstinence at W5, neither among W4 current (aOR=0.79, 95% CI=0.47, 1.32) nor former (aOR=0.86, 95% CI=0.44, 1.67) smokers. There was no e-cigarette quit-by-CTP smoking

status interaction (?2=0.03, p=0.863). Most W4 current CTP smokers continued smoking at W5 (e-cigarette quitters=83.8%, 95% CI=77.7, 89.9; e-cigarette users=79.2%, 95% CI=75.7, 82.6) and a substantial minority of W4 former smokers returned to smoking at W5 (W4 e-cigarette quitters=20.8%, 95% CI=12.1, 29.5; W4 e-cigarette users=17.6%, 95% CI=13.6, 21.7). Conclusions: Quitting versus continuing e-cigarettes was not associated with subsequent smoking among a US nationally representative sample of dual users and former smokers.

FUNDING: Federal

SYM5-4

ROLE OF DIFFERENT BEHAVIORAL USE PATTERNS IN DIFFERENCES IN MEASURED DEPENDENCE ON ELECTRONIC CIGARETTES AND COMBUSTIBLE CIGARETTES

Jonathan Foulds, PhD. Penn State University, College of Medicine.

Background: Most of the serious harms from nicotine products result from long term use, and so addictiveness is an important driver of total harms to health. Most comparative studies find electronic (e-)cigarettes to be less addictive than cigarettes, including studies of e-cigarettes capable of delivering nicotine like cigarettes. So why might e-cigarettes be less addictive? Method: Triangulation of evidence from various sources: pharmacokinetic studies, clinical trials, and studies of patterns of e-cigarette use (puff-topography and surveys) were used to assess potential reasons for lower measures of dependence among e-cig users than cigarette smokers (as measured by questionnaires, long term quitting or biomarkers of nicotine exposure). Results: Pharmacokinetic studies over the past decade find that e-cigarettes typically deliver a lower Cmax than cigarettes (e.g. 6 ng/ml v 15 ng/ml), whether on standardized or ad-lib puffing, but some device/liquid combinations can provide a nicotine boost comparable to a cigarette in experienced users. However, even experienced users of high nicotine delivery e-cigarettes typically have lower dependence scores (e.g. 8.4 v 14.5 on the Penn State Electronic Cigarette Dependence Index). There is evidence that e-cigarette dependence increases over the first 2-3 years of use, but flattens thereafter at a lower level than typical cigarette dependence. Studies of patterns of use find that e-cigarette users do not typically vape in concentrated bouts of 10-15 puffs within 4-8 minutes like smokers do (because the cigarette will burn out in that time). Rather they take 1-3 puffs intermittently as required. Conclusions: It is possible that mean dependence scores of exclusive e-cigarette users will continue to increase over time, but it appears likely they will remain lower than exclusive cigarette smokers. This may be partly related to lower nicotine absorption from a standard 10-puff use, but the differing real-world pattern of use may be an important factor causing e-cigarettes to commonly be less addictive. Main Messages: E-cigarettes can be addictive. However, as typically used, e-cigarettes deliver a smaller nicotine boost, are used less intensively in each bout of use, and users have lower scores on questionnaire measures of addiction, than cigarette smokers.

FUNDING: Federal

SYM6

DEVELOPMENT, DISSEMINATION, AND COMMERCIALIZATION OF DIGITAL SMOKING AND VAPING CESSATION AND PREVENTION PROGRAMS

Erika Litvin Bloom, PhD· WayBetter.

Difficulty in dissemination and resulting underutilization of evidence-based smoking and vaping cessation and prevention programs, especially clinic-based programs, is a longstanding problem. Recent advancements in technology have facilitated the development of new digital products and services, such as smartphone applications, to support smoking and vaping cessation and prevention. Some of this work is being done outside of traditional academic settings by a growing digital health industry, generating new opportunities for collaborations between academic researchers and businesses. This symposium will focus on new developments in digital programs for smoking and vaping cessation and prevention and strategies for academia-industry collaboration, dissemination, and commercialization. Dr. Bloom will describe the NIH SBIR/STTR grant mechanism, which provides funding to small businesses to develop commercializable products and allows for businesses to partner with academic researchers. She will also discuss her experience as a Co-Principal Investigator of an SBIR grant to support the development of a smoking cessation app with contingency management and social gaming elements and her recent career transition from academia to industry. Dr. Bar-Zeev will present qualitiative data and a behavioral analysis conducted to inform the development of a digital intervention to reduce secondhand smoke exposure during pregnancy that is delivered in antenatal clinics to pregnant patients and their partners and includes a gradual personalized plan and bio-chemical feedback. Dr. McClure will present acceptability data from a study of a digital health intervention for youth vaping cessation using contingency management, as well as lessons learned and considerations for the commercialization of and authorization of digital therapeutics. Dr. Gordon will present results from a randomized trial of a school-based digital smoking and vaping prevention program that was funded by an SBIR grant. This program requires little teacher training time and encourages engagement through interactive activities and affect-producing games. Finally, Dr. Vickerman will describe the development process for and present data from a randomized trial of a young adult digital vaping cessation program that includes automated and tailored text messaging and vlogs and is delivered within tobacco quitline systems, which allow for rapid and seamless dissemination.

SYM6-1

ACADEMIA-INDUSTRY COLLABORATION TO DEVELOP A DIGITAL SOCIAL GAME FOR CIGARETTE SMOKING CESSATION

Erika Litvin Bloom, PhD[1], Sandra J. Japuntich[2], Jeannette Tsuei[3], Atefeh Alivi Fili[4], Jesse Dallery[5], Tricia Leahey[6], Jamie Rosen[1]. [1]WayBetter, [2]Hennepin Healthcare and the University of Minnesota Medical School, [3]WayBetter and RAND Corporation, [4]Hennepin Healthcare Research Institute, [5]University of Florida, [6]University of Connecticut.

The NIH SBIR/STTR grant mechanism provides funding to small businesses to support research and development of commercializable products and services. We will provide an overview of this grant mechanism, explain how it can facilitate collaborations between academia and industry and influence career journeys, and describe our work on a digital social game for smoking cessation that is supported by a NIDA SBIR Fast Track award. Contingency management involves providing financial incentives for behavior change and is among the most effective non-pharmacological treatments for cigarette smoking cessation when tested in academic research settings. However, concerns about feasibility, acceptability, and relapse after incentives are discontinued have limited dissemination and commercialization of contingency management programs. The digital smoking cessation game we are developing includes a deposit contract, which is a self-sustaining, scalable form of contingency management, and other social gaming elements. The game is delivered via a smartphone application. Participants verify smoking abstinence using remote carbon monoxide breath testing with video-based identify verification. We will review the game development process including initial ideation and testing an early prototype on social media, developing a minimum viable product (MVP) version of a smartphone application, and testing this MVP in a pilot trial. During the pilot trial, which has already been published (Bloom et al., 2021), we collected quantitative and qualitative data that was used to inform revisions to the app and the design of an ongoing randomized trial. We will present the protocol for this trial, including the rationale for game and study design changes informed by the pilot trial, and early data on recruitment processes and challenges. Finally, we will discuss future plans and options for achieving successful commercialization of this product.

FUNDING: Federal; Other

SYM6-2

DEVELOPMENT OF A DIGITAL INTERVENTION TO REDUCE SECOND-HAND SMOKE EXPOSURE DURING PREGNANCY

Yael Bar Zeev, MD, MPH, PhD, Maya Rodnay, Anne-laure Guri-Sherman, Yehuda Neumark. The Hebrew University of Jerusalem.

Significance: Rates of second-hand smoke [SHS] exposure are high, reported by 32.8% of non-smoking Israeli women. Reducing SHS exposure during pregnancy could have a significant impact on maternal and infant health. Previous interventions were conducted mainly in low-income countries, were not digital or integrated within healthcare. Most focused on the pregnant women, and included either self-report measures, or home air-monitoring. Methods: Qualitative interviews with: a) women who were pregnant or recently gave birth, and exposed to SHS within the home; b) men who smoke and live with a pregnant partner; were analyzed using general thematic analysis. A behavioral analysis was used to map the pregnant women and her partner's barriers to reducing SHS, and identify relevant intervention functions, and behavior change techniques that could be implemented within a digital intervention. Preliminary feedback from end-users provided initial input for the intervention development. Results: Nighty interviews were conducted: 66 women, and 24 men. Low knowledge on SHS specific harms in pregnancy was evident. For women the cigarette smell was perceived as intrusive; and a strong motivator for change; while men mentioned the smell as a way to assess the woman's exposure. Women talked about an inability to confront partners, feeling it is their responsibility and reporting using personal means of reducing exposure; while men reported feeling a strong responsibility for their pregnant partners; stated that they

are "doing the best they can", but emphasized that any changes have to be their own decision. Physical barriers to reducing SHS exposure, such as not having balconies, were mentioned. Based on these barriers, a draft digital intervention was designed including: a) recruitment during waiting periods in antenatal care; b) targeting of both the pregnant women and her partner; c) personalized bio-chemical feedback; d) a gradual personalized plan with choices. Preliminary feedback from 5 end-users was used to refine the first phase of the digital intervention. Conclusion: Formative research and a behavioral analysis informed the initial development of a digital intervention to reducing SHS exposure during pregnancy. The developed intervention will be assessed by experts, and additional end-users. Following iterations, the intervention will be tested for feasibility and acceptability in a clustered randomized control trial within eight prenatal clinics in Israel.

FUNDING: State; Academic Institution

SYM6-3

A CONTINGENCY MANAGEMENT (CM) DIGITAL HEALTH INTERVENTION FOR YOUTH NICOTINE VAPING

Erin A. McClure, PhD, Amanda Palmer. Medical University of South Carolina.

The uptake of nicotine vaping among youth over the past decade has been staggering. Yet, there are no best practice recommendations and work is limited on evaluating treatment interventions to curb youth vaping. Contingency management (CM) delivers incentives (typically financial incentives or vouchers) contingent on objective evidence of behavior. After decades of evidence demonstrating CM's substantial efficacy across substances and populations, there is a pressing need to evaluate CM for youth vaping and overcome barriers to its dissemination. In this presentation, Dr. McClure will discuss the use of a digital health intervention (DynamiCare, Boston MA) for youth vaping cessation, focusing on: 1) acceptability data from a remote pilot trial for youth vaping, 2) open-ended participant responses, and 3) barriers and potential solutions to implementing CM. The trial enrolled participants (N=27; 20±1.2 years old; 67% Female; 89% White; 15% Hispanic/Latinx) who were vaping nicotine regularly (29±4.3 days out of the past 30) from across the US. Participants were randomized 4:1 to CM (n=22) or monitoring control (n=5) delivered via a mobile app. Efficacy data (abstinent cotinine samples across treatment: CM=55% vs. controls=8%) have been published elsewhere (Palmer at al., 2022). Acceptability (strong and moderate responses collapsed) was favorable across groups for use of the app (84%), use of incentives for abstinence (75%) and incentive amount (75% vs. 100% in the control group), and self-efficacy improvements due to app and study-provided content (84%). Quantitative and open-ended feedback yielded opportunities for improvement regarding the oral fluid testing schedule, reminders, content provided through the app, preparation for the quit attempt, ease of video chat platforms and other remote procedures. Other lessons learned involve: 1) the detection of abstinence through oral fluid, and 2) incentive amounts needed to achieve abstinence. Contingency management is a highly efficacious behavioral intervention to promote abstinence from substances but has failed to be widely implemented, though policy, payment, and access obstacles are showing objective progress. The development and sustainability of a remote CM digital intervention appears feasible, acceptable under federal policy, and reimbursable and may be a critical advancement in addressing vaping.

FUNDING: Federal; Academic Institution

SYM6-4

CLICK CITY®: TOBACCO - A SMOKING AND VAPING PREVENTION PROGRAM

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Introduction: While the prevalence of smoking has decreased among youth, the prevalence of vaping has recently increased dramatically, greatly exceeding that of cigarette use. The increased prevalence of vaping among youth, the health effects of vaping, and the increased probability that adolescents will become addicted to nicotine through vaping provide support for the crucial need for the incorporation of vaping into tobacco prevention programs targeting youth. Within this Phase II SBIR project, we integrated content targeting risk factors predictive of vaping into an existing effective school-based tobacco prevention program. Click City®: Tobacco is designed for implementation in the 5th grade, with a booster in 6th grade, prior to the onset of tobacco use for most youth. Advantages of the program include: delivered online with fidelity of implementation, requires little teacher training time, allows students to work independently, and encourages student engagement through interactive activities and affect-producing games. Objectives: Our goals were to: 1) Develop additional content that specifically targets risk factors/mechanisms predictive of e-cig use to integrate into existing activities that previously targeted only conventional tobacco use; and 2) Update the programming to increase marketability by expanding the range of devices on which the program can be delivered, simplify the student user interface, and provide more robust teacher/administrator functionality; and 3) Conduct a randomized trial within 44 schools to assess: a) the effectiveness of the revised program on changing youth's intentions and willingness to vape and to smoke; and b) the logistics of implementing the program in the school setting. Method: We recruited and randomized 44 schools in two states, Arizona (AZ, 26 schools) and Oregon (OR, 18). We stopped the trial due to COVID-19 with completed data collected from 26 schools (16 AZ, 10 OR.; 1013 students in AZ, 424 in OR). We analyzed data using a mixed model analysis of variance with students nested within schools. Results: Click City®: Tobacco changed risk factors in the expected direction with small to medium effect sizes. The study continued in 2022 (analyses in progress). Discussion: Based on promising results, we are currently marketing Click City®: Tobacco to state and county health departments and schools districts across the United States.

FUNDING: Federal

SYM6-5

AN INNOVATIVE READILY SCALABLE VAPING CESSATION INTERVENTION FOR YOUNG ADULTS– THE RISE STUDY

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There remains a critical need to develop effective vaping cessation interventions for young adults (YA) that can be quickly disseminated with broad reach. The Research and Innovation to Stop E-cigarette (EC) use among YAs (RISE) study developed an innovative cessation program for YAs 18-24 who are exclusive EC users, that is being evaluated in an RCT. The vaping cessation program includes two coaching calls, nicotine replacement therapy (NRT) and an mHealth program. The mHealth program consists of automated, tailored text messaging using natural language processing, delivering links to TikTok-style vlogs with personas modeling quit processes, animations, podcasts, and assessments. Personas were designed to include underserved and disparate groups such as LGBTQ, Black and rural YA. The intervention was developed and built using state quitline (QL) systems to allow for rapid and seamless dissemination and post-study maintenance. Methods: RCT participants were recruited in the U.S. through social media (Facebook and Instagram). Following a baseline survey, all participants received a 2-call coaching program and were randomized to 1 of 4 groups (2x2 design): combo NRT (patch plus gum/lozenge; yes vs. no) and mHealth (yes vs. no). Outcomes are being collected through Dec. 2022. Results: As of July 2022, 6,289 completed online eligibility screening, two-thirds were ineligible due to dual use of other tobacco products (49%) or not using ECs at least 15 of past 30 days (17%). The study sample (n=417) was 72% female, 63% 21-24 years of age, and primarily Caucasian (77%), Black (12%), Asian (6.2%) with few of Hispanic ethnicity (7%). Most reported alcohol (80.4%) or cannabis use (59%) in the past month and 52% scored positive on a 2-item scale for generalized anxiety (GAD-2). Nearly all used ECs daily (97%) and most used disposable devices (63%). Nearly all reported medium (38%) or high (50%) nicotine dependence on the Penn State EC Dependence Index. Most had made a previous vaping quit attempt (89%), with 25% attempting to quit 5 or more times; 20% reported previous use of NRT to quit ECs. Discussion: There is high demand and need among YAs for evidence-based vaping cessation programs that can be quickly offered to the general population. If effective, the RISE intervention can be disseminated through state funded QLs. Future iterations should include content for multi-product users (tobacco/EC/cannabis/alcohol) and tailored for those with high anxiety.

FUNDING: Nonprofit grant funding entity

SYM7

KEY RESEARCH FINDINGS FROM THE ADVANCING SCIENCE AND PRACTICE IN THE RETAIL ENVIRONMENT (ASPIRE) CONSORTIUM

Maggie Mahoney. Katmai Government Services, CDC Office on Smoking and Health.

The overall goal of the NCI-funded multi-site Center, Advancing Science and Practice in the Retail Environment (ASPiRE) is to build a rigorous, scientific evidence base for effective tobacco control in the retail environment to reduce the public health burdens of tobacco use, including tobacco-related cancers and tobacco-related disparities. The retail environment – comprised of the built environment (retailer quantity and location) and consumer environment (product placement, promotion, and prices at point of sale) is a critical component of comprehensive tobacco control. Retail, where 98% of cigarettes are purchased, has been the dominant marketing channel for tobacco products

in the United States since 1988. The concentration of tobacco retail stores in specific areas (i.e., tobacco retailer density) contributes to higher tobacco use and exacerbates use disparities through increased exposure to tobacco marketing, access to cheaper products, and establishing tobacco-use norms. This session will feature presentations from researchers at the three universities that are part of ASPiRE: Stanford University, the University of North Carolina at Chapel Hill, and Washington University in St. Louis.

SYM7-1

TOBACCO RETAILER DENSITY AS A RISK FACTOR FOR SMOKING: A LONGITUDINAL ANALYSIS OF 195 LARGE POPULOUS COUNTIES BETWEEN 2006-2010

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Background: Several localities in the United States, including San Francisco and Philadelphia, have implemented policies to reduce the number of locations that sell tobacco. Previous research finds that places with a higher concentration of tobacco retailers also have higher smoking prevalence, providing potential scientific evidence in support of these policies. Changes in the retailer environment over time, however, provide the opportunity to conduct longitudinal analyses and better understand the extent to changes in density might be driving subsequent changes in smoking prevalence. Methods: Using a national longitudinal business list, we identified likely tobacco retailers between 2000-2017, and calculated two annual measures of county-level tobacco retailer density based on the numbers of retailers per 1,000 population and the number of retailers per square mile. We then matched a subsample of the tobacco retailer density measures with estimates of county smoking prevalence for 195 counties for which estimates were consistently available between 2006-2010 from the Selected Metropolitan/Micropolitan Area Risk Trends of BRFSS (SMART BRFSS) dataset. We analyzed dynamic panel models of the associations of each county tobacco retailer density measure with smoking prevalence, controlling for lag measures of tobacco retailer density and other county demographics. Results: Nationwide, the number of tobacco retailers increased from 317,492 in 2000 to 356,074 in 2017, with a peak in 2009 of 412,536. Between 2006-2010, a 10% annual increase in the numbers of retailers in a county per 1,000 population was associated with a 1.8 percentage point increase in the current smoking prevalence in the 195 analyzed counties ($p<0.01$). In the same sample, a 10% annual increase in the number of retailers per county land area was associated with a 0.3 percentage point increase in the current smoking prevalence ($p<0.01$). Conclusion: Longitudinal analyses confirm the findings of previous cross-sectional work, suggesting that the concentration of tobacco retailers may be an important risk factor for population level smoking. This study strengthens the evidence base in support of policies designed to limit the number of places that people can purchase tobacco in their counties.

FUNDING: Federal

SYM7-2

TOBACCO RETAILER DENSITY AND BIRTH OUTCOMES IN THE UNITED STATES: 2000-2016

Chris Baggett[1], David Richardson[2], Jacqueline Rudolph[3], Tzy-Mey Kuo[1], Amanda Kong[4], Shelley Golden[1]. [1]UNC Gillings School of Global Public Health, [2]University of California, Irvine, [3]Johns Hopkins School of Public Health, [4]University of Oklahoma Health Sciences Center.

Background: While significant progress has been made in reducing maternal exposure to tobacco smoke and subsequent adverse birth outcomes, further reductions may require strategies that reduce the availability of tobacco retailers. Purpose: In this study, we investigated the relationship between tobacco retailer density and birth outcomes across the United States (U.S.) and predicted the potential impact of a tobacco retailer density cap on these outcomes. Methods: Annual U.S. county rates of preterm birth, low birth weight, small-for-gestational-age, all-cause infant mortality and Sudden Infant Death Syndrome (SIDS) for the years 2000-2016 were calculated based on linked birth-death certificate data from the National Vital Statistics System. Tobacco retailers were identified from the National Establishment Time-Series Database. County-level tobacco retailer density was calculated as the number of retailers per 1,000 population and dichotomized as above or below a cap of 1.4 retailers per 1,000 people (50th percentile). We sought to estimate the effect of a capping intervention to reduce tobacco retailer density below 1.4 retailers per 1,000 on rates of the birth outcomes, where the target population was those counties where retailer density exceeded this cap. To estimate the intervention effect and control for confounders, such as county demographics and air pollution, we used Poisson regression, weighted by inverse odds of exposure weights. Results: Tobacco retailer density was positively associated with most adverse birth outcomes. A significant, persistent positive association between preterm birth rate and retailer density was observed (RR=1.07; 95%CI=1.01, 1.13). In contrast, SIDS mortality was only weakly and not consistently associated with retailer density (RR=1.23; 95%CI=0.26, 2.22). Counties with retailer density above the cap of 1.4 had 3.58-10.04 more preterm births and 0.47-1.91 more all-cause infant deaths per 1,000 births annually than counties below the cap. Conclusion: We found significant positive associations between tobacco retailer density and annual rates of several birth outcomes over 17 years. Higher rates of preterm birth, low birth weight, small-for-gestational-age, and all-cause infant mortality were seen in counties with high tobacco retailer density compared to those with low density. These results provide further support for regulating tobacco retail density to reduce adverse health outcomes associated with tobacco use.

FUNDING: Federal

SYM7-3

ARE TOBACCO RETAILERS SPATIALLY CLUSTERED NEAR SCHOOLS? EVIDENCE FROM 30 ASPIRE CITIES

Lisa Henriksen, PhD[1], Dennis Sun[2], Monica Vishwakarma[3], Amanda Recinos[4], Rong Lu[3], Yuhan Liu[3], Santosh Gummmidipundi[3], Manisha Desai[3], Nina Schleicher[3]. [1]Stanford Prevention Research Ctr, Dept of Medicine, [2]Statistics Department, California Poly San Luis Obispo, [3]Stanford University School of Medicine, [4]GreenInfo Network.

Background: Nearly half of US teens (ages 13-16) attend school within 1000 feet of at least one tobacco retailer. Greater availability of tobacco and exposure to retail marketing predict initiation of cigarettes, other tobacco products, and e-cigarettes. The tobacco industry claims that retailers of all kinds, including those that sell tobacco, locate near people who locate near schools. This is the first study to test whether tobacco retailers cluster near schools, more so than would be predicted by location in tracts with higher population density, as the industry hypothesized. The study draws on data from 30 major US cities. At the start of the study, 27 cities were members of the Big Cities Health Coalition, two cities were added for representation in the southeast (Memphis, TN, and New Orleans, LA), and Providence, RI, was added for early adoption of novel retail policies. Methods: We identified tobacco retailers using data from state or local licensing in 27 of the 30 ASPiRE cities and obtained data from commercial sources for three cities following previously established methods. We obtained existing boundary shapefiles for public K-12 schools (n=2,222) in eight cities and created shapefiles for public schools (n=6,682) in cities where these did not exist. We geocoded all tobacco retailers (n= 39,416), then computed their proximity to school boundaries (Euclidean distance). For each city, a Python script created 100 simulated distributions of tobacco retailers in census tracts in proportion to population. To test for spatial clustering, we modified Ripley's k statistic to assume that stores locate in proportion to population density rather than at random. Results: Across the 30 ASPiRE cities, 33% of tobacco retailers were located within 1000 feet (approximately 0.2 miles) of a school, ranging from 12% in Atlanta to 70% in New York. Across the four ASPiRE cities in Texas, at least 50% of tobacco retailers were located within 0.5 miles of public schools. Spatial clustering near schools was evident in the four Texas cities, particularly at 0.25 miles from schools in Houston and 0.5 miles from schools in San Antonio. Results will describe evidence of clustering for other ASPiRE cities. Conclusions: Contrary to the industry's claim, evidence suggests that tobacco retailers cluster near schools in some ASPiRE cities. Notably, spatial clustering was evident at distances greater than 500-1000 feet, thresholds typically specified in restrictions to prohibit tobacco sales near schools. Evidence of spatial clustering of tobacco retailers near schools could better inform state and local laws that limit where retailers can sell tobacco. Future research should test for disparities in clustering by comparing schools by student enrollment data and Title 1 status.

FUNDING: Federal

SYM7-4

PERCEIVED HELPFULNESS OF TOBACCO CONTROL POLICIES FOR SUPPORTING CESSATION: A SURVEY IN 30 CITIES ACROSS THE US WITH ADULTS WHO SMOKE DAILY

Judith J. Prochaska[1], Rong Lu[2], Yuhan Liu[3], Nina Schleicher[2], Trent Johnson[1], Amy Chieng[1], Erin Vogel[1], Ilana Raskind[4], Geoff Fong[5], Lisa Henriksen[4]. [1]Stanford Prevention Research Ctr, Dept of Medicine, [2]Stanford Prevention Research Center, Dept of Medicine, Stanford University, [3]Stanford University, [4]Stanford Prevention Research Center, Dept of Medicine, [5]University of Waterloo.

Background: Tobacco control policies aim to reduce smoking prevalence by preventing initiation and encouraging cessation. With baseline data from the ASPiRE 30 City Study

of adults who smoke daily, we examined perceived helpfulness of tobacco control policies for supporting cessation.Sample: Adults (age 21-59) smoking daily (target n=80 per city) were recruited via Qualtrics and Craigslist from 12/5/2019–3/3/2020. The analytic sample (N=2497, 54.3% female, 60.2% non-Hispanic white, age M=38.8 SD=10.1) averaged 12.4 cigarettes/day (SD=8.1); 77.5% smoked within 30 min of waking. Desire to quit smoking averaged 6.6 (SD=2.6, max=10); 44.7% smoked menthol-only; 55.1% vaped nicotine in the past month. Methods: Respondents rated six policies as very unhelpful (1), unhelpful (2), helpful (3), or very helpful (4) in encouraging people to quit smoking, averaged into a policy helpfulness index (alpha=0.87). Accounting for nesting in cities, GEE models examined perceived policy helpfulness as a function of respondents' tobacco use and policies of their city, adjusting for respondent demographic variables and recruitment source. Results: Most perceived the policies as helpful or very helpful for cessation: keeping cigarettes out of view in stores (54.2%), ending price discounts (51.3%), reducing tobacco retailers by half (58.3%), restricting sales to tobacco only stores (60.6%), ending menthol in 5 years (55.2%), and ending cigarette sales in 5 years (57.9%); policy index M=2.59, SD=0.80. In the GEE model, a higher policy index related to being younger, non-Hispanic white (v. multiracial), heterosexual, and less cigarette dependent; higher income; recruitment via Qualtrics; past-month nicotine vaping; and greater desire to quit smoking. Perceived policy helpfulness was unrelated to gender, employment, and menthol use. City of residence accounted for little variation in perceived policy helpfulness (ICC=0.034), and none of the city-level policy variables (cigarette excise tax, flavor policy score, preemption of retail licensing and smokefree air laws) were predictive in the model. Conclusions: Among 2497 adults in 30 US cities who smoke daily, a majority perceived the six policies as helpful for cessation with little city variation. Lower dependence, greater desire to quit, and vaping nicotine were associated with greater perceived helpfulness. Older age, lower income, and identifying as multiracial or LGBTQ were associated with lower perceived helpfulness.

FUNDING: Federal

SYM7-5

SHAPING THE BUILT ENVIRONMENT FOR TOBACCO TO REDUCE RETAILER DENSITY AND RESIDENT-TO-RETAILER PROXIMITY IN 30 BIG US CITIES

Todd Combs[1], Joseph Ornstein[2], Veronica Chaitan[1], Shelley Golden[3], Lisa Henriksen[4], Doug Luke[1]. [1]Washington University in St Louis, [2]University of Georgia, [3]UNC Gillings School of Global Public Health, [4]Stanford Prevention Research Center, Dept of Medicine.

Background: Combining geospatial data on residential and retailer density in 30 big US cities, we find that a large majority of urban residents live in tobacco swamps – neighborhoods with a glut of tobacco retailers. Several cities have recently implemented retailer reduction policies. More evidence is needed on how they impact both tobacco retailer density and resident-to-retailer proximity. Methods: We simulate the effects of tobacco retail reduction policies and compare probable changes in resident-to-retailer proximity and retailer density for each of the 30 cities. The cities are part of a larger research program on tobacco retail policies and their impact. We simulated the impact of three types of policies: tobacco retailer licensing caps, school-to-retailer buffers, and retailer-to-retailer buffers. For the impact of these policies, we measured 1) changes to the percentage of residents who lived with 500m, 1km, 1500m, and 2km of a tobacco retailer from the baseline measures, and 2) changes to tobacco retailer density (retailers per km2). Results: For the license caps, we found a non-linear relationship between the percentage of retailers removed and the decrease in the percentage of residents living near retailers. We also found greater impact of the license caps in communities who had relatively low resident-to-retailer proximity at baseline. School-to-retailer buffers decreased the percentage of residents living near retailers more in cities with higher baseline proximity measures and less in those with lower starting values. The retailer-to-retailer buffers had a small impact across all cities. For tobacco retailer density, however, retailer-to-retailer buffers had some of the largest effects across all cities, and the school-to-retailer buffers were most effective in high baseline retailer density cities. Conclusion: We found that context is important when estimating the impact of retailer reduction policies, for proximity and density measures. We also found that identical policies affected resident-to-retailer proximity and tobacco retailer density in very different ways. Several implications for science and practice include 1) the importance of simulation studies in tobacco retailer reduction policies to add to the evidence base, especially until more evaluation evidence is available, and 2) that policymakers should be familiar with measures of both proximity and density to help set achievable goals and implement strong policies.

FUNDING: Federal

SYM7-6

RETAIL TOBACCO POLICY EFFORTS AND IMPLEMENTATION BARRIERS IN THE UNITED STATES: INSIGHTS FROM PRACTITIONERS IN 30 BIG US CITIES

Stephanie Anderson[1], Laura Brossert[1], Todd Combs[1], Jennifer Cofer[2], Doug Luke[1]. [1]Washington University in St Louis, [2]MD Anderson Comprehensive Cancer Center.

BackgroundWith varying levels of progress on traditional tobacco control measures, i.e., excise taxes and smoke-free laws, interest continues to grow in policies focused on the tobacco retail environment at the local level. However, barriers to tobacco retail policy implementation at the local level persist, including preemption or lack of local legislative control. Here, we examine policy activity in 30 big US cities along with barriers and facilitators to policy progress. Methods: We conducted 30 semi-structured interviews with local tobacco control practitioners in 2019 and again in 2022. Questions included the level of priority placed on retail tobacco policy, progress on 22 specific policies, and barriers and facilitators to policy progress. We calculated standardized Retail Policy Activity Scores (RPAS) for each city with a possible range of 0-100, and categorized cities as Low-, Moderate-, or High-activity. We then examined qualitative results overall and by policy activity level at the two time points. Results: Despite cities having placed a high priority on retail policy, progress among cities has been slow. The mean RPAS was 16.5 (range = 0-56) in 2019; this number rose slightly by 2022 (mean = 18.3, range = 0-57). Lack of political will, industry activity, preemption, and enforcement challenges were frequently reported barriers across both time points. By 2022, COVID-19 had also presented a significant barrier to policy development, implementation, enforcement, and evaluation. Low-activity cities encountered the lion's share of barriers at the policy development stages, especially where preemption continued to strongly hinder retail policy efforts. High-activity cities ran into challenges most often in enforcement and evaluation. Despite these obstacles, respondents reported that both local and national partners helped to facilitate progress. Conclusion: More research and evaluation data, including case studies and success stories from localities where policies have been implemented, is needed to build support for retail tobacco policy in cities that struggle to begin or sustain progress. Preemption and lack of political will continue to thwart policy efforts. Even in cities with high levels of retail policy, more resources and coordination for enforcement are needed. Like in much of the public sector, COVID-19 derailed progress in local retail tobacco control, and steps to mitigate repeating this in the future should be taken.

FUNDING: Federal

SYM9

KEEPING UP WITH SOCIAL MEDIA: CUTTING-EDGE METHODS TO ANALYZE SOCIAL MEDIA TO INFORM TOBACCO CONTROL

Grace Kong. Juhan Lee, PhD. Yale School of Medicine.

Tobacco promotion is prolific on social media, and social media data are complex and voluminous, which makes data analysis challenging. However, methods to analyze complex data such as social media data are evolving. This symposium presents a variety of cutting-edge novel methods to analyze data from different social media platforms (e.g., YouTube, TikTok, Instagram, Twitter) to understand pro-tobacco trends to inform tobacco control efforts. First, Dr. Grace Kong will present background information on the types of tobacco promotional activities that are occurring on social media platforms and research gaps. Second, Mr. Ben Pretzer and Dr. Juhan Lee will present how BERT topic modeling is used to identify various themes related to e-cigarettes on TikTok. Third, Dr. Dhiraj Murthy will present how k-means clustering, classification (Graph Convolutional Networks (GCN) and network analysis are used to identify how e-cigarette content is tailored to user characteristics such as age and gender on YouTube. Fourth, Drs. Chris Kennedy and Julia Vassey will present deep learning object detection methods for automated analysis of visual posts on Instagram and TikTok to identify e-cigarette products on these platforms. Fifth, Dr. Alex Kresovich will present findings on measures to identify social media influencers promoting little cigars and cigarillos on Twitter and the impact of such tobacco influencers on social media users' attitudes and behavioral intentions related to tobacco use. Finally, Dr. Sherry Emery (Discussant) will lead a discussion of the four presentations and the potential for the application of the methods used in these studies to fill the research gaps in understanding tobacco promotion on social media and the implications for tobacco control.

SYM9-1

IDENTIFYING E-CIGARETTE CONTENT ON TIKTOK: USING BERT TOPIC MODELING APPROACH

Juhan Lee, PhD. Yale School of Medicine.

Background: E-cigarette content on social media is abundant. However, there is limited understanding of the e-cigarette content that exists on TikTok, which is one of the most frequently used social media platforms by young people. Due to the voluminous amount and complexity of data on TikTok, this study aimed to use the initiative machine learning approach (i.e., Bidirectional Encoder Representations from Transformers [BERT] topic modeling) to identify the e-cigarette content that exists on TikTok. Methods: We used an unsupervised machine learning technique, BERTopic modeling, which is based on Google's neural network-based technique that uses natural language processing pre-training to identify the most common e-cigarette topical themes on TikTok. We used 14 unique hashtags related to e-cigarettes (e.g., #vape, #vapelife, #vapenation) for data collection and analyzed 13,573 posts. BERT models were fine-tuned through an iterative corpus-pruning process involving tobacco research experts, in which non-relevant keywords were removed from the dataset. Topics were cross-referenced to determine the most frequently occurring topics and qualitatively labeled by two reviewers. Results: We identified 20 common topics, including vape shop/brand names (n=10; e.g., "marina", "aspire", "elf", "bar"), vape tricks (n=5; "ghost", "inhale", "chaser", "jellyfish"), non-e-cigarette related but style seen on TikTok (n=1; e.g., "comedy", "joke", "sketch", "meme"), concealing/using vape device in airport (n=1; (e.g., "airport", "security", "bottle"), smoking cessation (n=1; e.g., "quit", "addiction", "stop"), delta-8 THC (n=1; e.g., delta 8 vape brands), "mods" (n=1; e.g., "coil", "build", "shell", "wire", "wick"). Conclusions: We used a state-of-the-art unsupervised neural machine learning method, BERTopic to successfully identify relevant themes from TikTok. Concerningly, predominant topics related to e-cigarettes on TikTok included names of e-cigarette brands and stores, themes that appeal to youth such as vape tricks, and other themes not suitable for youth such as how to conceal/use e-cigarettes in airports and delta-8 THC products. Comprehensive regulation is needed on social media platforms to prevent youth access to this content.

FUNDING: Federal

SYM9-2

EFFECTS OF USER PROFILE ATTRIBUTES ON E-CIGARETTE-RELATED SEARCHES ON YOUTUBE: MACHINE LEARNING CLUSTERING AND CLASSIFICATION

Dhiraj Murthy, PhD. University of Texas at Austin.

Background: The proliferation of e-cigarette content on YouTube is concerning because of its possible effect on youth use behaviors. YouTube has a personalized search and recommendation algorithm that derives attributes from a user's profile such as age and gender. However, little is known on whether e-cigarette content is shown differently based on user characteristics. Methods: We created 16 fictitious YouTube profiles by age 16 and 24 years old, gender (female, male), and ethnicity/race to search for 18 e-cigarette related search terms. We used unsupervised and supervised machine learning (k-means clustering and classification (Graph Convolutional Networks (GCN)) and network theory to characterize the variation in search results of each profile. We further examined whether user attributes may play a role in e-cigarette related content exposure using networks and degree centrality. Results: We included 4,201 non-duplicate videos. Our k-means clustering suggests that the videos can be clustered into three categories. The Graph Convolutional Network achieved high accuracy (0.72). Videos are classified based on content into 4 categories: Product Review (49.3%), Health Info (15.1%), Instruction (26.9%), Other (8.5%). Underage users were exposed most to "instruction" videos (37.5%), with some indication that more female 16 year old profiles were more exposed to this content, while older age groups (24 years old) were most exposed to "product review" videos (39.2%). Conclusions: Our results indicate that demographic attributes factor into YouTube's algorithmic systems in the context of e-cigarette-related queries on YouTube. Specifically, differences in age and gender attributes of user profiles do result in variance in both the videos presented in YouTube search results as well as the types of these videos. We find that underage profiles were exposed to e-cigarette content despite YouTube's age-restriction policy that ostensibly prohibits certain e-cigarette content. Greater enforcement of policies to restrict youth access to e-cigarette content is needed.

FUNDING: Federal

SYM9-3

SCALABLE IDENTIFICATION OF E-CIGARETTE PRODUCTS IN INSTAGRAM AND TIKTOK VIDEOS USING COMPUTER VISION

Julia Vassey. University of Southern California, Oakland.

Background: Exposure to promotional content featuring e-cigarette products is associated with adolescent e-cigarette use. Instagram and TikTok, video-based social media platforms popular among adolescents, have been inundated with e-cigarette-related content posted by influencers - e.g., models, bloggers, brand ambassadors. Prior research has identified themes in visual social media e-cigarette-related promotional posts using qualitative content analysis. Applying advanced computational methods to conduct automated content analysis could be a valuable methodological contribution to tobacco control research. This is the first study to apply deep learning methods to identify multiple e-cigarette products in promotional videos posted by influencers on Instagram and TikTok. Methods: A training sample of 2,505 Instagram images featuring influencers promoting e-cigarette products was collected between 2019 and 2022 and labeled in the V7 Labs annotation application. A research assistant annotated the images for five classes, marking them with bounding boxes: mods, pods; disposable devices, e-juice containers, packaging boxes, and smoke clouds. Two researchers reviewed the preliminary labels to ensure consistency. We then trained a VarifocalNet object detector with a ResNeXt-101 pretrained backbone model using the MMDetection computer vision framework. We evaluated the model's performance on a validation set of 20 e-cigarette-related, 30-second-long videos from Instagram and TikTok, which were annotated at 5 frames per second. Results: 96.9% of the 1,509 validation set annotated video frames contained e-cigarette-related objects. Of these, 100% were successfully detected by the model as containing e-cigarette-related objects. For the remaining frames, 100% were correctly identified by the model as having no relevant objects. The class-specific mean absolute errors for correct object counts were: 0.25 mods, 0.32 pods; disposables, 0.12 e-juice bottles, 0.11 boxes, and 0.54 smoke clouds. Conclusions: Deep learning object detection provides automated analysis of visual posts of big data-scale sample sizes, offering timesaving compared to labor-intensive human coding. The deep learning model assessed on the short social media e-cigarette-related promotional videos can be used as a base model to detect the presence of e-cigarettes and other tobacco products in a large number of long-form videos (e.g., movies), providing valuable data for tobacco control and regulation.

FUNDING: Federal

SYM9-4

SOCIAL MEDIA INFLUENCERS IN THE PUBLIC HEALTH SPACE: HOW DO WE MEASURE AN INFLUENCER'S INFLUENCE?

Alex Kresovich, PhD. NORC at University of Chicago.

Significance: Numerous studies have established a causal link between tobacco product marketing and tobacco use. However, mechanisms for comprehensive regulation of tobacco promotion on social media have not been established. The issue is highly complicated because paid advertising accounts for only a fraction of product promotion on social media. In April 2019, FDA banned paid digital product marketing and influencer promotion of newly introduced tobacco products (such as IQOS heated tobacco brand), but digital and influencer advertising of other tobacco products, including little cigars and cigarillos (LCCs), continues to be unregulated. A significant challenge to enforcing a prohibition on influencer promotion of tobacco products is that few influencers disclose their relationship with brands. Further, influencer payment is challenging to trace and ranges across various incentives, including monetary compensation and free or discounted products or merchandise. Without explicit indications of influencer status, we must rely on other metrics. Audience size has been used as a proxy but may be insufficient to indicate status as a social media influencer about niche topics, such as tobacco use. Methods: 128 keywords were used to retrieve over 47 million tweets that likely contained LCC content from 08/2016 through 10/2021 (relevance classifier composite F-score = 0.88). We constructed seven measures of social media influence, including H-index and retweet and mentions network measures of in-degree, out-degree, and betweenness centrality. We compared the top 100 accounts measured by H-index and network measures with traditional influencer metrics within time period (retweet count, follower count, tweet count, number of mentions). Results: While there was some overlap between lists of top influencers identified by different measures, significant differences in lists surfaced specific topics and audiences. H-index and network measures required significant computational resources to construct. Conclusion: Our findings provide the theoretical and methodological foundations to address the three core elements of tobacco influencer marketing: 1.) how to detect general and specific

tobacco influencers on social media; 2.) how to assess the effects of tobacco influencers on audience attitudes and behavioral intentions; 3.) how to measure the impact of tobacco influencers at scale.

FUNDING: Federal

SYM10

SUBSTITUTABILITY OF ALTERNATIVE PRODUCTS AMONG SMOKERS: EXAMINING THE IMPACT OF ACCESSIBILITY AND APPEAL

Theodore Wagener. The Ohio State University.

This symposium will take a translational approach in summarizing evidence on the impact of alternative products and their potential regulations on abuse liability, use behaviors, and preferences among adult smokers and young adult non-users. The symposium places an emphasis on vulnerable populations by focusing on non-Hispanic Black smokers and young adult non-users. From a human laboratory study of the comparative abuse liability of cigarettes, e-cigarettes, and heated tobacco products (HTPs) among non-Hispanic Black and White smokers, the first presentation finds that while cigarette use resulted in significantly greater nicotine delivery, participants reported similar reductions in craving and withdrawal across products. Moreover, the three products were rated similarly on the majority of subjective effects measures. These findings indicate that e-cigarettes and HTPs may approximate the reinforcement profile of cigarettes and could be viable alternatives to combustible cigarettes. From a behavioral economics choice task, the second presentation compares subjective and behavioral preferences for an e-cigarette and HTP relative to smokers' own cigarettes in Black and White smokers. Findings suggest that for smokers who are unable or unwilling to quit, decreasing the access or appeal of cigarettes may encourage a switch to alternative nicotine delivery products like e-cigarettes and HTPs, which offer a possibility for harm reduction. Using an e-cigarette purchase task, the third presentation examines how adult smokers and young adult tobacco non-users respond to e-cigarette price increases after viewing e-cigarette advertisements. Results show that adult smokers are more likely to continue purchasing e-cigarette puffs as the price increases compared to young adult tobacco non-users, suggesting that price increases would not affect adult smoker choices, but may be beneficial to dissuade young adults from purchasing the product even after viewing e-cigarette advertisements. Collectively, findings suggest that potentially reduced harm alternative products are viable substitutes for cigarettes among current smokers, smokers are willing to make a switch to these products as barriers are enacted that make cigarettes more difficult to access, and adult smokers may be willing to pay a higher price for e-cigarettes, which reduces the appeal for young adult non-users. The symposium will focus on the policy implications of the studies individually and collectively.

SYM10-1

ABUSE LIABILITY OF E-CIGARETTES AND HEATED TOBACCO PRODUCTS COMPARED TO COMBUSTIBLE CIGARETTES AMONG AFRICAN AMERICAN AND WHITE SMOKERS

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Introduction: While over half of smokers attempt to quit smoking each year, fewer than 10% are successful. For smokers who are unable to quit, alternative products such as e-cigarettes (ECs) and heated tobacco products (HTPs) may serve as potential options for harm reduction. For this to be true, ECs and HTPs must be as appealing and deliver nicotine as effectively as cigarettes. Use of these products has proliferated among white smokers, yet little is known about the acceptability of ECs and HTPs among African American smokers who bear a disproportionate burden of smoking-related morbidity and mortality. Methods: Twenty-two smokers (AA (n = 12) and white (n = 10)) completed a standardized 10-puff bout followed by a 60-minute ad libitum use assessment with their usual brand cigarette, a JUUL EC, and an IQOS HTP. Visits were completed in a semi-randomized crossover design. Assessments included plasma nicotine concentration (baseline, 5, 7, 15, 60 min.), changes in craving and withdrawal, behavioral intentions, and subjective effects. Measures were compared across products. Results: While all products resulted in significant increases in nicotine delivery, cigarettes resulted in significantly greater nicotine concentrations at all timepoints compared to both the EC and HTP. Cigarette craving and nicotine withdrawal were reduced during the 10-puff bout and ad libitum sessions for all products and did not differ significantly by product ($p > .10$). Combustible cigarettes were rated as significantly more pleasurable and satisfying compared to HTPs ($p < .05$) but not ECs. The three products were rated similarly on the other eight measures of subjective effects ($p > .05$). Participants reported greater behavioral intentions for cigarette use compared to HTP ($p < .05$) but not EC. Discussion: All products delivered significant levels of nicotine. While combustible cigarette use resulted in significantly greater nicotine delivery, participants reported similar reductions in craving and withdrawal across products, indicating that the EC and HTP products may approximate the reinforcement profile of combustible cigarettes, despite reduced nicotine exposure. The three products were rated similarly on the majority of subjective effect measures, which may indicate ECs and HTPs could be viable alternatives to combustible cigarettes.

FUNDING: Federal

SYM10-2

PREFERENCE AND SUBSTITUTABILITY OF E-CIGARETTES AND HEATED TOBACCO PRODUCTS FOR CIGARETTES AMONG AFRICAN AMERICAN AND WHITE SMOKERS

Olivia Funk, MPH[1], Nicole Nollen[1], Theodore Wagener[2], Jasjit Ahluwalia[3], Matthew Mayo[1], Kazi Md Farhad Mahmud[1], Leah Lambart[1], Eleanor Leavens[1]. [1]University of Kansas School of Medicine, [2]The Ohio State University College of Medicine and Comprehensive Cancer Center, [3]Brown University School of Public Health and Alpert Medical School.

Introduction: Alternative nicotine delivery products, including e-cigarettes and heated tobacco products (HTPs), contain fewer toxicants than combustible cigarettes and offer a potential for harm reduction. Despite known smoking-related inequities, few studies of potentially reduced harm products have actively recruited minoritized smokers. This study examined subjective and behavioral preferences for a JUUL e-cigarette and IQOS HTP relative to participants' usual brand cigarette (UBC) in diverse smokers naïve to alternative nicotine delivery products. Methods: Using a semi-randomized crossover design, 21 adult smokers (11 African American, 10 White) completed three separate product use visits including the UBC, e-cigarette, and HTP, during which their subjective preferences were gathered. At the final visit, participants completed a concurrent choice task where they worked to earn puffs. For this task, the UBC was placed on a progressive ratio schedule and the e-cigarette and HTP were placed on a fixed ratio schedule to simulate behavioral preference for the three products as cigarettes became more difficult to earn. The product selected (behavioral preference) was then compared to the product they reported preferring (subjective preference). One participant showed no behavioral preference and was excluded. Results: Most participants had a subjective preference for the UBC (n = 11, 52.4%), followed by an equal subjective preference for the e-cigarette and HTP (n = 5, 23.8%). During the concurrent choice task, participants showed a behavioral preference for the e-cigarette (n = 9, 42.9%), followed by HTP (n = 8, 38.1%) and UBC (n = 4, 19.1%). Moreover, participants allocated a significantly greater number of puffs to the alternative products compared to the UBC (e-cigarette or HTP; $p = .011$). There was poor agreement and a lack of statistically significant concordance ($? = 0.19$, $p = .083$) between participants' subjective and behavioral preferences. Discussion: As policies that limit the availability or appeal of combustible cigarettes are enacted (e.g., removal of menthol, lowering nicotine to minimally or non-addictive levels), the acceptability of alternative nicotine delivery products must be considered. Findings need confirmation in a fully powered switching trial but suggest that African American and White smokers are willing to substitute the UBC for an e-cigarette or HTP when the attainment of cigarettes becomes more difficult.

FUNDING: Federal

SYM10-3

E-CIGARETTE PURCHASE TASK RESPONSES IN YOUNG ADULT TOBACCO NON-USERS AND ADULT SMOKERS

Donghee Lee[1], Jonathan Schulz[2], Andrea Villanti[3], Jessica Liu[4], Brittney Keller-Hamilton[5], Joanne Patterson[6], Amelia Wedel[7], Coralia Vazquez-Otero[8], Elise Stevens[1]. [1]Umass Chan Medical School, [2]2Vermont Center on Behavior and Health, University of Vermont, [3]Rutgers School of Public Health, Rutgers Center for Tobacco Studies, [4]Harvard TH Chan School of Public Health, [5]The Ohio State University College of Medicine, Center for Tobacco Research, [6]The Ohio State University College of Public Health, [7]Syracuse University, [8]The University of Texas at San Antonio.

Introduction: Research has noted a public health need to increase use of e-cigarettes as a tool for smoking cessation without increasing use among youth and non-smokers. E-cigarette price increase could be a way to achieve changes in demand behavior. An e-cigarette purchase task is a behavioral economic task that assesses hypothetical

e-cigarette consumption across escalating prices. In this pilot study, we examined the demand for e-cigarette puffs among young adult tobacco non-users and adult smokers after viewing e-cigarette advertisements (ads) from popular brands. Methods: U.S. young adults (18 to 24 years), who do not use e-cigarettes or smoke cigarettes, and adult cigarette smokers (25 years and older) were recruited via the crowdsourcing platform, Prolific. Participants (N=115) were randomized to view two e-cigarette ads from a pool of 173 ads that had been content analyzed for popular features. After each ad, participants completed purchase tasks to indicate how many puffs of e-cigarettes they would take in 24 hours across a range of 17 different prices for one puff, ranging from "free" to $5 per puff. Results: Overall, there was a difference in demand curves between the two groups. Adult smokers indicated greater demand for e-cigarettes than young adults who do not use e-cigarettes or cigarettes, with higher values for intensity, breakpoint, and Pmax. Conclusions: Results suggest that adult smokers were less sensitive to the price increase than young adult tobacco non-users, even after viewing popular e-cigarette ads. Adult smokers were more likely to continue purchasing e-cigarette puffs as the price increased than young adult tobacco non-users. Findings provide preliminary evidence that increasing e-cigarette prices may dampen e-cigarette purchases among young adult tobacco non-users, without deterring adult smokers from purchasing. More research is needed to understand key behavioral economic motivations that could inform future public health and communication interventions.

FUNDING: Federal

SYM10-4

PSYCHOPHARMACOLOGICAL CORRELATES OF EXCLUSIVE HEATED TOBACCO PRODUCT USE: HOW DO THESE NOVEL NICOTINE DELIVERY DEVICES COMPARE WITH COMBUSTIBLE CIGARETTE OR NICOTINE VAPING PRODUCT USE?

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Aims: We compared psychopharmacological correlates of longer-term (>3 months) exclusive heated tobacco product (HTP) use with exclusive combustible cigarette (CC) or nicotine vaping product (NVP) use. Given limited long-term, industry-independent research on HTPs, assessing their psychopharmacological profile relative to established products (CC/NVP) provides insights into the potential of HTP for harm reduction. Specifically, this study assessed the association of exclusive HTP, CC and NVP use with smoker identity, nicotine intake, withdrawal symptoms, and attitudes towards products. Methods: UK current/past smokers were recruited from three naturally occurring groups - exclusive HTP, CC and NVP users (N=45/46 per group, total N=136, mean age in years=37.1 (SD=13.9), male=66.2%, white=77.2%). Participants provided urine samples analysed for the nicotine metabolite cotinine, completed a questionnaire assessing socio-demographic and smoking characteristics (age started smoking, pack years smoked), smoker identity, product-specific dependence and withdrawal symptoms (mood and physical symptoms), and, for HTP/NVP users only, attitudes towards products. Results: In analysis adjusting for socio-demographic and smoking characteristics, smoker identity was similarly pronounced for HTP and CC users and for both stronger than for NVP users (Wald ?2=11.6 and ?2=21.1, respectively; p<0.001). Groups did not differ in cotinine levels, product-specific dependence (time to first product use and product cravings) or withdrawal symptoms. While HTP users exhibited similar levels of cigarette-specific cravings to NVP users, for both these were significantly lower than for CC users (Wald ?2=21.0 and 31.9, respectively; p<0.001). HTP and NVP users reported similar levels of perceived product satisfaction, efficacy for smoking cessation and safety (compared with cigarettes). Yet, product addictiveness relative to CC was rated higher for HTP than NVP (Wald ?2=6.2, p=0.012). Conclusions: The psychopharmacological profile of HTP was in between that of NVP and CC, indicative of a more limited harm reduction potential for HTP than NVP. HTP and NVP users had comparable product dependence and nicotine intake, product use seemed equally effective in controlling cigarette cravings and withdrawal symptoms and was perceived as equally safe, satisfying and helpful for smoking cessation. However, compared with NVP use, HTP use was associated with maintenance of a stronger smoker identity and perceived addiction, which may undermine long-term cessation of any nicotine-containing products.

FUNDING: Nonprofit grant funding entity

SYM11

HELPING YOUTH QUIT - BUILDING THE EVIDENCE BASE ON PROMISING PRACTICES

Brenna VanFrank. Centers for Disease Control and Prevention.

With an estimated 6.6 million U.S. middle and high school students currently using tobacco products in 2021, youth use of commercial tobacco remains an urgent public health concern in the United States. While most youth report wanting to quit using tobacco products, and most have tried to quit, the evidence for how to help youth stop using tobacco remains sparse. Clinical guidelines, such as those from the U.S. Preventive Services Task Force, acknowledge this lack of evidence but encourage healthcare professionals to use clinical judgement when deciding how to help youth quit. In this symposium, presenters will explore the current state of youth tobacco cessation and promising practices and interventions to support youth in quitting tobacco use. Current epidemiologic measures of youth tobacco cessation intentions, attempts, and clinical interventions, including disparities in these measures, will be presented using data from the 2021 National Youth Tobacco Survey. Promising clinical practices and cessation interventions will be discussed, including new clinical tools from the American Academy of Pediatrics, a new youth-focused quitline intervention from Optum, and an adolescent-specific text-based vaping cessation program from the Truth Initiative. Youth cessation interventions in school settings will additionally be explored with presentation of a pilot middle and high school-based multidisciplinary cessation intervention using project ECHO in Kansas. ECHO (Extension for Community Healthcare Outcomes) utilizes technology to increase professionals' access to health care education and case-based best practices, particularly in underserved and remote areas. Presenters discussing these interventions will additionally address strategies to advance health equity by reaching and intervening with specific subpopulations of youth who experience tobacco-related disparities. Finally, the presenters and discussant will explore gaps in the current evidence base and share their perspectives on how the field can move forward to better support youth cessation.

SYM11-1

CLINICAL TOBACCO INTERVENTIONS DURING VISITS TO HEALTHCARE PROVIDERS AMONG U.S. MIDDLE AND HIGH SCHOOL STUDENTS – NATIONAL YOUTH TOBACCO SURVEY, 2021

Ahmed Jamal, MBBS, MPH, Andrea Gentzke, Brenna VanFrank. Centers for Disease Control and Prevention.

Significance: The U.S. Public Health Service (PHS) Clinical Practice Guideline for Treating Tobacco Use and Dependence recommends that clinicians ask pediatric and adolescent patients about tobacco use and provide a strong message regarding the importance of abstaining from any tobacco use. Methods: Data came from the 2021 National Youth Tobacco Survey (NYTS), a nationally representative survey of U.S. middle school (MS) and high school (HS) students (n=20,413; response rate: 44.6%). Students who visited a healthcare provider (HCP) during the past 12 months (n=17,195) reported if they (1) were asked if they used cigarettes; e-cigarettes; or other tobacco products; and (2) received advice not to use cigarettes; e-cigarettes; or other tobacco products. Weighted prevalence estimates with 95% confidence intervals (CI) were generated. Multivariable adjusted prevalence ratios (aPR) were assessed by sociodemographic characteristics for each outcome. Results: Among students who reported a HCP visit, 42.1% (95% CI: 39.0-45.2) were screened for any tobacco product use (by product type, cigarettes: 35.4%; e-cigarettes: 29.6%; other tobacco products: 22.2%); 44.7% (95% CI: 42.2-47.3) were advised not to use "any" tobacco product (cigarettes: 38.9%; e-cigarettes: 33.8%; other tobacco products: 29.6%). Screening for any tobacco product use was higher among HS students (aPR=1.79, 95% CI: 1.64-1.96; vs. MS), and those reporting severe psychological distress (aPR=1.11, 95% CI: 1.04-1.17; vs. none). Students of non-Hispanic Black (aPR=0.85, 95% CI: 0.77-0.93), Hispanic (aPR=0.83, 95% CI: 0.75-0.93) and non-Hispanic other race (aPR=0.85, 95% CI: 0.75-0.98) were less likely to report screening for any tobacco product use (vs. non-Hispanic White). Receiving advice not to use any tobacco product was higher among HS students (aPR=1.15, 95 CI: 1.07-1.23; vs. MS), male students (aPR=1.20, 95% CI: 1.15-1.25; vs. female), and students of middle (aPR=1.08, 95% CI: 1.02-1.15) or high (aPR=1.13, 95% CI: 1.04-1.22) family affluence (vs. low); Hispanic students (aPR=0.88, 95% CI: 0.80-0.96; vs. non-Hispanic White) were less likely to report receiving HCP's advice not to use any tobacco product. Conclusions: In 2021, less than half of students who visited a HCP reported being screened for or receiving advice against the use of any tobacco product. These findings can be used by researchers and healthcare providers to track and work toward improving adherence to the PHS guideline.

FUNDING: Federal

SYM11-2

HELPING CLINICIANS ACT ON YOUTH TOBACCO CESSATION

Julie Gorzkowski, MSW, LSW, Leticia Brown. American Academy of Pediatrics.

Tobacco product use among youth is an urgent clinical concern; youth e-cigarette use is an epidemic and youth use other tobacco products at troubling rates. Youth are uniquely vulnerable to nicotine dependence and clinical visits are an important opportunity to intervene. Although the US Preventive Services Task Force concluded insufficient evidence to assess the efficacy of primary care interventions for youth cessation, their corresponding practice considerations acknowledged that clinicians should "use clinical judgment to decide how to best help youth who use tobacco". Clinicians need support in identifying youth who use tobacco products and helping them quit, especially given the evolving landscape of tobacco products. To address key knowledge gaps and aid in clinical decision making, the American Academy of Pediatrics (AAP), in collaboration with CDC Office on Smoking and Health, convened experts in substance use treatment, behavioral health, and adolescent development to create a cessation resource for pediatric health clinicians. The resource, "Youth Cessation: Considerations for Clinicians" introduces the "Ask-Counsel-Treat" (ACT) model. The model addresses: 1) "Ask," with tips on effective screening for different types of tobacco products 2) "Counsel," with strategies for counseling about quitting; and 3) "Treat," with tips on connecting patients with behavioral supports and considerations for determining whether nicotine replacement therapy (NRT) may be appropriate for patients. Companion materials include a comprehensive list of available behavioral supports for quick referral, as well as a one-pager on the how to optimize the EHR for addressing youth cessation. The resource is available at www.aap.org/cessation. The ACT Model is designed to prepare clinicians to identify adolescent use, support quitting, and connect patients with appropriate behavioral and pharmacological tools to support a successful quit. The resource was published in July 2021 with 33,377 unique visits from 17,347 unique users from July 2021-July 2022. Most-used features include the overview of the ACT Module (accessed by 52% of users), directory of behavioral supports for youth (accessed by 19% of users), and guide to NRT in adolescent patients (accessed by 15% of users).

FUNDING: Federal

SYM11-3

TEEN TOBACCO AND NICOTINE QUIT SERVICES: NOT YOUR GRANDFATHER'S QUITLINE

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Despite drops in youth e-cigarette use rates from a high of 28% in 2019 to 11% in 2021, teen vaping remains a public health problem. Past tobacco control campaigns directed at youth were focused on prevention and while new research is emerging, little is known about youth cessation.Quitlines are an effective and accessible public health approach for adult cessation. While Quitlines have adapted services for youth, traditional telephonic coaching does not appeal to teens who prefer digital communication such as texting. Quitline enrollment data bears this out: In 2021 youth were only 0.2% of quitline enrollments nationwide. Optum, quitline vendor for 23 publicly funded quitlines, developed a new youth-centric approach to tobacco and vaping cessation. The new program, Live Vape Free, was piloted starting in September 2021 and consists of an online course for adults and a tailored text-based mHealth program for teens. The online course uses video and interactive content to prepare adults to have productive conversations with their teens about vaping prevention and cessation. The teen program uses automated text messaging to deliver links to TikTok-like vlogs, educational animations, quizzes, podcasts and other engaging content. The five personas represented in the vlogs reflect a range of demographics to engage high risk groups including LGBTQ, Black and rural teens. Overall, the content guides teens to build a quit plan, get ready for the quit date and learn skills needed to stay quit.Data collected during the pilot phase included engagement, quit info, demographics, and member self-efficacy. 717 teens sent in an initial text. Of these 62% (450) met eligibility requirements (age, zip code). 72% (326) completed enrollment, 74% (245) set a quit date via text, 86% (283) engaged with text dialogues and live links. 93% (264) of enrollees responded to at least one text message. Of the engaged teens, 99 unique users clicked links embedded in a text; there were 163 links clicked for an average of 3.9 visits to linked content. On average engaged teens watched 3.42 videos and spent 7 min 22 secs viewing online content. The pilot identified technical bugs and informed design improvements. We were able to increase enrollment from about 60% to 72% by streamlining enrollment and fixing eligibility design flaws. The pilot demonstrated that once enrolled, teens engaged in a text-based mHealth program and those who opened links had repeat visits.

FUNDING: Unfunded

SYM11-4

PAYING IT FORWARD: HOW TEENS HELP OTHER TEENS QUIT VAPING THROUGH THE NATION'S LARGEST QUIT VAPING PROGRAM

Megan A. Jacobs, MPH, Sarah Cha, Michael S. Amato, Giselle Edwards, Amanda L. Graham. Truth Initiative.

In January 2019, the non-profit public health foundation, Truth Initiative, nationally launched the first program designed to help teens (13-17yo) and young adults (YA; 18-24yo) quit vaping: This is Quitting (TIQ). It is grounded in best practices from smoking cessation research, adapted to the unique qualities of young e-cigarette users based on extensive formative research. As of August 2022, over 475,000 teens and young adults have enrolled in TIQ (Teen: 173,703; YA: 299,302). A randomized trial of TIQ among n=2,600 YA demonstrated its effectiveness in promoting abstinence at 7-month follow-up compared to control (OR=1.39; 95%CI, 1.15-1.68; P < .001), with equivalent effects across subpopulations who typically experience health disparities (e.g., sexual/gender minorities and those experiencing mental health challenges).Messages are interactive and tailored by age, device type, and enrollment date/quit date. Keywords provide on-demand access to more messages for coping with cravings/withdrawal ("COPE"), relapse ("SLIP"), stress ("STRESS"), general quitting advice ("TIPS"), or extra inspiration ("FEELS"). A defining feature of TIQ is that all messages are written in first person, most of which have been submitted by other enrollees – especially the on-demand support messages. This presentation focuses on analysis and practical implementation of messages submitted by teens. We analyzed n=429 submissions and the on-demand support types requested by teens (n=13,126) between January-August 2022 to explore the relationship between messages teen TIQ users submit and what they request from the program. Themes among messages submitted by teens are FEELS (34%), COPE (31%), TIPS (18%), STRESS (6%) and SLIP (3%), whereas themes of messages requested by teens are COPE (24%), STRESS (21%), SLIP (13%), TIPS (4%) and FEELS (2%). In this session, examples of teen submissions in each category will be shared, as well as demonstrated examples of how submissions are implemented both within TIQ and in program promotion. Attendees will gain insights into 1) opportunities to bolster education and confidence in coping strategies and 2) leverage the social support provision of motivation/inspiration by teens to inform cessation program development and effective ways to promote quit vaping resources.

SYM11-5

EVALUATION OF A PILOT ECHO PROJECT TO ADDRESS YOUTH E-CIGARETTE USE IN KANSAS

Babalola Faseru, MD, MPH[1], Hina Shah[2], Eleanor Leavens[1], Mark Thompson[3]. [1]University of Kansas Medical Center, [2]Kansas Health Institute, [3]Kansas State Department of Education.

The doubling of the rate of current use of e-cigarettes from 2017 to 2019 among youth in Kansas signaled a critical need for a concerted effort to develop the capacity of school staff to address this significant public health concern. The consequences of e-cigarette use on learning and students' wellbeing are multifaceted and warrant an innovative approach to equip multidisciplinary school staff with the knowledge and the resources to address e-cigarette use collaboratively and equitably. We adapted the Extension for Community Healthcare Outcomes (ECHO) model and developed the first "Vaping ECHO for Education" to engage multidisciplinary school teams in a learning collaborative and disseminate best practices for addressing e-cigarette use in Kansas Middle and High schools. Using a quasi-experimental pretest posttest design, we selected pilot school teams based on geography/location (rural/urban), socioeconomic profile (percent free/reduced lunch), racial ethnic composition, and the composition of the multidisciplinary team to ensure diversity of schools and participants. The project included 1) pre-training evaluation 2) primary training components (i.e., kickoff summit, web-based resource toolkit, seven biweekly ECHO sessions) 3) an implementation action plan developed by the school teams to address e-cigarette use in their schools, and 4) post-training evaluation. A total of 20 school teams (11 High School, 5 Jr./Sr. High School, 4 Middle School; 4 Urban, 4 Semi-Urban, 5 Densely settled Rural, 4 Rural, 3 Frontier) out of 49 that applied were selected. Each team included up to five members (e.g., teachers, school nurses, counselors, social workers, athletic trainers, health teachers, coaches, administrators, and student resource officers). One hundred and twenty-two participants registered and took the pre-training evaluation and 70 completed the post-training evaluation. Eighty three percent of respondents reported over 25% of the knowledge gained was new. Fifty seven percent learned from cases presented by other teams always or most of the time and 53% learned from all or most action plans presented by other teams. Seventy three percent found the toolkit somewhat or very useful. Seventeen out of the

20 school teams submitted action plans. Overall, 60% of school teams indicated they met most or all of their action plans. In conclusion, the ECHO model is an effective platform for disseminating evidence-based strategies to multidisciplinary school staff.

FUNDING: Unfunded

SYM12

HEALTH EQUITY PERSPECTIVES ON POLYSUBSTANCE USE WITH TOBACCO

LaTrice Montgomery. University of Cincinnati.

The co-occurring use of tobacco and other substances is a significant public health problem that warrants urgent attention. This symposium will highlight research on the prevalence, correlates and treatment implications of using tobacco and other substances, especially among underrepresented populations who experience disparities related to polysubstance use. First, Mr. Morris will present findings from published news reports and peer-reviewed articles on individuals, especially those living in rural areas, who use vapes containing opioids. Ms. Liu will present data from an online regional survey assessing the prevalence and correlates of tobacco and cannabis co-use among New England adolescents and adults who vape. Dr. Jacobs will present findings from a pooled analysis of epidemiologic data from the National Survey on Drug Use and Health on the association of human capital factors and tobacco and cannabis co-use among Black adolescents. Ms. Lambart will present research on the relationship between tobacco and cannabis co-use and cessation among Black adults enrolled in a cigarette cessation trial. Dr. Cottrell-Daniels will provide a synthesis of findings from the panelists and emphasize the importance of addressing polysubstance use to advance health equity in tobacco prevention and control.

SYM12-1

VAPING OPIOIDS: SHOULD WE BE WORRIED?

James D. Morris[1], Kinsey Pebley[2], Melissa Little[3]. [1]The University of Memphis, [2]Medical University of South Carolina, [3]University of Virginia.

Significance: The use of e-cigarettes or vapes has increased substantially among youth and young adults. Those living in rural areas are at a greater risk of using tobacco products and experiencing increased morbidity and mortality from tobacco use. While there is a growing body of research that examines vaping cannabis and THC, studies have not examined vaping other substances, such as opioids. Thus, little is known about the prevalence of vaping opioids, especially in historically high-risk areas for tobacco use, such as rural communities. Methods: The current study reviewed published news reports and peer-reviewed articles discussing individuals using vapes containing opioids. LexisNexis, PsychInfo and Google were searched using seven key terms or phrases to identify relevant news media: youth, young adults, vaping, e-cigarettes, opioids, heroin, fentanyl. Each article was coded on six characteristics by two independent reviewers: substance, setting of incident (home, school, city/state/country), age of individual, outcome (e.g., overdose, death), and news source (e.g., local, national). Results: Of the 24 articles found (n = 22 local news articles and n = 2 published case reports), 80% discussed vaping fentanyl, 10% discussed heroin, and 20% discussed both. The majority, (60%) involved school aged youth, 20% involved adults ages 25 - 36, and 20% did not describe the age of the users. Additionally, 60% of the incidents involving school-aged children occurred within their schools during the school day. The reported incidents happened in various regions across the United States (CA, CO, WV, TN, CT, PA) and internationally (i.e., Canada, Poland). There was a mixture between rural and urban areas reporting incidents. Three of the articles with identifiable locations reported on incidents occurring within rural areas, while seven articles reported on incidents occurring in urban areas. Discussion: Results suggested that youth are using opioids in vapes with severe adverse health consequences, and that this phenomenon is occurring in both urban and rural regions. This presentation will make recommendations for future surveillance systems to monitor this health risk behavior, a necessary first step in providing adequate and appropriate care to individuals in need of services. These systems will be particularly important in rural regions, given the historically elevated rates of tobacco and other substance use and inadequate access to healthcare resources.

FUNDING: State

SYM12-2

PREVALENCE OF DUAL-USE OF NICOTINE AND CANNABIS VAPING PRODUCTS AMONG YOUTH AND ADULTS IN FIVE NEW ENGLAND STATES

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Significance: Current measures of vaping behaviors do not distinguish what substances participants are vaping and to what extent users are dual-using nicotine and cannabis vaping products. This study describes the use of new survey questions that more specifically ask whether participants who vape are vaping nicotine, cannabis, CBD, or another substance. Methods: Adolescents and adults from Massachusetts, New Hampshire, Vermont, Connecticut, and Rhode Island participated in an online survey from April 2021 to July 2022. Participants who vaped were asked, "Have you used any of the following vape substances in the past 30 days?" with the possible responses of nicotine, cannabis, CBD, other, and "don't know." Dual-use of both nicotine and cannabis was defined as the vaping of both nicotine and cannabis and/or CBD in the past 30 days, operationalized as a dichotomous outcome. Data were collected in monthly, repeated cross-sectional waves for both adults and adolescents (with some participants responding to the survey for more than one month). Univariate logistic generalized estimating equation models were run to determine the sociodemographic characteristics of dual-use for both adolescents and adults. Results: The analytic sample included 1746 adolescents who provided 1893 responses (mean age 15.1 years, 47% female, 73.9% White) and 1473 adults who were current tobacco users and provided 1990 responses (mean age 45.1 years, 61.1% female, 85% White). Of adolescents, 7.2% had dual-used in the past 30 days (38.9% among those who currently vaped), and adolescents who were non-White ($p<0.001$), non-Hispanic ($p=0.013$), or had parents who had completed a Bachelor's degree or higher ($p<0.001$) had lower odds of dual-use. Of adults who are current tobacco users, 24.6% had dual-used in the past 30 days (41.8% among those who currently vaped), and adults who were non-White ($p<0.001$), non-Hispanic ($p=0.018$), identified as not-heterosexual ($p<0.001$), and had an income of greater than $50K ($p=0.019$) had higher odds of dual-use. Discussion: Our findings show that a sizable proportion of a sample of New England adolescents and adults who currently vape are dual-using nicotine and cannabis. Our study addresses a key gap in adequate survey measures for assessing the vaping of multiple substances and can help in better screening for and characterizing health disparities around dual-use.

FUNDING: Federal

SYM12-3

THE ROLE OF HUMAN CAPITAL DEVELOPMENT AMONG US BLACK ADOLESCENT TOBACCO AND CANNABIS USERS

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Significance: Although studies show that Black adolescents have lower rates of tobacco and cannabis use (TCU) compared to their White counterparts, by their late 30s, Blacks' levels of TCU are higher than other racial/ethnic groups. Subsequently, Black adults experience higher rates of lung cancer, cardiovascular and other life-threatening diseases. To better understand the contributions of broader social determinants to TCU among Black youth, this study examined the association between three human capital domains (cognitive development, social and emotional development, health –physical and mental) and exclusive and concurrent TCU among Black adolescents. Methods: Publicly available data for Black adolescents ages 12 to 17 (N = 9017) in the National Survey on Drug Use and Health (NSDUH) 2015-2019 were analyzed. Bivariate logistic regression analyses were conducted to assess annual prevalence change in 12-month single and concurrent TCU. Adjusted regression models examined demographic trends and the influence of human capital domains: cognitive development, social and emotional development, health) on exclusive and concurrent TCU. Results: From 2015 to 2019, prevalence of 12-month tobacco and cannabis use among Black adolescents remained stable at below 7.6% and 13.6%, respectively, without statistically significant changes. Meanwhile, the prevalence of concurrent TCU decreased significantly from 9.2% to 5.6% (OR=0.89, $P<0.01$). Compared to Black youth with lower investment in cognitive development, greater investment in cognitive development significantly decreased the likelihood that adolescents had used tobacco (AOR=0.58, $P<0.001$), cannabis (AOR=0.64, $P<0.001$), and co-use (AOR=0.58, $P<0.001$). Similarly, higher social and emotional development was associated with lower odds of tobacco use (AOR=0.86, $P<0.001$), cannabis use (AOR=0.83, $P<0.001$), and co-use (AOR=0.81, $P<0.001$). Good overall physical health was significantly associated with decreased likelihood of tobacco

(AOR=0.52, P<0.001), cannabis (AOR=0.63, P<0.001), and co-use (AOR=0.54, P<0.05). Poor mental health increased odds of reporting cannabis use (AOR=1.62, P<0.001). Discussion: Overall, findings indicate investments in cognitive, social and emotional development, and health among Black youth is protective against TCU. Ongoing and consistent efforts to sustain human capital development among Black adolescents throughout the life course may contribute to reducing TCU disparities in adulthood.

FUNDING: Federal

SYM12-4

IMPACT OF BLUNT USE ON ABSTINENCE AMONG AFRICAN AMERICAN DAILY SMOKERS IN A SMOKING CESSATION CLINICAL TRIAL

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Significance: Cigarette and cannabis co-use is common in a subset of tobacco users. Blunts, a rolled tobacco product containing marijuana, may present a unique challenge for smokers trying to quit. This secondary analysis looked at the relationship of co-use and cessation among people enrolled in a cigarette cessation trial. Methods: 500 African American daily smokers were randomized to varenicline (VAR, n=300) or placebo (PBO, n=200) for 12 weeks, along with culturally-relevant smoking cessation counseling. Participants were asked about their past 7-day blunt use at baseline, weeks 4, 8, 12, 16, and 26 and dichotomized into ever (blunt use reported at any timepoint) versus never blunt users (no blunt use reported during the study). Outcome was salivary cotinine-verified 7-day point prevalence smoking abstinence at Weeks 12 (secondary) and 26 (primary). Logistic regression examined the effects of treatment and blunt use on quit status. Results: 75 people (32 female, 43 male) reported blunt use. Blunt users were significantly younger than never blunt users [45.6 years (SD= 12.5) versus 53.1 years (SD=11.0), p<0.001]. There were no other differences between blunt and never blunt users. Blunt users smoked 10.4 (SD=5.2) cigarettes per day (CPD) and 4.2 (SD=12.5) blunts per week at baseline. The majority had some college or a college degree (54.7%), were employed full- or part-time (61.3%), but had low income ($29,410 mean household income). The logistic regression showed no treatment by blunt use interaction or significant main effect of blunt use on weeks 12 or 26 abstinence (p > 0.05). After adjusting for the effect of treatment, those who used blunts had statistically similar odds of quitting as those who never used blunts at Week 12 (OR: 0.68, 95% CI: 0.31, 1.5) and Week 26 (OR: 0.84, 95% CI: 0.38, 1.87). Overall, 10.7% and 10.7% of blunt users were quit at Weeks 12 and 26, respectively versus 14.6% and 12.2% of never blunt users. Mean blunt use decreased to 2.5 (SD=8.9) blunts per week at Week 12 but returned to baseline levels (mean=4.2, SD=13.9) by Week 26. Conclusion: Cigarette and blunt co-use did not negatively impact cessation among participants in a smoking cessation clinical trial. Research is needed to examine the full spectrum of tobacco/cannabis co-use. To further understand the implications of co-use among smokers actively trying to stop smoking, prospective studies are needed.

FUNDING: Federal

SYM13

ACCESS TO APPROVED AND UNAPPROVED NICOTINE PRODUCTS AND SMOKING CESSATION SUPPORT FOR GENERAL AND PRIORITY POPULATIONS: POLICY AND CLINICAL PRACTICE IMPLICATIONS

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Smoking continues to be a leading contributor to disease burden worldwide. Smoking also contributes to health inequalities leading to the shortened life expectancy of high-risk groups such as people with mental illness and substance use disorders. Unassisted quitting has a very low success rate of 3-5% in the general population and almost 0% in many high-risk groups, hence the need for support. Effective smoking cessation treatment includes supply of pharmacotherapy (more than doubles the quit success compared with placebo) with behavioural counselling (increases success by another 10-20%). The much slower decline in smoking among high-risk groups indicates that smoking cessation efforts at the general population level are not effectively addressing tobacco-related disparities. Reduced provision and use of pharmacotherapies such as nicotine replacement therapy (NRT) contribute to the lower cessation rates. Combination NRT is best practice for high nicotine dependence, coupling sustained release nicotine patches, with fast-acting products providing an immediate effect, such as nicotine gum or inhalators. More recently, emerging evidence suggests that Nicotine Vaping Products (NVPs) are at least as effective as NRT for smoking cessation, safer than continued smoking and a preferred option for high-risk groups. However, legal access to NVPs in Australia requires a medical prescription. A change in regulations in October 2021 provided a streamlined process by which Australians with a medical prescription can access NVPs that meet a quality standard (without being an approved medicine). This globally unique model is intended to prevent youth uptake of NVPs while allowing supply to adults who wish to use them for smoking cessation. This selection of presentations will provide critical information on the use of nicotine products and other smoking cessation support in the general community and within high-risk groups. A diverse range of qualitative and quantitative research methods (including population modelling techniques, qualitative interviews and clinical trials) will be presented to provide a complete picture of the value and use of approved and unapproved nicotine products with and without other smoking cessation support. It also examines the benefits and limitations of the Australian model of prescription only access to NVPs and considers the potential impacts of applying this model to a country that currently has more liberal access to NVPs (NZ).

SYM13-1

QUITLINK: OUTCOMES OF A RANDOMIZED CONTROLLED TRIAL OF PEER WORKER FACILITATED QUITLINE SUPPORT FOR PEOPLE RECEIVING MENTAL HEALTH SERVICES

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Background: Given the significant mortality gap for people who smoke and experience mental illness, accessible effective tobacco treatment is needed. Quitlink aimed to enhance existing Quitline services by adding dedicated counsellors trained in a specialised intervention for people with mental illness. Methods: The Quitlink trial used a prospective, cluster randomized, open, blinded endpoint (PROBE) design to compare standard smoking care against the Quitlink intervention. Peer workers (people with a lived experience of mental ill-health and recovery) facilitated recruitment and provided standard smoking care (brief advice and print resources). Participants smoked 10+ cigarettes a day (CPD) and accessed treatment/support from mental health/AOD services. The intervention included: standard smoking care plus proactive referral to quitline with a dedicated counsellor for each participant and up to eight weeks of combination NRT. Assessments were completed at 2, 5 and 8 months post baseline. The primary outcome was self-reported 6 months sustained smoking abstinence with no relapse since the end of treatment at 8-month follow-up. We aimed to recruit 382 participants. Results: 109 participants completed baseline assessment and were randomised. About half were female, average age was approximately 45 years and most received a disability support benefit. On average, participants smoked around 20 CPD at baseline. Most had a diagnosis of a psychotic disorder. At the 2-month follow-up there were significant differences in the odds of 7-day point prevalence abstinence between the Quitlink (11/49, 22.4%) and standard smoking care (2/50, 4%) conditions (OR=8.06, 1.27-51.00; p=0.03). There was a large but non-significant difference in self-reported prolonged abstinence at 8-month follow-up between the Quitlink (6/37, 16%) and standard smoking care (1/47, 2.1%) conditions (OR=9.04, 0.57-144.29; p=0.12, n=91). Socioeconomic disadvantage, psychological distress, heavy smoking, cannabis use and hazardous drinking were common. Conclusion: Although underpowered due to the impact of COVID-19 on recruitment, the clinically significant benefit of the Quitlink intervention for smoking cessation for people experiencing mental illness is important. The differences in smoking rates between standard care and intervention was as predicted and indicated clinical benefit from the intervention.

FUNDING: Federal; Academic Institution

SYM13-2

PERCEPTIONS OF NICOTINE PRODUCTS FOR TOBACCO SMOKING CESSATION FOLLOWING DISCHARGE FROM ALCOHOL AND OTHER DRUG RESIDENTIAL WITHDRAWAL SERVICES: A QUALITATIVE ANALYSIS

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Introduction: Tobacco smoking is highly prevalent among alcohol and other drug (AOD) service clients in Australia (77%). Despite clients' interest in quitting smoking and nicotine replacement therapy, abstinence is infrequently sustained post-discharge. Vaporised nicotine products (VNP) are an alternative means of managing nicotine withdrawal after discharge from residential smoke-free clinical sites, which we are currently trialling. This study examined AOD service clients' experiences of combination nicotine replacement therapy (NRT) or VNP for smoking cessation post-discharge.Method: We interviewed a subset (n=31) of residential service users from the NEAT clinical trial (n=367), who used 12-week combination NRT or VNP with Quitline access for smoking abstinence post-discharge from a residential AOD withdrawal service. Participants aged =18 years who smoked tobacco and had not used a VNP in the past month described their health and social changes, tobacco cravings, nicotine use, Quitline experience, and barriers and facilitators to combination NRT or VNP for smoking cessation. We inductively analysed interview transcripts for salient themes. Results: Combination NRT and VNP were feasible and acceptable for smoking cessation. Combination NRT was useful for managing nicotine cravings, with inhalators having potential to address smoking behaviour. VNP use was viewed as effective for smoking cessation and managing cravings post-discharge, with some drawbacks for VNP (e.g., taste) and combination NRT (e.g., behavioural preferences). Quitline services received mixed support, as participants could access support via AOD counselling. Conclusion: Using nicotine products for smoking cessation was considered generally acceptable by AOD service clients. Accessing suitable nicotine products for VNP use beyond the trial was a barrier to sustained abstinence.

FUNDING: Federal; Academic Institution

SYM13-3

HEALTH PRACTITIONER EXPERIENCES OF AUSTRALIA'S PRESCRIPTION-ONLY REGULATORY MODEL OF NICOTINE VAPING PRODUCTS: A QUALITATIVE STUDY

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Introduction: Until recently nicotine vaping products (NVPs) were not permitted to be sold in Australia. In October 2021, Australia's Therapeutic Goods Association (TGA) introduced a unique regulatory model that allowed pharmacies to supply nicotine vaping products (NVPs) if they meet a quality standard (TGO110). Pharmacies can only supply NVPs in pre-manufactured form if they are prescribed by a medical practitioner who is an Authorised Prescriber or via the Special Access Scheme. However, Australians can personally import NVPs or have the product extemporaneously compounded when prescribed by any medical practitioner. This project explored health practitioners' experiences related to smoking cessation and NVPs in the context of this new regulation, and their views on the model. Method: We recruited a diverse sample of Australian health practitioners (doctors, pharmacists, nurses, drug and alcohol counsellors, and other allied health professionals) via professional networks, social media, public databases and websites. Semi-structured interviews that explored knowledge of the regulations, experiences of providing smoking cessation advice since the new regulations, views on the effectiveness of the model, and professional training needs for smoking cessation and NVPs were analysed thematically. Results: Preliminary results from 37 interviews found support for the regulatory intent of reducing youth use, but views were mixed on the role of NVPs for smoking cessation and harm reduction. Concerns included: 1) lack of support for the practicalities of prescribing NVPs, including the appropriate dose and product type; 2) limited availability of NVPs via pharmacies; 3) concerns about supplying unapproved products; 4) lack of NVPs meeting TGA requirements; 5) complexity of the regulations; 6) inadequate time for learning about the regulations and the available products; and 7) easy accessibility of illicit products without a prescription. Conclusion: Overall, while some health practitioners perceived benefits of legal access to NVPs for smoking cessation, many interviewees did not believe the regulations sufficiently addressed product safety or youth access. More resources for health professionals, greater enforcement to prevent illicit NVP sales, and greater availability of TGA-compliant products in pharmacies could help the policy meet its objectives.

FUNDING: Federal; Academic Institution

SYM13-4

MODELLING THE POTENTIAL IMPACTS OF POLICIES LIMITING NICOTINE VAPING PRODUCT SUPPLY TO PHARMACIES OR PRESCRIPTION-ONLY

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Background: In countries such as New Zealand (NZ) with liberal access to nicotine vaping products (NVPs), net health gain may arise from interventions to restrict vaping product sales to pharmacies if these simultaneously reduce youth access to vaping but maintain access for adults who smoke and want to use NVPs as a smoking cessation aid or tobacco-substitute. Methods: This study used two linked simulation models to evaluate interventions restricting access to NVPs by limiting sales to pharmacies or by requiring a General Practitioner's prescription: (i) a Markov model of smoking and vaping; and (ii) a proportional multistate lifetable model. Model parameters were from the literature and an expert knowledge elicitation process. Results: The four modelled interventions that limited NVP sales to pharmacies (with or without quitting support) slowed the rise in vaping but also the decline in smoking prevalence. Consequently, all interventions resulted in a net health loss (up to 56,100 health-adjusted life years, 95% uncertainty interval [UI]: 18,900 to 84,000), increased health expenditure (up to $NZ 415 million, 95% UI 117 to 705) and income loss (up to $NZ 323, 95% UI 92 to 556), throughout the lifetime of the modelled population. In order to off-set the negative impact of the interventions the level of smoking cessation would need to increase by 20% to 40%. Conclusions: In the current NZ context, compared to liberal access to NVPs, standalone interventions to limit access to NVPs without additional interventions to substantially increase smoking cessation would probably cause health and income loss in the population and higher health care system expenditure.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

SYM14

HEATED TOBACCO PRODUCT (HTP) USE IN JAPAN: FINDINGS FROM THE ITC PROJECT ON BIOMARKERS OF EXPOSURE, TRANSITIONS BETWEEN CIGARETTES AND HTPS, INCLUDING ?COMPLETE TRANSITION? FROM CIGARETTES, AND CHANGES IN TOTAL TOBACCO CONSUMPTION

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Introduction: Since heated tobacco products (HTPs) were introduced in Japan by Philip Morris International (PMI) with IQOS in 2016, followed by British American Tobacco's glo and Japan Tobacco International's Ploom TECH in 2017, Japan has been the focus of intensive attention regarding all aspects of HTPs. Sales of cigarettes have fallen significantly, with financial reports that by 2019 HTPs had replaced nearly one-third of cigarettes consumed in Japan. The emergence of HTPs, accompanied by major investment in these products by tobacco companies, have led to an unprecedented need for research evidence from basic science (e.g., toxicant exposure) to population-level studies on the use of HTPs (e.g., patterns of use and transitions of use, notably whether HTPs can help people transition away from smoking). However, most of the evidence about HTPs have come from the tobacco industry rather than from industry-independent sources. Since 2018, the International Tobacco Control Policy Evaluation (ITC) Project has conducted multiple research studies in Japan, including an ongoing annual national cohort survey of smokers, HTP users, dual HTP-cigarette users, and non-users. This symposium will consist of four ITC studies conducted in Japan. Maciej Goniewicz will present biomarker data on the exposure to nicotine and tobacco-related toxicants among smokers, HTP users, dual HTP-cigarette users, and non-users in Japan and among smokers, nicotine vaping product (NVP) users, dual NVP-cigarette users, and non-users in Canada. Shannon Gravely will present a comparison of HTP consumption relative to total tobacco use between ITC Japan data and PMI data. Geoffrey T. Fong will present findings from the ITC Japan Survey on transitions between cigarettes and HTPs across three survey waves. Steve S. Xu will present findings on changes in cigarette and total tobacco (including HTPs) consumption among cigarette-only smokers who did vs. those who did not initiate HTP use between survey waves. Ken Warner will serve as the Discussant.

SYM14-1

USERS OF HEATED TOBACCO PRODUCTS ARE EXPOSED TO LOWER LEVELS OF TOXICANTS COMPARED TO COMBUSTIBLE CIGARETTE SMOKERS, BUT HIGHER THAN USERS OF NICOTINE VAPING PRODUCTS: FINDINGS FROM THE ITC JAPAN-CANADA BIOMARKERS STUDY

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Introduction: This cross-sectional study evaluated Heated Tobacco Product (HTP) users' nicotine and tobacco-related toxicant exposure, vs non-users of nicotine, combustible cigarette smokers, and nicotine vaping product (NVP) users. Methods: The study was conducted September 2018-February 2019 in Japan (where cigarette and HTP use were prevalent) and Canada (where cigarette and NVP use were prevalent). Along with non-users (n=140), five patterns of everyday nicotine use were sampled: (1) NVP only (n=26); (2) HTP only (n=128); (3) Concurrent NVP+cigarette (n=53); (4) Concurrent HTP+cigarette (n=73); and (5) Cigarette only (n=130). Biomarkers of exposure (NNAL, a marker of NNK, and 3HPMA, a marker of acrolein) were measured in urine samples and normalized for urinary creatinine levels; geometric means were compared across user groups. Linear regression results were adjusted for country of residence, sociodemographic variables, and cigarettes per day. Results: HTP-only users had significantly higher concentration of biomarkers compared to non-users, e.g., NNAL 0.03 v. 33.89 pg/mg creatinine (p<0.001) and 3HPMA 546.1 v. 805.9 ng/mg (p=0.003). HTP-only users had significantly lower concentrations of most biomarkers compared to cigarette-only smokers, e.g., NNAL 33.89 vs. 175.43 pg/mg (p<0.001) and 3HPMA 805.88 vs. 1229.17 ng/mg (p<0.001), although exposure to nicotine did not differ significantly (p= 0.234). HTP-only users had significantly higher concentrations of biomarkers compared to NVP-only users, e.g., NNAL 33.89 vs. 0.17 pg/mg (p<0.001) and 3HPMA 805.9 vs. 457.5 ng/mg (p=0.011). No significant differences in nicotine exposure were observed among concurrent HTP+cigarette users compared to cigarette-only smokers. Concurrent HTP+cigarette users showed lower concentrations of biomarkers compared to cigarette-only users, e.g., NNAL 41.5 vs. 175.4 ng/mg (p=0.002) and 3HPMA 889.7 vs. 1229.2 pg/mg (p=0.016). Conclusions: Among a sample of Japanese and Canadian nicotine users, exposure to tobacco-related toxicants was lower among HTP-only users than cigarette-only smokers, but for certain tobacco-related toxicants was higher than for NVP-only users. Results were consistent with prior industry-funded studies; however, the comparison of HTP and NVP concurrent use groups is a new contribution to the literature.

FUNDING: Unfunded; Federal; State

SYM14-2

AN EXAMINATION OF PHILIP MORRIS INTERNATIONAL'S ESTIMATE OF IQOS USERS WHO HAVE "COMPLETELY TRANSITIONED" FROM CIGARETTES: FINDINGS FROM THE 2018 ITC JAPAN SURVEY

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Significance: In quarterly presentations to shareholders, Philip Morris International (PMI) has consistently highlighted one statistic from its IQOS User Survey: that over 2/3 of IQOS users have "completely transitioned" from cigarette smoking to IQOS use, defined as those for whom IQOS accounts for at least 95% of total tobacco consumption. This study conducted analyses from the 2018 ITC Japan Survey to assess PMI's 2018 statement that 67% of IQOS users had "completely transitioned" from cigarettes. Methods: Data came from 614 regular HTP users (>=weekly and used >=100 HTP sticks/lifetime; IQOS n=412; other HTPs (BAT's glo and JTI's Ploom TECH, n=202)) in the 2018 ITC Japan Survey, a national web cohort survey of tobacco/nicotine users. For each respondent (current smokers, n=507; ex-smokers, n=107), tobacco consumption per day (TPD) was the sum of self-reported cigarettes smoked per day (CPD) and heat sticks consumed per day (HPD). The key measure for each respondent was the percentage of total tobacco consumption that was accounted for by HTPs: the HPD/TPD ratio. We computed the percentage of HTP users for whom the HPD/TPD was >=95% ("completely transitioned") for two groups: (1) IQOS users; (2) all HTP users (IQOS/Ploom TECH/glo). For each group, we computed the HPD/TPD ratio in two ways: (a) unweighted, and (b) weighted to the sex and age distribution of PMI's IQOS User Survey (Q1 2018, N=1,000), thus aligning our weighted estimates with PMI's own analysis as closely as possible with publicly available information. Results: In the unweighted analysis, 27.4% of IQOS users had "completely transitioned"; in the PMI-ITC weighted analysis, 48.5% of IQOS users had "completely transitioned." Similar results were found for all HTP users (IQOS/glo/Ploom TECH): in the unweighted analysis, 25.1% of HTP users had "completely transitioned"; in the PMI-ITC weighted analysis, 48.3% of HTP users had "completely transitioned."Conclusion: ITC Japan data yielded estimates of HTP users who had completely transitioned from cigarettes that were much lower than PMI's estimate of 67% (subsequent estimates from PMI have been >70%). It is important to note that this cross-sectional study does not address the much more important prospective question: what is the likelihood that a smoker who takes up HTPs will be completely transitioned in the future?

FUNDING: Federal; State

SYM14-3

TRANSITIONS OF TOBACCO PRODUCT USE AMONG EXCLUSIVE SMOKERS, EXCLUSIVE HEATED TOBACCO PRODUCT (HTP) USERS, AND DUAL HTP-CIGARETTE USERS IN JAPAN: INITIAL FINDINGS FROM THREE WAVES OF THE ITC JAPAN COHORT SURVEY (2018-20)

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Significance: Japan has been the epicenter for heated tobacco products (HTPs) since 2016. One key question about HTPs is their association with cigarettes. This study is an initial description of transitions in product use of cigarette-only, HTP-only, and cigarette-HTP dual users in Japan between 2018-19 and 2019-20. Methods: Data are from adult (20+yrs) smokers of the ITC Japan cohort survey who participated in at least 2 consecutive waves of the W1 (Feb-Mar 2018), W2 (Dec 2018-Jan 2019), and W3 (May-Jun 2020) surveys. We created transition tables for W1-W2 and W2-W3, weighting and adjusting by sex and age. The user groups were at least monthly cigarette-only smokers (W1-W2: N=2102; W2-W3: N=1226), at least weekly HTP-only users (W1-W2: N=62; W2-W3: N=564), or duals (W1-W2: N=268; W2-W3: N=646). Among daily smokers, we examined transitions among never HTP users (W1-W2: N=1440; W2-W3: N=731), previous HTP trier but not current user (W1-W2: N=558; W2-W3: 438) and current HTP users (W1-W2: N=260; W2-W3: N=572). Results: Among W1 cig-only smokers, 7.9% were not smoking at W2 (1.8% HTP only+6.1% quit smoking), 22.5% were cig+HTP dual, and 69.7% stayed cig-only. Among W1 cig+HTP dual users, 9.7% were not smoking (6.4% HTP only+3.3% quit all), 71.7% stayed dual, and 18.7% were cig-only (quit HTP). Among W1 HTP-only users, 68.8% were not smoking at W2 (62.8% HTP only+6.0% quit HTPs). W2-W3 transitions were similar: among W2 cig-only smokers, 10.3% were not smoking at W3 (3.3% HTP only+7.0% quit smoking), 12.4% were duals, and 77.3% stayed cig-only. Among W2 duals, 14.0% were not smoking at W3(11.7% HTP only+2.3% quit all), 56.1% stayed duals, and 29.9% were cig-only (quit HTP). Among HTP only users, 60.0% were not smoking at W3(48.1% HTP only+11.9% quit HTP), 34.3% were duals, and 5.7% were cig-only. Transitions among daily smokers showed minor differences in next-wave rates (W1-W2/W2-W3) of not smoking among never HTP users=6.3%/8.1% (1.9%/2.3% HTP only+4.4%/5.8% quit smoking), previous HTP triers=8.7%/9.0% (1.9%/4.1% HTP only+6.8%/4.9% quit smoking), and current HTP users (duals)=9.0%/10.9% (5.6%/9.2% HTP only+3.4%/1.7% quit all). Conclusion: These initial transition tables are a starting point for more rigorous analyses on HTP use and smoking cessation that will address biases such as the effects of length-biased sampling of HTP users, which lead to disproportionately greater inclusion of "treatment failures" and lesser of "treatment successes" at baseline.

FUNDING: Federal; State

SYM14-4

CHANGES IN CIGARETTE AND TOTAL TOBACCO CONSUMPTION AMONG SMOKERS WHO DID AND DID NOT INITIATE HEATED TOBACCO PRODUCTS: FINDINGS FROM THE 2018-2019 ITC JAPAN SURVEYS

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Significance: Since heated tobacco products (HTPs) were launched nationally in Japan in 2016, there has been a substantial reduction in cigarette consumption. This study

examined how consumption of cigarettes, HTPs, and total tobacco (cigs+HTPs) changes as exclusive smokers take up HTPs, compared to those who do not, and among those who do, how complete switchers compare to dual users. Methods: Data are from the 2,096 adult (20+ yrs) smokers of the ITC Japan cohort survey who answered both the Wave 1 (W1, Feb-Mar 2018) and Wave 2 (W2, Dec 2018-Jan 2019) surveys. At W1, all respondents were exclusively smoking cigarettes (>=monthly). We assessed their tobacco use at W2 among four groups: exclusive smokers at W2 (S-S; N=1,473), duals at W2: those who continued to smoke but also reported >=weekly HTP use at W2 (S-D; N=482), completely switched from cigarettes to HTPs (S-H; N=41); and quit smoking and did not initiate HTPs (S-Q; N=100). For each respondent at each wave, tobacco consumption per day (TPD) was the sum of cigarette sticks smoked per day (CPD) and heat sticks consumed per day (HPD). Weighted estimates also controlled for demographics and smoking dependence (time to first cigarette at W1). Results: Those who stayed exclusive smokers (S-S) decreased their CPD by 4%, from 14.5 to 14.0, which was significantly lower (p=0.03) than those who became dual users (S-D), who decreased their CPD by 7%, from 15.2 to 14.1. S-D users averaged 5.2 HPD, so their TPD increased by 34%, from 15.2 to 19.3. Exclusive smokers who became exclusive HTP users increased their TPD from 15.1 (all CPD) to 16.7 (all HPD, p=0.30). Including smokers who quit (S-Q) allowed us to examine changes in tobacco consumption in W1 smokers who did not take up HTPs (S-S+S-Q) vs. W1 smokers who did take up HTPs, either as dual users or as exclusive HTP users at W2 (S-D+S-H). For those who did not take up HTPs, CPD decreased by 5% (14.0 vs 13.3, p<0.001). Those who initiated HTPs (dual users or exclusive HTP users) TPD increased by 30% (14.7 vs 19.1, p<0.001). Conclusion: Japanese smokers who took up HTPs reduced their cigarette consumption by only 1.1 sticks/day but added 5.2 HTP sticks/day, thus leading to substantial increases in total tobacco consumption (4.1 sticks/day). Although the health impact is unclear, noting FDA's authorization allowing IQOS to be marketed in the US as a reduced exposure product, these results suggest that HTPs led to low levels of substitution of cigarettes.

FUNDING: Federal; State

SYM15

NDERSTANDING COMMERCIAL TOBACCO USE IN POPULATIONS OF SPECIAL RELEVANCE: EXAMINATION OF HEALTH EQUITIES AND TOBACCO IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

Maansi Bansal-Travers. Roswell Park Comprehensive Cancer Center.

It is recognized that commercial tobacco use and related health outcomes vary by sociodemographic characteristics and that some populations (e.g., socioeconomically disadvantaged populations, racial and ethnic minority populations, LGBTQ+ communities, people of reproductive age, and the military/veteran population) experience tobacco-related disparities. Knowledge gaps remain on differences in tobacco product use beliefs and behaviors among populations experiencing tobacco-related disparities with respect to understanding how to create tailored interventions to decrease the disproportionate and detrimental health impacts from commercial tobacco. The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, health, sociodemographic characteristics, and other factors. This nationally representative, longitudinal cohort study of approximately 46,000 adults and youth in the U.S. began in 2013 with subsequent annual data collection. This symposium will present in-depth examinations of tobacco use in select populations using cross-sectional and longitudinal analyses of the PATH Study data from 2013-2021. Specifically, this symposium will provide a theoretical framework about the intersectionality of commercial tobacco use (i.e., people who belong to multiple underserved and underrepresented populations can experience compounded discrimination or disadvantages) and provide estimates on: 1) Cigarette, cigar, and electronic nicotine delivery systems use patterns in LGBTQ+ communities; 2) Menthol cigarette use and quitting in non-Hispanic, Black/African American populations; 3) Tobacco product use and cessation methods/quit attempts by people who are pregnant or of reproductive age; and 4) Tobacco products and beliefs, use, access, and cessation among military/veteran populations.

SYM15-1

UNDERSTANDING COMMERCIAL TOBACCO USE IN POPULATIONS OF SPECIAL RELEVANCE: EXAMINATION OF HEALTH EQUITIES AND TOBACCO IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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It is recognized that commercial tobacco use and related health outcomes vary by sociodemographic characteristics and that some populations (e.g., socioeconomically disadvantaged populations, racial and ethnic minority populations, LGBTQ+ communities, people of reproductive age, and the military/veteran population) experience tobacco-related disparities. Knowledge gaps remain on differences in tobacco product use beliefs and behaviors among populations experiencing tobacco-related disparities with respect to understanding how to create tailored interventions to decrease the disproportionate and detrimental health impacts from commercial tobacco. The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, health, sociodemographic characteristics, and other factors. This nationally representative, longitudinal cohort study of approximately 46,000 adults and youth in the U.S. began in 2013 with subsequent annual data collection. This symposium will present in-depth examinations of tobacco use in select populations using cross-sectional and longitudinal analyses of the PATH Study data from 2013-2021. Specifically, this symposium will provide a theoretical framework about the intersectionality of commercial tobacco use (i.e., people who belong to multiple underserved and underrepresented populations can experience compounded discrimination or disadvantages) and provide estimates on: 1) Cigarette, cigar, and electronic nicotine delivery systems use patterns in LGBTQ+ communities; 2) Menthol cigarette use and quitting in non-Hispanic, Black/African American populations; 3) Tobacco product use and cessation methods/quit attempts by people who are pregnant or of reproductive age; and 4) Tobacco products and beliefs, use, access, and cessation among military/veteran populations.

FUNDING: Federal

SYM16

CORRECTING MISPERCEPTIONS ABOUT NICOTINE AND REDUCED NICOTINE CIGARETTES TO INCREASE THE EFFECTIVENESS OF RELATED TOBACCO REGULATORY POLICIES

Melissa Mercincavage, PhD. University of Pennsylvania.

Public misunderstanding of nicotine is a significant obstacle to reducing harms from combustible tobacco in the U.S., with nearly half of adult smokers believing that reduced nicotine content (RNC) cigarettes are less likely to cause cancer than other cigarettes. The Food and Drug Administration recently authorized two RNC cigarettes as Modified Risk Tobacco Products (MRTP) and has reiterated its intention to pursue a low nicotine product standard for cigarettes. Without effective public education on RNC cigarettes, nicotine misperceptions may undermine the public health benefits of both authorized modified risk RNC cigarettes and a nicotine reduction policy. In this symposium, we will synthesize current research on perceptions of RNC cigarettes, a nicotine reduction policy, and nicotine/RNC educational messages to identify content that may improve misperceptions about nicotine and RNC cigarettes. In the first talk, Rachel Denlinger-Apte will present interview data summarizing adolescent daily smokers' perceptions of a reduced nicotine product standard following use of RNC cigarettes in a laboratory study. In the second talk, Charity Ntansah will present focus group data describing little cigar/cigarillo users' reactions to policies reducing nicotine in cigarettes and other combustible products. Reed Reynolds will then present data from a discrete choice experiment on associations of RNC messages with perceived harm, attitudes toward a nicotine reduction policy, and intentions to quit or use RNC cigarettes. Melissa Mercincavage will present data from an online study assessing perceived message effectiveness of the MRTP claims authorized by FDA for the VLN brand of RNC cigarettes and associations with misperceptions of nicotine and RNC cigarettes. Andrea Johnson will present heatmapping data from a population-based study examining how visual engagement with nicotine educational content relates to perceived message effectiveness. Finally, Andrea Villanti will discuss implications of the presented studies for current regulatory efforts related to the marketing of MRTP products and reducing nicotine content in cigarettes. This symposium will present data collected from various populations and utilizing a variety of quantitative and qualitative methods, including online surveys, laboratory experiments, in-depth interviews and focus groups, to cover a topic with timely public health policy implications that will be of broad interest to SRNT members.

SYM16-1

QUALITATIVE REACTIONS TO A LOW NICOTINE PRODUCT STANDARD FOR CIGARETTES FROM ADOLESCENTS WHO SMOKE

Rachel Denlinger-Apte, PhD. Wake Forest School of Medicine.

Significance: The Biden Administration recently added a low nicotine product standard for cigarettes and combusted tobacco to its policy agenda. This qualitative study examined reactions to a potential low nicotine product standard among adolescents aged 15-20 who smoke cigarettes daily. Methods: After completing a lab study involving exposure either to low nicotine (n=10) or normal nicotine (n=15) Spectrum research cigarettes, we conducted follow-up interviews with participants to explore their (1) knowledge, attitudes, and perceptions of a low nicotine product standard and (2) anticipated tobacco use behavior after policy implementation. Interviews were audio-recorded, transcribed verbatim, double-coded, and analyzed using reflexive thematic analysis. Results: Nearly half of interviewees supported a low nicotine product standard because they thought it would help prevent young people from becoming dependent on cigarettes and/or it would help people quit smoking. Reasons some interviewees opposed the policy included beliefs that adults should have the choice to smoke and that a nicotine reduction policy would increase smoking stigma. Many interviewees thought the policy could lead to youth seeking out alternative products (e.g., JUUL). Others believed the policy would be ineffective because youth would find ways to circumvent the policy (e.g., illicit market) or would increase the number of cigarettes they smoke in order to maintain the same nicotine level. However, about half of interviewees said they would attempt to quit smoking while the other half said they would continue smoking, although some thought they would reduce their smoking. Conclusions: Many interviewees supported the policy, correctly understood its purpose, and indicated quit intentions due to such a policy. However, skepticism about the policy's effectiveness was common and several expressed concerns about infringement on personal liberties, increased stigma, and compensatory smoking. Our findings point to the importance of pre-policy media campaigns targeting adolescents who smoke to minimize negative reactions, dispel fears, and correct misperceptions.

FUNDING: Federal

SYM16-2

REACTIONS TO MESSAGES ABOUT A NICOTINE REDUCTION POLICY FOR CIGARETTES AND OTHER COMBUSTED TOBACCO PRODUCTS: A FOCUS GROUP STUDY AMONG LITTLE CIGAR AND CIGARILLO USERS

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Significance: The US Food and Drug Administration (FDA) has proposed rulemaking to reduce the nicotine content in cigarettes and other combusted tobacco products to non-addictive levels. This qualitative study documents reactions to messages communicating this policy among people who use little cigars and cigarillos (LCCs). Methods: In August 2021, we recruited for and conducted eight focus groups with participants from four populations with the highest rates of LCC use (African American males and females, White males and females). We tested eight messages: three risk messages, three quit efficacy messages, one message about misperceptions of compensation (i.e., smoking more to get desired nicotine), and one message about using alternative nicotine sources (e.g., e-cigarettes). Participants described their reactions to the messages and the policy. Results: Risk messages motivated White male and female participants to quit when the message described how the policy would remove the pleasure they get from nicotine, while African American male and female participants were motivated to quit by the harmful chemicals that remain in reduced nicotine LCCs. Efficacy messages made some participants feel that the policy would cause them to relapse or would encourage the use of LCCs due to nicotine reduction. Many participants expressed favorable responses to the compensation message; however, African American and White male groups were skeptical of the message and expressed distrust of the FDA. The message about using alternative nicotine sources sparked intense responses, with many participants expressing outrage and mistrust of the message, believing that it advocated use of e-cigarettes, which they perceived as equally harmful as cigarettes. Overall reactions to the nicotine reduction policy varied in intensity across groups. Participants were perplexed as to why the FDA would only remove nicotine while allowing other harmful chemicals in LCCs. Perceived effectiveness of the policy was dampened by participants' beliefs that they were not addicted to cigarillos and that the policy would be useless for those who only use cigarillos to make wrappers for blunts. Conclusion: Participants' reactions to messages about a nicotine reduction policy differed depending on their perceptions of nicotine and addiction to LCCs. Because LCC users perceived LCCs as different from cigarettes, the FDA should consider using different messages to communicate with people who use LCCs.

FUNDING: Federal

SYM16-3

MESSAGING ABOUT VERY LOW NICOTINE CIGARETTES TO INFLUENCE POLICY ATTITUDES, HARM PERCEPTIONS, AND SMOKING MOTIVATIONS: A DISCRETE CHOICE EXPERIMENT

Reed Miller Reynolds, PhD. University of Massachusetts, Boston.

Significance. To reduce smoking and the harms it causes, countries, including the US, are considering policies to reduce nicotine in combustible tobacco to minimally addictive levels. Such a policy aims to minimize the levels of the chemical in cigarettes that causes smoking dependence: helping people who smoke quit more easily and keeping experimenters (primarily youth) from a lifetime of smoking. Effective messages about very low nicotine cigarettes (VLNCs) and this policy are crucial in combating misperceptions threatening the policy's effectiveness. Data and Methods. A discrete choice experiment (DCE) assessed messages about VLNCs. Participants were 590 adults who smoked exclusively, 379 adults who both smoked and used e-cigarettes, 443 adults who formerly smoked, and 351 young adults who never smoked (total n=1,483). Seven message attributes were varied systematically (source, harm, chemicals, nicotine, satisfaction, addictiveness, quitting efficacy). Outcomes were selection of messages that generated the most positive attitude toward reduced nicotine policy, the greatest perceived harmfulness of VLNCs, and most strongly motivated quitting and initiating behavior for VLNCs. Results. Information about specific harms and chemicals of VLNCs had the largest effects on selection of messages as eliciting more negative attitudes toward VLNCs policy, increasing perceived VLNC harmfulness, increasing motivation to quit VLNCs, and decreasing motivation to try VLNCs. Messages with information about quitting efficacy were selected as more motivating to quit among those who smoke, but also more motivating to try VLNCs among those who do not smoke. Describing VLNCs as still causing severe disease and containing harmful chemicals led to more negative evaluations of the policy. Conclusion. Harm and chemical information can be prioritized to ensure VLNCs are not misperceived as less harmful than regular cigarettes; messages about increased quitting efficacy and reduced addictiveness associated with VLNCs may backfire if presented to those who do not smoke.

FUNDING: Federal

SYM16-4

GREATER PERCEIVED EFFECTIVENESS OF EDUCATIONAL MESSAGES ASSOCIATED WITH GREATER MISPERCEPTIONS OF NICOTINE AND REDUCED NICOTINE CONTENT CIGARETTES

Melissa Mercincavage, PhD. University of Pennsylvania.

Significance: Without effective public education on nicotine and reduced nicotine content (RNC) cigarettes, nicotine misperceptions may undermine the public health benefits of recent regulatory actions by the Food and Drug Administration (FDA) to authorize two RNC cigarettes as Modified Risk Tobacco Products (MRTP) and to pursue a low nicotine product standard. Research is needed to identify educational messages that promote accurate perceptions of nicotine and by extension, RNC cigarettes. Methods: We tested 26 candidate nicotine and RNC educational messages in the May 2022 Rutgers Omnibus Study?a quarterly, cross-sectional, web-based mTurk survey of approximately 3,000 18-45-year-olds in the U.S. Participants were randomized to view one of 26 brief text-based messages (n = 8 from our ongoing research; n = 6 MRTP messages authorized by FDA; n = 12 messages from FDA's "From Plant to Product to Puff" education campaign). After message exposure, participants completed an adapted three-item scale of perceived message effectiveness (PME) assessing the extent to which the message raised nicotine concerns/discouraged nicotine use, a single belief item that nicotine causes cancer, and six items assessing RNC cigarette beliefs. Analyses examined the mean PME of each message and its association with nicotine and RNC cigarette beliefs. Results: Across all messages, a one-unit increase in mean PME was correlated with higher odds of endorsing a false belief about nicotine (nicotine causes cancer; odds ratio (OR) = 1.33, 95% CI = 1.24, 1.42); this relationship was present in current smokers and non-smokers. Mean PME was not correlated with false beliefs about RNC cigarettes in crude analyses but was correlated with higher false beliefs about RNC cigarettes in current cigarette smokers (b = 0.43, 95% CI = 0.22, 0.65). Examination of individual messages suggested that exposure to five of the candidate messages increased the odds of a correct belief about nicotine; one message

substantively increased correct beliefs about RNC cigarettes. Conclusions: Messages that increase perceptions of nicotine harms also increase misperceptions about nicotine and RNC cigarettes. Findings from this pilot study dramatically increase the available evidence on messaging to educate consumers about RNC cigarettes, which may be used in future interventions to improve misperceptions of nicotine and RNC cigarettes.

FUNDING: Federal

SYM16-5

EFFECT OF ENGAGEMENT WITH NICOTINE CORRECTIVE MESSAGING ON PERCEIVED MESSAGE EFFECTIVENESS IN U.S. ADULTS

Andrea C. Johnson, PhD. University of Pennsylvania.

Introduction: Widespread misperceptions of nicotine could undermine the public health benefits of FDA's proposed nicotine reduction policy. Delivering brief nicotine corrective messages may improve understanding of the effects of nicotine in the population, though little is known about the relationship between engagement and perceived effectiveness of nicotine educational messages. Methods: 794 U.S. adults in NORC's AmeriSpeak Panel were randomized to three exposures of 8 nicotine corrective messages (NCM; n=393) or to a delayed message control (n=401). All participants were exposed to the NCM intervention after a final outcome assessment and completed a heatmapping task to assess message engagement where participants clicked on up to five areas within each message that attracted their attention. Upon completion of message exposure, participants completed a three-item perceived message effectiveness (PME) scale. A general linear model examined the association between engagement (click count) across the 8 messages and average PME. Results: Participants (n=590) in the intervention and control condition were equally likely to click on the any NCM at Wave 4 (Experimental: n=271, 93.5%, Control: n=304, 95.3%, p=0.58), though the intervention group had a higher mean number of total clicks (p<.001) and on average for each message (p=.01). Modeling indicated being in the intervention group or the total number of clicks were not positively associated with PME on their own. Yet, there was a significant interaction effect of study condition by total number of clicks across the 8 messages (b=0.02, p=0.04), with the intervention group indicating greater PME with a greater number of clicks. The intervention group had a greater number of clicks on messages related to nicotine causing addiction (p=0.01), nicotine causing people to smoke regularly (p=0.02), nicotine not causing cancer (p=0.04), and the amount of nicotine in e-cigarettes (p=0.001).Discussion: Relative to the control, increased engagement with nicotine messages was associated with greater PME among those in the NCM condition. However, intervention participants had been exposed to these messages up to 3 times prior to this assessment, and control participants were engaging with the messages for the first time. Future work should determine if message engagement increases with dose of exposure and if engagement and perceived message effectiveness are associated with correct beliefs about nicotine.

FUNDING: Federal

SYM17

INDIVIDUALIZING TOBACCO TREATMENT TO INCREASE QUIT RATES

Matthew Bars, MS CTTS NCTTP. IntelliQuit/ FDNY Tobacco Treatment Program.

THE REAL-WORLD IMPACT OF 3 ALTERNATIVE NICOTINE-DELIVERY PRODUCTS ON COMBUSTIBLE CIGARETTE USE. The FDA has proposed to reduce combustible tobacco's immense toll on public health by: 1) authorizing modified risk products, and 2) reducing nicotine in combustible cigarettes to non-addictive levels. This research examines how well e-cigarettes and very low nicotine cigarettes (VLNCs) can substitute for regular combustible cigarettes. INCREASING EFFICACY AND QUIT RATES IN WOMEN OF REPRODUCTIVE AGE: WHAT IS THE WILLINGNESS TO USE EXOGENOUS HORMONES? Smoking cessation pharmacotherapies are less efficacious in women of reproductive age, perhaps due to ovarian hormones. Ovarian hormones influence nicotine metabolism, smoking-related symptoms (e.g., craving), and, arguably, smoking cessation outcomes. However, it may be possible to favorably modify ovarian hormones, perhaps via hormonal contraceptives, to yield improved smoking cessation outcomes in women. This study investigated the acceptability of exogenous hormone administration as a tool for smoking cessation for women. A RANDOMIZED CONTROLLED TRIAL OF MULTIPLE PHARMACOTHERAPY ADAPTATIONS BASED ON TREATMENT RESPONSE IN AFRICAN AMERICAN SMOKERS The standard of care in tobacco treatment is to continue initial pharmacotherapy even when individuals do not stop smoking. An alternative strategy is to adapt pharmacotherapy for individuals who do not quit. A handful of studies have examined pharmacotherapy adaptation, but they have adapted pharmacotherapy only once, focused on adaptation distal rather than proximal to a failed quit attempt, and few have included racial/ethnic minority smokers who have less success in quitting and bear a disproportionate share of tobacco-related morbidity and mortality. POINT OF CARE BIOCHEMISTRY ASSAYS AND TITRATION OF TOBACCO TREATMENT MEDICATIONS INCREASES INDIVUDUAL QUIT RATES Tobacco dependence has been described as a chronic disease. Yet, one aspect of chronic disease management, the effective titration of tobacco treatment medications, is underutilized. Total Nicotine Equivalents (TNEs) and expired breath carbon monoxide (EtCO) measures all sources of nicotine. We developed a mobile app that allows in-office or telehealth quantitative measurement of nicotine consumption in 15 minutes. We further describe a treatment algorithm emphasizing intake and follow-up visit urinary TNEs, EtCO, tobacco consumption, patient feedback and withdrawal symptom assessments increasing quit rates.

SYM17-1

POINT OF CARE BIOCHEMISTRY ASSAYS AND TITRATION OF TOBACCO TREATMENT MEDICATIONS INCREASES INDIVUDUAL QUIT RATES

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Tobacco dependence has been described as a life-threatening, chronic disease. One aspect of chronic disease management, specifically the effective titration of tobacco treatment medications, is underutilized. Total Nicotine Equivalents (TNEs) and expired breath carbon monoxide (EtCO) measures all sources of nicotine. We developed a mobile app that allows in-office or telehealth quantitative measurement of nicotine consumption in 15 minutes. We further describe a treatment algorithm emphasizing intake and follow-up visit urinary TNEs, EtCO, tobacco consumption, patient feedback and withdrawal symptom assessments increasing quit rates. TNE and EtCO are the 2 most common measures of biochemical tobacco consumption. While EtCO can only measure combustible tobacco, TNEs report all forms of nicotine consumption. The Konig reaction of the nicotine metabolite-related ubiquitous pyridine ring produces an increasingly reddish-pink colored product, directly proportional to nicotine consumption. Every color can be described mathematically as Red, Green & Blue from 0 to 255, yielding over 16 million colors.We created a mobile app and algorithm that determined the relationship between 2 nicotine reference laboratories measures of urinary TNEs and colors produced by a nicotine test strip. Utilizing the colorimetric paper assay of unprocessed urine, computer vision, and neural network architecture-generated algorithms, we created a mobile and web-based app that returns a quantitative laboratory value in nanomoles per milliliter in 15 minutes. The mobile app can be used in-office or via remote patient monitoring and telehealth interventions. Analysis of over 100,000 images found a R2 of 0.980 and a RMSE of 8.52 nanomoles per milliliter between the reference laboratories and the nicotine urine test strip. Together, with tobacco user histories and current treatment status, TNE assays and EtCO measurements provide powerful tools regarding chronic disease management while promoting therapeutic progress. Consistent with previous studies, we have shown that titrating medications to nicotine metabolites is inversely correlated with withdrawal symptoms and positively correlated with quit rates. At the Fire Department of New York City (FDNY) tobacco treatment program medication titration empowers a biochemically confirmed long-term quit rate of ~70%.

FUNDING: Unfunded; Other

SYM17-2

THE REAL-WORLD IMPACT OF THREE ALTERNATE NICOTINE-DELIVERY PRODUCTS ON COMBUSTIBLE CIGARETTE USE

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Background: The FDA has proposed to reduce combustible tobacco's immense toll on public health by: 1) authorizing modified risk products, and 2) reducing nicotine in combustible cigarettes to non-addictive levels. This research examines how well e-cigarettes and very low nicotine cigarettes (VLNCs) can substitute for regular combustible cigarettes and whether this is influenced by steady-state nicotine from a nicotine patch. Methods: In this mixed design experiment, adults who smoked daily and were not motivated to quit were randomized to 4 weeks of using: 1) VLNCs; 2) Juul e-cigarettes (tobacco or menthol flavor); or 3) no alternative product. During 2 of these weeks (Switch Weeks), participants were asked to switch from their usual cigarettes and use only study products. During each Switch Week they were assigned, in double-blind fashion and counterbalanced order, to use either an active nicotine or placebo patch. Participants recorded each use of their own cigarettes or any alternative product in real time via a smartphone. Results: Of those randomized (N=209), 160 (76.6%) completed both Switch Weeks and

were included in analyses (60.0% female, 21.9% African American, 51.9 [SD=12.1] years old, 16.8 [SD=9.3] cigarettes per day). During the 2 Switch Weeks, participants in the No Product group smoked more of their own cigarettes per day (M=5.48, SD=0.63) than did those in the E-cigarette (M=3.20, SD=0.63) and VLNC (M=2.88, SD=0.65) groups; the E-cigarette and VLNC groups did not differ. There was no significant difference in cigarettes smoked per day during active vs. placebo patch Switch Weeks (p=.09), nor was there a study product x patch condition interaction (p=.51). During both the active and placebo Switch Weeks, E-cigarette group participants were significantly more likely than the No Product group to be CO-confirmed abstinent from smoking. There were no differences between the VLNC and No Product groups in cotinine-confirmed smoking abstinence at the end of the placebo Switch Week. Conclusions: E-cigarettes and VLNCs appear similar in their ability to substitute for participants' usual cigarettes, significantly reducing the number of cigarettes smoked regardless of whether participants had an active or placebo patch. This illustrates the importance of behavioral factors, in addition to nicotine dependence, in sustaining smoking behavior and the need to address these individual factors as part of smoking cessation treatment.

FUNDING: Federal

SYM17-3

A RANDOMIZED CONTROLLED TRIAL OF MULTIPLE PHARMACOTHERAPY ADAPTATIONS BASED ON TREATMENT RESPONSE IN AFRICAN AMERICAN SMOKERS

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BACKGROUND: The standard of care in tobacco treatment is to continue initial pharmacotherapy even when individuals do not stop smoking. An alternative strategy is to adapt pharmacotherapy for individuals who do not stop smoking. A handful of studies have examined pharmacotherapy adaptation, but they have adapted pharmacotherapy only once, focused on adaptation distal rather than proximal to a failed quit attempt, and few have included racial/ethnic minority smokers who have less success in quitting and bear a disproportionate share of tobacco-related morbidity and mortality. METHODS: African American (AA) smokers (n=392) were randomized 1:1 to optimized treatment (OPT) or usual care (UC). Participants in both groups received 7 sessions of smoking cessation counseling and 18-weeks of pharmacotherapy with long-term follow-up through week 26. OPT participants received nicotine patch (NP) and up to two pharmacotherapy adaptations to varenicline (VAR) and bupropion plus NP (BUP+NP) based on CO-verified smoking status (CO >= 6 ppm) at Weeks 2 and 6. UC participants received NP for the duration of treatment. Outcome was anatabine- and anabasine-verified 7-day point prevalence smoking abstinence (<= 2 ng/ml on both alkaloids) at weeks 12 (primary), 18, and 26. RESULTS: Of the 196 participants randomized to OPT, 53 (27.0%) responded to NP at both optimization time points and were never adapted, 48 (24.5%) were adapted to VAR after non-response to NP, and 87 (44.4%) were adapted to BUP+NP after non-response to NP and VAR; 8 (4.1%) were missing and never optimized. In intent-to-treat analyses imputing those lost to follow-up as smokers, there were no statistically significant differences in verified abstinence between OPT and UC at weeks 12 (17.4% vs 11.7%, OR=1.58, CI=0.89, 2.80, p=0.12), 18 (16.3% vs 15.8%, OR=1.04, CI=0.61, 1.78, p=0.89), or 26 (12.2% vs 13.3%, OR=0.91, CI=0.76). Similar trends were observed for completers only. Despite repeated, unsuccessful quit attempts, most participants remained committed to quitting (OPT 83.1% vs UC 89.3%), while a smaller proportion wanted to cut back but not quit (OPT 15.7% vs UC 10.7%) or were no longer interested in quitting (OPT 1.2% vs UC 0.0%) (p=0.13). CONCLUSION: Optimization to VAR and/or BUP+NP after failure of NP monotherapy did not improve quit rates for AA smokers relative to an 18-week course of treatment with NP.

FUNDING: Federal

SYM17-4

INCREASING EFFICACY AND QUIT RATES IN WOMEN OF REPRODUCTIVE AGE: WHAT IS THE WILLINGNESS TO USE EXOGENOUS HORMONES?

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Background: Several smoking cessation pharmacotherapies are less efficacious in women of reproductive age, perhaps due to ovarian hormones. Ovarian hormones influence nicotine metabolism, smoking-related symptoms (e.g., craving), and, arguably, smoking cessation outcomes. However, it may be possible to favorably modify ovarian hormones, perhaps via hormonal contraceptives, to yield improved smoking cessation outcomes in women. However, the acceptability of exogenous hormone administration as a tool for smoking cessation for women is unknown. Methods: We conducted a cross-sectional online survey in women 18-40 years old who self-reported daily cigarette smoking. Willingness to use various hormones (i.e., estrogen, progesterone, combination) and methods of delivery (i.e., oral contraceptive, transdermal patch, vaginal insert, injection) were assessed, as well as history of using hormones. Descriptive analysis and logistic regression were conducted using SAS. Results: Respondents (n=461) were, on average, XX years old and smoked XX cigarettes/day. Overall, the most respondents indicated they were willing to use an oral contraceptive (32%), followed by transdermal patch (22%), injectable hormone given by a healthcare provider (21%), injectable hormone self-injected (16%), and vaginal insert (9%). Participants who had used hormones previously were significantly more likely to be willing to use oral hormones (97%; 388 out of 400 respondents) versus those who had no history of hormone use (12%; 7 out of 61 respondents; OR: 2.03, 95% CI: 1.01, 4.06). There were no differences by type of hormone. Conclusions: Nearly all participants who have a history of using hormonal contraceptives would be willing to use them to help with smoking cessation. In contrast, those without a history of use are unlikely to be willing to use them. This may be related to a possible contraindication to hormonal contraceptive use. Given hormonal contraceptive use is highly prevalent in women of reproductive age who smoke, future interventions should explore how to incorporate exogenous hormones as an adjunctive smoking cessation pharmacotherapy.

FUNDING: Nonprofit grant funding entity

PODIUM PRESENTATION 1

PAPER SESSION 1: UNDER THE INFLUENCE: CONSEQUENCES OF TOBACCO AND E-CIGARETTE MARKETING

PPS1-1

IMPACT OF E-CIGARETTE MARKETING ON YOUTH AND YOUNG ADULT SMOKING AND VAPING BEHAVIORS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Significance: Studies show e-cigarette marketing entices young people to use e-cigarettes emulating old tobacco marketing tactics. This study estimates the overall effect of the impact that e-cigarette marketing has on smoking and vaping behaviors among youth and young adults. Methods: A systematic review and meta-analysis were conducted in accordance with PRISMA and registered with PROSPERO. We searched PubMed, Embase, and Web of Science from January 1, 2007 to April 30, 2022 using keywords: e-cigarettes, vaping, ENDS, JUUL; marketing, advertising, promotion; youth, young adults. Preferred subject terms were used where appropriate. Covidence software was used to screen results and abstract data. Inclusion criteria were: studies of the association of e-cigarette marketing on smoking and vaping that employed estimates of risk (e.g., odds ratios) that could be compared in a standardized way. Both "marketing" and "smoking and vaping" were considered broadly; studies of youth (12-18 years old) or young adults (18-29 years old); original research; full-text articles, and English language articles. The present analyses included adjusted estimates of risk only (e.g., adjusted for sociodemographic variables, other substance use, other tobacco product marketing, and more). Meta-analyses were conducted using the metan command in STATA. Results: 1152 unique titles and abstracts were screened, of which, 146 underwent full-text review, and 31 studies were ultimately included. When pooled across 161 adjusted estimates of risk abstracted from 31 studies, exposure to e-cigarette marketing increased risk of smoking and vaping behaviors by 41% (aOR=1.41, 95% CI=1.35-1.46, I^2=88%). Subgroup analyses revealed results were significant and similar for youth vs. young adult samples, U.S. vs. non-U.S. samples, cross-sectional vs. cohort studies, and poor or fair vs. good quality studies. Results were similar by e-cigarette marketing channel (e.g., retail vs. online media), study follow-up period (e.g., 6 months vs. 12 months), and behavioral measure of smoking or vaping product outcome (e.g., ever use vs. past 30-day use). There were significant differences by smoking or vaping product; the pooled effect of e-cigarette marketing exposure on dual or poly-use was significantly greater (aOR=1.67, 95% CI=1.53-1.83, I^2=47%) than the effect on e-cigarette use (aOR=1.39; 95% CI=1.33-1.45, I^2=88%) or cigarette use (aOR=1.28; 95% CI=1.19-1.38, I^2=0.3%), although all were significant. Conclusion: E-cigarette companies are increasingly advertising their products, especially via online media with large youth and young adult audiences and where regulations are lacking. Finding from 31 studies show e-cigarette marketing is effective in increasing risk of e-cigarette and other tobacco product use. Greater health messaging and federal restrictions are needed to address e-cigarette marketing.

FUNDING: Federal; Academic Institution

PPS1-2

AN IN-DEPTH INTERVIEW STUDY TO EXAMINE THE INFLUENCE OF E-CIGARETTE AD FEATURES ON PERCEIVED E-CIGARETTE APPEAL AND USE INTEREST AMONG YOUNG ADULTS

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Introduction. E-cigarette advertising exposure affects young people's perceptions and use of e-cigarette products. This study examined the influence of e-cigarette ad features on young adults' perceived e-cigarette appeal and use interests and how it differs between non-tobacco users and cigarette smokers. Methods. A New Jersey-based convenience sample of young adult (18-29 years) non-tobacco users (n=20) and established cigarette smokers (n=15) were recruited. They first completed a background survey and viewed 30 cartridge-based e-cigarette ads (~7 seconds each) on a computer screen. They then received a semi-structured one-on-one in-depth interview (~20 minutes) to discuss how ads and ad features (e.g., nicotine warning, human models, marketing claims, price promotions, flavor descriptors) that they just viewed influenced their perceptions and interests in using e-cigarettes. Research team members double coded interview transcripts, resolved coding disagreements, and conducted a thematic analysis to determine emerging themes. Results. Two key ad features were found to prompt e-cigarette use interests among participants: (1) fruit/candy flavor descriptors and packages; and (2) price promotions (e.g., discounts and coupons). Colorful patterns and backgrounds grabbed participants' attention but did not change the perceived appeal of e-cigarettes unless they were perceived to reflect e-cigarette flavors. Claims promoting switching from cigarettes to e-cigarettes made smokers perceive the ads were for them but did not generate higher interest in using unless other benefits of vaping (e.g., convenience, no smell) and additional facts about reduced harm were also mentioned. These claims made non-users less interested in using e-cigarettes because they perceived that these ads were not for them. Nicotine warning labels often reduced non-users' interest in vaping but rarely influenced the interest of smokers. Participants' existing opinions that e-cigarettes are equally or more harmful than cigarettes reduced their interest in using the products even when they viewed the ads favorably. Discussion. Salient e-cigarette ad features (fruit/candy flavors and price promotions) may prompt e-cigarette use interests among both non-tobacco users and cigarette smokers. To make smoker-targeted ads more effective in promoting e-cigarette use among smokers, "switching" claims and other vaping benefits need to be included, along with scientific facts about the comparative harm of e-cigarette versus cigarette use. Policymakers may need to take a balanced approach to consider e-cigarette ad features' impact on young adults—both non-tobacco users and cigarette smokers—to maximize e-cigarettes' public health benefits and minimize their harm.

FUNDING: Federal

PPS1-3

THE LONGITUDINAL ASSOCIATION BETWEEN COUPON RECEIPT AND ESTABLISHED CIGARETTE USE AMONG YOUNG ADULTS IN THE UNITED STATES

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Significance: Tobacco companies often distribute coupons as part of a marketing strategy to offset the cost of cigarettes among price-sensitive people who smoke. Coupon receipt has been linked with smoking initiation among people who do not smoke, although few studies have studied this association longitudinally or among young adults. In this study, we examine the prospective association between tobacco coupon receipt and established cigarette smoking among young adults (aged 18-24) in the United States. Methods: Using data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health Study, discrete-time survival models were fit to an unbalanced person-period dataset of respondents who did not smoke at baseline. Respondents had no established smoking pattern (fewer than 100 cigarettes in lifetime) and no current (no past 30-day use) cigarette smoking at baseline (person n=4,521, risk period n=15,897). Cigarette initiation was measured as current past 30-day established cigarette use at follow-up. Coupon receipt was measured as a binary time-varying exposure, lagged by one wave to ensure that the coupon exposure preceded the outcome for temporality. We controlled for sociodemographic variables (age, sex, race/ethnicity, educational attainment), and time-varying tobacco-related variables (living with a person who smoked, second-hand smoke exposure, other combustible tobacco product use, and e-cigarette use). Results: Coupon receipt increased the risk of established cigarette use at follow-up among young adults who did not smoke at baseline, adjusting for covariates (adjusted hazard rate (aHR): 1.55, 95% CI: 1.09, 2.22). Conclusions: We found that coupon receipt increased the risk of established cigarette use at follow-up among young adults, controlling for potential confounders. Young adults are a price-sensitive group and young adulthood is a time during which many individuals initiate or experiment with smoking. Our findings suggest that coupons are one way that tobacco companies influence young adults to promote established cigarette use. A national ban on coupons could help to inhibit established cigarette smoking among young adults.

FUNDING: Federal

PPS1-4

SHARE OF CIGARETTE SALES WITH BRANDS USING "NATURAL," "ORGANIC," AND "TOBACCO AND WATER" PACKAGING TERMS IN THE UNITED STATES, 2017-2021

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INTRODUCTION AND SIGNIFICANCE: Cigarette pack terms such as "natural," "organic," and "tobacco and water" may communicate inappropriate reduced harm messages to consumers. While Natural American Spirit (NAS) is the most popular brand using these terms, other brands have also positioned themselves as "natural" cigarette brands. The purpose of this study was to describe the proportion of cigarette sales that used these potentially misleading terms - "natural," "organic," or "tobacco and water" - in the United States from 2017 to 2021. METHODS: Data come from Nielsen Scantrack sales data collected in 24 US states covering 78% of the US population from March 2017 to November 2021. We describe the proportion of cigarette sales attributed to brands that use "natural," "organic," or "tobacco and water" on their packaging by state and month/year. RESULTS: Overall, 4.9%, 0.8%, and 2.71% of cigarettes sold from 2017 to 2021 used the "natural," "organic," or "tobacco and water" terms. Between March 2017 to November 2021, the proportion of cigarette sales using the "natural," "organic," or "tobacco and water" terms increased by 0.28%, 0.31%, and 0.84%, respectively. The proportion of annual sales showed small but consistent increases in the proportion of cigarette sales from brands using the terms "natural" (February 2017: 4.88% vs. February 2021: 5.16%), "organic" (February 2017: 0.67% vs. February 2021: 0.85%), and "tobacco and water" (February 2017: 2.23% vs. February 2021: 2.89%). The proportion of cigarette sales using "natural" "organic," and "tobacco and water" were highest in Oregon (13.01%, 3.07%, and 11.30%, respectively); California, Washington, Arizona, Massachusetts, and Colorado were also among the top 5 states with the highest cigarette market shares for brands using "natural," "organic" and "tobacco and water" packaging terms. For all three terms, NAS cigarettes accounted for the highest proportion of cigarette sales. CONCLUSION: Cigarette brands using the terms "natural," "organic," and "tobacco and water" increased their market share between 2017 and 2021 in 24 US states; these brands are substantially more prevalent in some western states. Given results from longitudinal and experimental data suggesting that these terms communicate reduced harm information to current and potential consumers, our findings emphasize the importance of regulating these terms and continually monitoring their population impact.

FUNDING: Federal; Academic Institution

PPS1-5

'TEENAGERS WILL CERTAINLY BE CURIOUS' - CHINESE HIGH-SCHOOL STUDENTS' PERCEPTIONS OF THE INTENDED AUDIENCE AND INFLUENCE OF TOBACCO MARKETING IN CHINA

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Significance. The link between youth exposure to tobacco marketing and tobacco use is well documented in Western countries. Less is known about this relationship in China, a country with high rates of tobacco use. This qualitative study investigated the extent to which Chinese high-school students perceive that they are the target of tobacco marketing and how they describe the influence of tobacco marketing on youth tobacco use. Methods. From Dec 2021-Jan 2022, we conducted 20 online focus group discussions (FGDs) with 119 Grade 10 high-school students from 10 Chinese cities. Groups were conducted separately by gender. Trained moderators followed a semi-structured guide. First, groups were asked to describe their exposure to tobacco marketing, which we defined as cigarette and e-cigarette ads/product displays. Next, groups discussed (1) who they believed was the target audience for the marketing they were exposed to and (2) what impact tobacco marketing exposure has on youth tobacco use. We conducted a thematic analysis of the two topic areas using transcripts translated into English. Results. All groups felt that cigarette ads/displays were targeted toward older adults, except for flavor capsule cigarettes which some groups felt were more modern and intended for use by teens and college students. In contrast, all groups discussed how e-cigarette ads/displays were largely intended for middle- and high-school youth who would be attracted to the stylish, trendy product design, the bright colors and fashion used in ads/displays, and the available flavors. While some groups discussed how e-cigarette marketing could be intended for adults in their 30s-40s who might be trying to quit smoking, most groups indicated that e-cigarettes were part of youth culture and not meant for older adults. Finally, all groups discussed how multiple factors (e.g., peer use) influence youth tobacco use, including tobacco marketing exposure. However, most groups felt that exposure to e-cigarette ads/displays could directly increase youths' interest in trying an e-cigarette, particularly e-cigarette displays in shopping malls and e-cigarette social media ads posted by peers or influencers. Discussion. Chinese youth in this study believe flavor capsule cigarette and e-cigarette ads/displays are intended for teens and exposure to e-cigarette marketing could lead to future product use. Findings can inform e-cigarette marketing restrictions in China.

FUNDING: Nonprofit grant funding entity

PPS1-6

IS EXPOSURE TO ENDS MARKETING AT MORE THAN ONE CHANNEL ASSOCIATED WITH INCREASED RISK OF ENDS USE AMONG YOUNG ADULTS?

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Significance: Prevalence of electronic nicotine delivery systems (ENDS) marketing is high among young adults in the U.S. Most research has examined the impact of ENDS marketing exposure at the point-of-sale, but young adults are exposed across multiple channels including at community events and in magazines. Given high levels of exposure, those who are exposed across more channels may be at greater risk for ENDS use as compared to those exposed only through one channel. Therefore, this study examined if exposure to ENDS marketing through two or more channels, as compared to exposure to one channel, was associated with increased risk for ENDS use among young adults. Methods: Participants were 1,630 young adults (51.8% female; 62% white; *m* age=21.8[*SD*=2.2]) in a cross-sectional online survey drawn from the Qualtrics panel (January-April 2022). Exposure to ENDS marketing in the past month was measured across seven channels: on billboards, inside/outside of stores, at community events, in magazines, on television, on radio, or on the computer or internet. Exposure was then summed across the channels and dichotomized to represent exposure at one channel versus exposure at two or more channels (those who were not exposed (n=17, 1%) were dropped from the analysis). Current ENDS use was measured with one item that assessed past month use (any use=1, no use=0). Logistic regression analysis, controlling for sex, age, race/ethnicity, and SES, was used to examine the association between ENDS marketing exposure and current ENDS use. Results: 48.5% of participants had used ENDS in the past 30 days and 36.6% of participants were exposed to two or more channels of ENDS marketing. After controlling for sex, age, SES, and race/ethnicity, those who were exposed to ENDS marketing at two or more channels were 1.34 times (95% CI=[1.09, 1.66]) more likely to be current ENDS users as compared to those who were exposed at one channel. Conclusions: Exposure to ENDS marketing at two or more channels was associated with a greater likelihood of ENDS use as compared to exposure at only one channel, suggesting cumulative exposure to ENDS marketing among young adults be particularly important to understand. Future research is needed that explores how exposure across channels may interact as well as the possible mediators or moderators of this relationship.

FUNDING: Academic Institution

PAPER SESSION 2: TOBACCO RETAILER LOCATION RESTRICTIONS: EVALUATING IMPACT

PPS2-1

THE IMPACT OF LICENSE FEES ON THE DENSITY OF TOBACCO RETAILERS IN CALIFORNIA - A SEGMENTED INTERRUPTED TIME SERIES ANALYSIS BY INCOME AND RACE/ETHNICITY

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Background: On May 9, 2016, the State of California passed a law to increase the license fee of tobacco retailers from a one-time-only fee of $100 to an annual fee of $265, which went into effect on June 9, 2016. This study investigates how this change impacted the density of tobacco retailers in California by neighborhood income and race/ethnicity characteristics. Data and Methods: We obtained quarterly data on the number of active tobacco retailer licenses from 2011 to 2020 in every zip code in California from the California Department of Tax and Fee Administration (CDTFA). These data were then linked to zip code-level income, race/ethnicity, and population measures from the American Community Survey databases. We used single-group segmented interrupted time series analysis to assess the impact of license fees on tobacco retailer densities by neighborhood income and race/ethnicities. Results: Following the increase in license fees, the density of tobacco retailers reduced by 4 stores per 100,000 people. Moreover, the increase in license fees continuously reduced tobacco retailer densities in zip codes with a majority of low- and middle-income population and in zip codes with a majority Black population, suggesting a long-term impact on these neighborhoods. Conclusions: Given that higher smoking prevalence is associated with greater tobacco outlet density, the license fee increase could be an effective policy tool to reduce tobacco use among economically disadvantaged and minority Black communities, thereby addressing tobacco use disparities.

FUNDING: Academic Institution

PPS2-2

INTRODUCING A PHARMACY-SUPPLY MODEL FOR TOBACCO: A QUALITATIVE ANALYSIS OF PHARMACISTS' PERSPECTIVES

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Significance: Tobacco's widespread availability has helped normalise its use among young people and facilitate relapse among people trying to quit smoking. Many jurisdictions are therefore considering how to reduce tobacco supply. Aotearoa New Zealand (NZ) plans to reduce tobacco retail outlets from around 6000 to between 300 and 600 but has not yet identified an alternative supply system. Modelling studies have suggested that pharmacies could supply tobacco and cessation support, thus contributing to endgame goals; however, little is known about the feasibility or acceptability of this approach. Methods: We undertook in-depth interviews with 16 community pharmacists practising in Dunedin, NZ. We explored the physical changes required to enable pharmacy sales (e.g., store layout, storage and security) and how pharmacists interpreted supplying tobacco alongside their ethical responsibilities as healthcare professionals. We used both descriptive qualitative analysis and a reflexive thematic analysis approach to interpret the data. Results: Although some participants felt supplying tobacco would parallel other services (e.g., dispensing methadone), none felt enthusiastic about offering this service and several expressed implacable opposition to the idea. Regardless of their support, participants anticipated their stores would require major physical changes to store sufficient quantities of tobacco securely and provide spaces for private consultations. They anticipated that providing cessation advice would place significant demands on staff time. While participants generally felt physical and staffing matters could be resolved, many saw supplying tobacco through a deontological lens and viewed it as antithetical to their health-promoting role. Only a minority took a utilitarian perspective and saw potential benefit in supplying tobacco if they could provide cessation advice alongside providing tobacco products. Conclusions: Although supplying tobacco via pharmacies has some advantages, notably that pharmacists could provide cessation support and advice, adopting a pharmacy-supply model will require major store refurbishments and additional staffing. Furthermore, the entrenched opposition expressed by some pharmacists challenges the political feasibility of this approach.

FUNDING: Other

PPS2-3

FLAVORED TOBACCO SALES RESTRICTIONS AND YOUTH E-CIGARETTE USE BY TOBACCO RETAILER DENSITY

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Background: Flavored tobacco sales restrictions (FTSR) may reduce youth tobacco use, but may not be as effective in areas with greater tobacco retailer density (TRD), which is associated with greater tobacco access and more common in high-minority and low-income areas. We investigated the possible unintended consequences of FTSRs on e-cigarette access and use for youth in high TRD cities compared with low TRD cities. Methods: We analyzed data from the California Healthy Kids Survey using a difference-in-differences (DID) strategy. We compared pre- and post-policy changes in ease of access to e-cigarettes, current use, and ever use one year after implementation among students attending school in a city with a FTSR (n=20,832) versus without (n=66,126). Separate analyses were conducted for students in cities with low and high TRD, with a median cutoff of 3.3 tobacco retailers per square mile. Results: A higher percent of Hispanic students (39.2% vs. 32.0%), Asian students (23.7% vs. 14.8%), and students with parents with less than a high school education (15.2% vs. 8.8%) attended school in cities with high TRD, compared with low TRD. Among students with low TRD, FTSRs were associated with reduced ease of access to e-cigarettes (DID=0.59, 95% CI: 0.47, 0.74), ever use (DID: 0.79, 95% CI: 0.66, 0.95), and current use (DID=0.74, 95% CI: 0.59,0.94). However, among students with high TRD, FTSRs were associated with increased ease of access (DID: 1.3, 95% CI: 1.1, 1.5) and current use (DID=1.6, 95% CI: 1.3, 1.9). Conclusions: FTSRs were associated with lower youth e-cigarette access and use in low, but not high TRD areas. Stronger policies or enforcement may be needed in high TRD areas.

FUNDING: Federal

PPS2-4

THE PERCEIVED IMPACT OF LARGE REDUCTIONS IN TOBACCO RETAIL OUTLETS: A QUALITATIVE ANALYSIS OF NEW ZEALAND SMOKERS

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Significance: As part of a broader tobacco endgame strategy that involves denicotinisation and the introduction of a smokefree generation, Aotearoa New Zealand (NZ) plans to reduce tobacco retail outlets from around 8000 stores to between 300 and 600 outlets. Although studies have modelled the impact of this policy and surveyed people who smoke to assess their views on this measure, none have yet undertaken an in-depth analysis of how people who smoke anticipate responding to this policy. Methods: We undertook online in-depth interviews with 24 people who currently smoke (range 37 to 119 minutes in length). We recruited participants from two urban areas and used a novel mapping approach to examine their current tobacco outlets and views on a post-policy implementation scenario, where far fewer outlets would be available. We probed how participants viewed the policy and anticipated managing its implications, and explored their thoughts on its wider personal and social implications. We used both descriptive qualitative analysis and a reflexive thematic analysis approach to interpret the data. Results: While most participants planned to accommodate the changes by using alternative outlets or bulk-purchasing, they felt people with limited transport or mobility would face access problems and increased costs. Although they disliked the prospect of disruption, many felt the policy would spur a quit attempt, believed it would protect young people from smoking uptake, and thought it would reduce relapse among people who had quit smoking. Several thought reducing tobacco supply could increase crime, though many also anticipated increased vaping, given alternative nicotine products would remain available. Conclusions: Many participants hoped to become smokefree and some welcomed retail reduction measures, which they thought would prompt a quit attempt and reduce the risk of relapse. Concerns about how people living in marginal circumstances would access tobacco if they did not quit highlights the importance of providing comprehensive community cessation support, as outlined in the NZ Action Plan. Initiating communications plans could help reduce concerns we detected, encourage cessation attempts, and direct people who smoke to community support.

FUNDING: Other

PPS2-5

AN EXAMINATION OF RACIAL, ETHNIC, AND SOCIOECONOMIC INEQUITIES IN TOBACCO RETAILER AVAILABILITY OVER TIME, UNITED STATES

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BACKGROUND. Studies indicate that neighborhood demographic characteristics are associated with tobacco retailer availability. Research has not examined whether *change* in neighborhood demographic composition is associated with tobacco retailer availability, which could result from industry targeting. Using a national dataset of tobacco retailers in the United States (US), the present study examined the relationship between change in neighborhood demographic composition from 2000 to 2010 and tobacco retailer availability in the following decade. METHODS. Using the geographically harmonized Longitudinal Tract Data Base, we calculated the change in the percent of non-Hispanic Black residents, percent of Hispanic or Latino residents, and the percent of residents living below the federal poverty level (FPL) from 2000 to 2010 for each census tract (N = 70,244) in the US. We used the National Establishment Time-Series database to create a list of tobacco retailers at the census tract level. We used general estimating equation methods to examine the relationships between the change in tract-level sociodemographic characteristics from 2000 to 2010 and the average count of tobacco retailers from 2011-2017. Models controlled for the average count of tobacco retailers from 2000-2010 and the nesting of tracts within counties. RESULTS. A 10-percentage point difference in the change in percent of Black residents from 2000-2010 was associated with 0.28 more tobacco retailers, on average from 2011-2017 (p<0.001). Similarly, a 10-percentage point difference in the change in percent of Hispanic/Latino residents from 2000-2010 was associated with 0.30 more tobacco retailers, on average from 2011-2017 (p<0.001). Tracts with an increase in the percent of residents living below the FPL were also associated with a higher average retailer count (b=0.06, p<0.001). In adjusted models that included all sociodemographic variables, change in Black and Hispanic/Latino neighborhood composition remained significantly associated with tobacco retailer availability. CONCLUSIONS. Neighborhoods with a growing population of Black or Hispanic/Latino residents and those living under the FPL from 2000 to 2010 witnessed an increase in tobacco retailer availability. Partnerships with local communities to design tobacco control policies (e.g., capping the number of retailers in a neighborhood) are needed to reduce inequities in retailer availability.

FUNDING: Federal; State

PPS2-6

THE ASSOCIATION BETWEEN LOCAL TOBACCO RETAIL LICENSING ORDINANCES AND ADULT CIGARETTE AND E-CIGARETTE USE BY RACE/ETHNICITY, INCOME, AND EDUCATION (2016-2020): THE CASE OF CALIFORNIA

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Significance: Evidence suggests that the presence of state tobacco retail licensing (TRL) regulations is associated with lower e-cigarette use among adults. However, there is limited evidence on the association between the strength of local TRL ordinances and adult tobacco product use - cigarettes, e-cigarettes, or dual use. This study investigates the association between the strength of local TRL ordinances and adult tobacco use patterns (i.e., cigarette, e-cigarette, and dual use), and differences by sociodemographic characteristics, using California as a case study. Methods: We merged data from the California Health Interview Survey (CHIS) and the American Lung Association's (ALA) State of Tobacco Control Reports from 2016 to 2020. The ALA graded each jurisdiction based on the strength of the local TRL ordinance (A-strongest to F-weakest). We estimated multilevel multinomial logistic regression models to examine the relationship between the strength of local TRL and cigarette and e-cigarette single and dual use among adults aged 25 and older, nesting by jurisdiction. We also examined the potential for effect modification by including interaction terms for race/ethnicity, income, and education in separate models. Results: Exclusive cigarette use (9.0%) was the most common tobacco product use pattern, followed by dual use (0.5%) and exclusive e-cigarette use (0.3%) across all the sociodemographic variables. We found no association between the strength of local TRL grade and exclusive cigarette use, exclusive e-cigarette use, or dual use. However, we found suggestive evidence that the association between stronger TRL grades and lower odds of exclusive e-cigarette use was modified by education; less-educated participants living in jurisdictions with stronger grades (vs. weakest) were less likely to prefer e-cigarette to no tobacco use than higher-educated participants. There were no other significant interactions by race/ethnicity or income. Conclusion: Our findings suggest that stronger local TRL ordinances may be associated with reducing socioeconomic differences in e-cigarette use in California. Future studies should consider testing the differential impact of the TRL policies among youth and young adults who are more likely to use e-cigarettes.

FUNDING: Federal

PPS2-7

ASSESSING THE PROFILE OF SUPPORT FOR POTENTIAL TOBACCO CONTROL POLICIES TARGETING AVAILABILITY IN GREAT BRITAIN: A CROSS-SECTIONAL POPULATION SURVEY

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Significance: National governments in Great Britain are considering or have outlined an aim to reduce smoking prevalence to less than 5% within the next 10-15 years. Public support or opposition to proposed tobacco control policies, and the characteristics of support/opposition, can inform and influence the likelihood of implementation of these policies. Our aim was to examine the level of support for tobacco availability policies across Great Britain (GB) and associations between support for policy and sociodemographic, smoking and quitting characteristics. Methods: A cross-sectional representative survey (the Smoking Toolkit Study) of adults in GB (n=2,197) during September 2021. Logistic regressions estimated the associations between support for each policy and sociodemographic and smoking characteristics. Results: There was majority support for requiring retailers to have a license which can be removed if they sell to those under-age (89.6%) and for restrictions on the sale of cigarettes and tobacco near schools (69.9%). More supported than opposed raising the legal age of sale of cigarettes and tobacco to 21 (49.2% supported;30.7% opposed;20.1% unsure) and reducing the number of retailers selling tobacco in neighbourhoods with a high density of tobacco retailers (46.5% supported;23.3% opposed;30.2% unsure). More opposed than supported a ban on the sale of cigarettes and tobacco to everyone born after a certain year from 2030 onwards (a "tobacco-free generation") (41.3% opposed;34.5% supported;24.2% unsure). Age was positively associated with support for raising the age of sale and inversely associated with requiring tobacco retailer licenses. Women were more likely to support raising the age of sale and reducing the number of retailers. Conclusions: Requiring tobacco retailer licensing and restrictions on sales near schools received majority support. Other tobacco availability policies received substantial support despite considerable opposition.

FUNDING: Federal; Nonprofit grant funding entity

PAPER SESSION 3: CHRONIC DISEASE: TOBACCO TREATMENT ENGAGEMENT, DEVELOPMENT, AND OUTCOME

PPS3-1

QUITTING SMOKING CAN REDUCE LUNG CANCER FOR INDIVIDUALS AT BOTH HIGH AND LOW GENETIC RISK LEVELS: A META-ANALYSIS

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Genome-wide association studies (GWAS) have identified an increasing number of genomic variants significantly associated with common complex human diseases including smoking behaviors and lung cancer. Polygenic risk scores (PRSs) provide a single measure of genetic association that aggregates risk alleles across the genome. PRS may confer information on risk magnitude that is equivalent to that conferred by clinical risk factors. Proper clinical implementation of PRS is now an important area of active research across many disease areas. While many variants have been identified for smoking behaviors, their utility for predicting lung cancer remains unclear. Further, it is unclear whether smoking cessation confers the same benefits in lung cancer risk reduction for those who have high versus low genetic risk. Methods: We examined associations between polygenic risk scores (PRSs) and lung cancer in 18 case control studies of European ancestry (11,621 cases and 7,240 controls). We evaluated the risk of lung cancer based on PRS of lung cancer, PRS of smoking behaviors, and *CHRNA5* rs16969968. Results: First, the PRS of lung cancer, PRS of smoking behaviors, and rs16969968 were independently associated with the hazard of lung cancer (HR=1.06, 95%CI=1.04-1.08, $p=1.71\times10^{-7}$; HR=1.16, 95%CI=1.11-1.21, $p=3.73\times10^{-10}$; HR=1.16, 95% CI=1.12-1.20, $p=2.93\times10^{-16}$). Individuals with high combined genetic risk had a 6-year earlier median age of lung cancer compared with those with low risk. Second, smoking cessation (former vs. current smokers) was associated with a lower likelihood of lung cancer (HR=0.49, 95%CI=0.43-0.55, $p=1.57\times10^{-33}$), and an 8-year delay in lung cancer diagnosis age. The beneficial effects of smoking cessation were significant in those at high or low genetic risks. Conclusion: These data suggest the potential of a combined PRS to identify those at risk for earlier lung cancer. Importantly, we demonstrate that smoking cessation is highly beneficial in reducing lung cancer risk for those who smoke regardless of genetic risk level. These results suggest the potential benefit of smoking cessation for all smokers, and provide data for framing preventive interventions for those who smoke.

FUNDING: Nonprofit grant funding entity

PPS3-2

AN OPT-OUT REFERRAL STRATEGY MITIGATES RACIAL AND ETHNIC DISPARITIES IN REFERRAL AND ENGAGEMENT OF CANCER PATIENTS IN TOBACCO TREATMENT SERVICES

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Significance: For patients diagnosed with cancer, quitting smoking increases long-term survival, reduces symptom burden, optimizes postoperative outcomes, and improves quality of life. Despite the benefits of quitting, tobacco treatment access and utilization remains low with less than 40% of oncologists reporting referral of their patients for tobacco treatment. Black/African American and Hispanic/Latino patients are generally referred to tobacco treatment at lower rates than White, non-Hispanic patients despite higher rates of tobacco use. Utilizing an opt-out referral approach as an implementation strategy in cancer care settings may be effective for reducing clinician referral bias and other barriers to tobacco treatment. This paper describes the effect of an 'opt-out' referral approach on the rate of tobacco treatment referral and acceptance among Black/African American and Hispanic/Latino patients with cancer. Methods: Memorial Sloan Kettering Cancer Center has adopted universal screening of tobacco use and standardized treatment practices for current tobacco use. To evaluate the quality of tobacco treatment care, a univariate descriptive analysis of patient referral and acceptance was conducted. The sample included all patients who were diagnosed with cancer between January 2021-December 2021 (N=95,356). Results: Among the total number of patients screened for tobacco use, 72,189 identified as White, non-Hispanic, 6,661 as Black/African American, 16,506 as other races, and 6,249 as Hispanic/Latino. Of the 3,927 patients who reported currently smoking, 2,988 identified as White, non-Hispanic, 384 as Black/African Americans, 555 as other races, and 294 as Hispanic/Latino. The overall referral rate for tobacco treatment was 60% and there were no racial or ethnic differences. We found that 48.5% (n=117) of Black/African American, 43.3% (n=81) of Hispanic/Latino, and 38.7% (n=698) of White, non-Hispanic patients accepted a tobacco treatment referral. Conclusion: These findings suggest that systems-level strategies such as an 'opt-out' approach may be effective for eliminating clinician referral bias and mitigating racial disparities in tobacco treatment delivery among Black/ African American and Hispanic/Latino patients with cancer who have historically had lower rates of tobacco treatment engagement. Additional, research is needed to improve patient access and utilization of tobacco treatment in cancer care.

FUNDING: Federal

PPS3-3

CO-DEVELOPMENT OF A TAILORED SMOKING CESSATION PROTOCOL FOR AND WITH CANCER PATIENTS - FINDINGS FROM A MULTI-METHOD STUDY

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Significance: The benefits of smoking cessation (SC) after a cancer diagnosis are well documented, however, a lack of emphasis is reported. While much has been achieved with tobacco control strategies, a focused, targeted approach to SC for cancer patients who smoke is lacking thereby limiting further progress. Our Irish Cancer Society funded research enabled the co-creation of a SC framework for cancer services in Ireland. Methods: Supported by a Steering Committee with 3 patient representatives, this research collated evidence from 5 work packages: a rapid review of SC in cancer patients; a review of national smoking rates among cancer patients (2014-2018); a national audit of existing SC services (SCS) across all adult cancer hospitals; semi-structured interviews with cancer patients who smoke or quit at diagnosis and cancer healthcare professionals (HCPs), and a Patient Voice in Cancer Research (PVCR) workshop. Results: Smoking rates among cancer patients nationally have plateaued while general population rates have decreased; hospital audits identified variation in SCS and limited referrals from oncology services. Qualitative analysis identified key themes including: routine but variable SC assessment and support; patients' striving but struggling to quit; the need for a well-defined referral system and personalised one-to-one SC intervention with ongoing support. SC barriers included limited knowledge of SC supports, lack of will power, limited family support and poor prognosis. HCPs were interested but need more time, information, and training to address SC and make referrals to SCS. The rapid review found limited evidence of an optimal SC intervention for cancer patients. Based on collated findings a set of recommendations was developed to incorporate SC with comprehensive cancer care in cancer hospitals. Key recommendations included: national media awareness; a concise paper-based or electronic referral template, consultant-led pre-treatment opt-in referrals; dedicated SC advisors within cancer services or hospital SCS; bespoke interventions incorporating behavioural therapy and pharmacotherapy linking to community SC assistance for ongoing support; SC and pharmacotherapy training and routine updates on referrals for oncology HCPs; documentation and routine departmental audits of referrals/uptake. Conclusion: Our research highlights prominent gaps in available SC services and a lack of systematic approach. Our results-based recommendations should reduce inequity and promote effective SCS for cancer patients.

FUNDING: Nonprofit grant funding entity

PPS3-4

QUITTING MATTERS PROJECT: PILOT TRIAL RESULTS

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Objectives: Tobacco use disorders are disproportionately prevalent among people with HIV (PWH) and are a significant contributor to morbidity and mortality in this population. Reaching communities of PWH to facilitate cessation is challenging. Digital Therapeutics (DTx) can potentially provide wider reaching evidence-based smoking cessation treat-

ments for this population. Methods: In a remote pilot RCT we compared the feasibility, acceptability, preliminary efficacy, and implementation potential of Learn to Quit-PWH (LTQ-H), a DTx tailored to PWH, versus NCI QuitGuide. All participants received nicotine replacement therapy (i.e., patch). Primary feasibility outcomes included recruitment rates, recruitment reach, community partnerships with HIV clinics, digital biomarkers of DTx use (i.e., objective measures of DTx use), usability and user experience of the DTx, and feasibility of remote clinical trial procedures. While not statistically powered to detect differences in abstinence, secondary outcomes included 7-day point prevalence abstinence at week 12 verified by expired carbon monoxide (PPA; CO < 5 ppm; iCO Breathalyzer, Bedfont Scientific Ltd.). Results: Recruitment lasted one year at a rate of 3.5 participants per month (N=43). The sample was demographically diverse, with participants from 10 US states, and 46% African-American. We conducted outreach in 31 infectious disease clinics in the Eastern US and built relationships with local HIV providers. Digital biomarkers of LTQ-H use indicated that an average of 65% of its key modules were completed during the trial. The usability of LTQ-H [Mean System Usability Scale (SUS)=75] was above the standard cut-off (i.e., 68) and comparable to the well-established QuitGuide (Mean SUS=78). A random sample of qualitative interviews (n=17) suggested that LTQ-H effectively influenced key processes of change and led to a more positive User Experience (UX). At week 12, LTQ-H resulted in greater but not significantly higher biochemically verified 7-day PPA compared to QuitGuide (14% vs 10%; CI: 0.23 to 6). Conclusion: This trial successfully reached and accrued a diverse sample of PWH across the US, demonstrated the feasibility of remote collection of both digital biomarkers and biomarkers of tobacco use, and established community relationships with HIV clinics. The DTx tested in this intervention showed promising usability and UX, addressed targeted processes of change, and offered promising clinical benefit. A Type 1 hybrid effectiveness-implementation trial is needed to evaluate this novel DTx in a larger sample.

FUNDING: Federal; Academic Institution

PPS3-5

SMOKING CESSATION OUTCOMES AMONG SURVIVORS OF CERVICAL INTRAEPITHELIAL NEOPLASIA AND CERVICAL CANCER: A COMPARISON OF IN-CLINIC VS. ONLINE RECRUITMENT APPROACHES

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Significance: Smoking is a major risk factor for cervical cancer and cervical intraepithelial neoplasia. One-third of cervical cancer survivors are current smokers, a greater proportion than among other subgroups of cancer survivors. Recruitment of cancer survivors to smoking cessation trials is challenging, and virtually all trials have recruited from clinical settings. We describe a two-pronged recruitment strategy utilized in a recently completed RCT testing the efficacy of a Motivation And Problem Solving (MAPS) approach for facilitating smoking cessation among cervical cancer survivors. Methods: Participants (n = 202) were recruited: 1) locally from a gynecologic oncology clinic in Oklahoma City, and 2) nationally online via Facebook. This study compares the two recruitment methods on participant retention, NRT use, and self-reported 7-day and biochemically confirmed abstinence across the 18-month follow-up period. We used an intent-to-treat approach (missing = smoking). Results: The majority of participants were recruited online (n = 115; 56.9%) vs. in-clinic (n = 87; 43.1%). Overall retention was good, with 77.8% of participants completing the 18-month follow-up. Facebook-recruited participants were 5-12 times as likely as clinic-recruited participants to complete follow-up assessments at every time point (3 month: Facebook = 96.5%, Clinic = 81.6%; OR = 5.86, 95% CI: 1.87, 18.38; 6 month: Facebook = 93.9%, Clinic = 67.8%; OR = 6.28, CI: 2.55, 15.43; 12 month: Facebook = 95.7%, Clinic = 60.9%; OR = 12.04, CI: 4.41, 32.86; 18 month: Facebook = 91.3%, Clinic = 60.9%; OR = 5.15, CI: 2.31, 11.47; all p = .002). There were no differences between Facebook- and clinic-recruited participants at any follow-up assessment in self-reported NRT use (all p = .07), self-reported 7-day point prevalence abstinence (all p = .10), or biochemically confirmed 7-day point prevalence abstinence (all p = .14). Conclusions: Although participants recruited from Facebook were more likely to complete follow-up measures throughout the study period, there were no differences in smoking cessation outcomes. These findings indicate that online recruitment of cervical cancer survivors may be suitable for reaching and engaging cancer survivors in tobacco cessation trials. This could prove impactful for facilitating smoking cessation among cervical cancer survivors.

FUNDING: Federal

PPS3-6

ADAPTING A TEXT MESSAGING-BASED TOBACCO USE CESSATION PROGRAM FOR PEOPLE LIVING WITH HIV IN UGANDA AND ZAMBIA

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Significance: There is little available evidence supporting interventions to help PLWH tobacco users living in low-income African countries. This study describes results from the development phase of a study to adapt and evaluate a text messaging-based intervention for PLWH tobacco users in Uganda and Zambia that provides 6 months of ongoing support for tobacco cessation as an adjunct to standard of care. Methods: Forty-eight PLWH tobacco users were recruited from HIV clinics in Uganda (regions: Arua, Moroto) and Zambia (regions: Mongu, Chipata) to participate in focus groups (8 groups; 2-8 participants per group). Discussions provided feedback on content and delivery of the TMI, and a survey assessed acceptability and feasibility. In addition, 28 health services workers with knowledge of HIV and tobacco use were recruited across the health facilities to participate in focus groups (4 groups; 6-9 participants per group). Discussions focused on barriers to helping PLWH quit tobacco, feedback on use of text-messaging program, and critical elements in tobacco cessation services for PLWH in Uganda and Zambiz. Results: Survey data indicated high program acceptance across geographic regions, feasibility issues to address in preparation for the upcoming clinical trial, and feedback on the quantity and timing of message delivery. Qualitative analysis identified themes relevant to quitting tobacco that will be used to inform the adapted text messaging program, including specific program suggestions around text content and delivery to ensure the cultural appropriateness of the intervention to PLWH tobacco users in Uganda and Zambia. Conclusions: The proposed text-messaging intervention was well-received by both PLWH tobacco users and the health services workers who serve this population. Focus group and survey data provided concrete suggestions for how to tailor the program to address the cultural context of tobacco use, and the unique barriers to quitting, among PLWH in Uganda and Zambia.

FUNDING: Federal

PPS3-7

OPTIMIZING BEHAVIORAL AND PHARMACOLOGICAL SMOKING CESSATION INTERVENTIONS AMONG PEOPLE LIVING WITH HIV: RESULTS OF A FACTORIAL DESIGN RANDOMIZE TRIAL

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Significance: Smoking among people living with HIV/AIDS (PLWH) is the leading contributor to premature mortality. The relative values of pharmacotherapy and behavioral therapy for PLWH smokers remain unknown. Methods: The study used a factorial design to randomize participants into 4 conditions: (1) Varenicline (12 weeks) + Positively Smoke Free (8 weeks); (2) Varenicline (12 weeks) + Standard of Care (brief advice to quit); (3) Placebo (12 weeks) + Positively Smoke Free (8 weeks); and (4) Placebo (12 weeks) + Standard of Care. The primary outcome was the 7-day point prevalence abstinence (PPA) (<10mm) at 36 weeks. The trial was registered with ClinicalTrials.gov (NCT02460900). The study was conducted from June 2016 to November 2020. Results: Two hundred participants were randomized into the study. On average, participants were African-American (89.7%), men (62.8%) who primarily smoked mentholated cigarettes (96.7%). Nearly all were taking antiretroviral medication (96.2%). Quit rates for the sample were 7.5% at 36 weeks. Compared to those who received placebo, neither those who received varenicline (36 weeks (OR [95%CI], 1.31 [0.33-5.22]), p=0.70) nor those who received PSF (36 weeks (OR [95%CI], 0.26 [0.03-2.44]), p=0.24) were any more likely to quit smoking. Compared to varenicline alone and positively smoke free alone, those who received varenicline and PSF (OR [95%CI], interaction term, 3.55 [0.26-47.3], p=0.34) were not any more likely to quit smoking. Conclusions: Among an urban living, primarily African-American sample of PLWH neither varenicline, nor positively smoke free were found to be efficacious for smoking cessation at the primary end-point of 36 weeks.

FUNDING: Federal; Pharmaceutical Industry

PAPER SESSION 4: TRAINING THE TRAINERS: PERSPECTIVES AND UTILIZATION OF CHAMPIONS TO PROVIDE TOBACCO CESSATION INTERVENTIONS

PPS4-1

TOBACCO CESSATION CHAMPIONS - RECOGNIZING PHYSICIANS WHO ASK, ADVISE, AND REFER

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Significance: Tobacco use is one of the most preventable causes of morbidity and mortality in the United States. In our project, positive reinforcement for tobacco cessation referrals was accomplished by recognizing physicians/practitioners across the University of Maryland Medical System (UMMS) for their commitment to tobacco cessation. Methods: Outreach and education are conducted across UMMS to physicians/practitioners to promote the use of a tobacco cessation e-referral to the Maryland Quitline or to the on-campus Tobacco Health Practice for patients who use tobacco products. Education occurred via grand rounds, departmental meetings, webinars, pre-recorded presentations, Epic tip sheets, and one-on-one academic detailing. Data from the Epic EHR were reviewed to identify the number of tobacco cessation e-referrals to the Maryland Quitline by physicians/practitioners across the UMMS in 2021. Results: Over 500 physicians/practitioners and staff were educated across 40 presentations on how to use the e-referrals. Physicians/practitioners who e-referred ten or more patients in a 12-month period were considered 'Tobacco Cessation Champions,' and those who e-referred less than ten patients were considered 'Tobacco Cessation Advocates.' Each physician/practitioner received a letter and certificate via e-mail celebrating their work and inspiring them to encourage their colleagues to e-refer their patients for tobacco cessation. Letters and certificates were tailored to Champions and Advocates, respectively. In 2021, 264 physicians/practitioners e-referred patients to the Maryland Quitline. These physicians/practitioners received a letter and certificate in January 2022. There were 203 e-referrals submitted to the Maryland Quitline in the fourth quarter of 2021 and 269 e-referrals submitted to the Maryland Quitline in the first quarter of 2022. There were also 443 referrals to the Tobacco Health Practice in 2021. Conclusion: Positive reinforcement and acknowledgment of physicians'/practitioners' work to improve their patient's health may help increase tobacco cessation e-referrals. Physicians/practitioners self-reported enthusiasm at being acknowledged for their effort. Access to accurate EHR data can be a valuable tool in quality improvement to improve clinical outcomes in vulnerable populations. Future iterations of this effort should consider the proportion of patients who smoke and patients who do not require referral for treatment. Utilizing the rate of eligible smokers who need and are referred for treatment may produce a more accurate representation of physician/practitioner treatment efforts.

FUNDING: State

PPS4-2

CLINICIAN VIEWS OF PROACTIVE TOBACCO TREATMENT PROGRAMS FOR PATIENTS WITH COPD: A QUALITATIVE EVALUATION

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Introduction: Proactive tobacco treatment programs (PTTP) are an evidence-based strategy to recruit patients who smoke to make supported quit attempts. However, such programs are rarely implemented. We performed a qualitative assessment of clinicians to inform the creation of a PTTP for patients with chronic obstructive pulmonary disease (COPD) who smoke (PCWS). Methods: Informed by the Consolidated Framework for Implementation Research, we conducted semi-structured interviews to assess clinician views of PTTPs, including barriers, program structure and the use of technology to facilitate outreach. Clinicians (n=20) caring for PCWS at a VA medical center were purposively sampled to represent the multidisciplinary COPD care team and included: primary and specialty care physicians, nurses and advanced practice providers, tobacco treatment pharmacists, respiratory therapists, a psychologist and physician and nursing leaders. Interviews were recorded, transcribed and analyzed using directed content analysis (NVIVO software). Results: Clinicians in all roles felt that PTTPs could be an effective use of resources to help PCWS quit. However, several suggested PTTPs for younger patients who smoke would be more effective for long-term harm reduction. Clinicians supported that many staff roles could be trained to provide the outreach, but a licensed provider (e.g. nurse, pharmacist) was not necessary. Though they supported that technology could be part of the program, most expressed reservations about relying on any single method to reach patients. They advocated for multiple avenues (phone calls, drop-in clinic, texting), as the population of older PCWS was perceived to be low utilizers of technology and also frequently screen their phone calls. A point of contact who could walk patients through all available treatment options, rather than referring patients to a single treatment program, was preferred, as PCWS were perceived to have highly variable tobacco treatment needs and preferences. Many clinicians were unaware of key available tobacco treatment programs. This was an acknowledged limitation of current tobacco treatment referral pathways and an argument offered in favor of PTTPs. Conclusions: Clinicians are strongly supportive of PTTPs for PCWS, but the optimal way to structure and staff such programs remains unclear. Designing a population-based outreach strategy that does not systematically exclude subgroups of patients, such as those with low use of technology, will be important to ensure equity and maximize impact while avoiding excessive complexity.

FUNDING: Federal

PPS4-3

SMART RECOVERY FOR SMOKING: FACILITATOR PERSPECTIVES ON USING MUTUAL AID GROUPS TO PROVIDE TOBACCO TREATMENT SUPPORT

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Significance: The prevalence of cigarette smoking among people in alcohol and other drug (AOD) treatment is two to four times higher than that in the general population. SMART Recovery groups through trained facilitators provide peer support for people with AOD use problems based on motivational interviewing and cognitive behaviour therapy approaches. Addressing smoking and tobacco dependence within mutual peer support groups presents an opportunity to tackle tobacco use in the AOD sector. This study aimed to explore facilitator attitudes to tobacco treatment support to inform the development of such a program within SMART Recovery groups. Methods: SMART Recovery facilitators in Australia were sent a link to complete an online survey that asked about attitudes towards addressing tobacco smoking as part of SMART Recovery. Semi-structured interviews were conducted with SMART Recovery facilitators to further explore attitudes as well as potential barriers and facilitators. A qualitative description approach was taken to analyse the interview data. Results: 19 facilitators completed a quantitative survey, and 6 facilitators completed a qualitative interview. The survey and interview findings were consistent in that most facilitators agreed SMART Recovery should help people to address their tobacco smoking (either as their main behaviour of concern, or alongside change in other behaviours). Within the interviews, facilitators identified that many of their group members are tobacco smokers, but that tobacco smoking was rarely raised in their groups. The most common barrier described in the interviews to addressing tobacco smoking was the perception that SMART Recovery participants would prioritise other substance use. Facilitators endorsed connection to quitlines, training for facilitators, embedding tobacco smoking support in SMART materials, tackling tobacco smoking in the context of regular groups as well as tobacco smoking specific groups. Conclusion: Despite the common co-occurrence of dependent AOD use and tobacco smoking, our findings suggest tobacco smoking is not routinely addressed in SMART Recovery groups. Mutual support groups are a common method for accessing support for AOD issues and presentations to these groups represent opportunities to engage people who smoke tobacco and to provide mutual aid and referral to tobacco treatment to improve health outcomes. The key recommendations endorsed by facilitators point to opportunities for future work to pilot these.

PPS4-4

CORRELATES OF INTENTION TO PROVIDE SMOKING CESSATION COUNSELING AMONG RESPIRATORY THERAPISTS IN SAUDI ARABIA

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Significance: While smoking in high-income countries has been on the decline for decades, it is increasing in Saudi Arabia. This high burden of tobacco use calls for more health care providers to actively engage in tobacco control efforts. Respiratory therapists (RTs) in Saudi Arabia have frequent opportunities to address tobacco use in a particularly high-risk population. However, they rarely provide smoking cessation counseling to their patients. We examined sociodemographic, behavioral, and cognitive factors associated with RTs' intention to provide smoking cessation counseling to patients using the theory of planned behavior (TPB). Methods: We conducted an online cross-sectional survey with RTs in Saudi Arabia that asked questions about tobacco use and cessation counseling. We analyzed sociodemographics, tobacco use, and TPB-related constructs associated with intention to provide smoking cessation counseling to patients who smoke using linear regression models. Results: A total of 153 RTs completed the survey. The average age was 34 years (SD ± 8.03), the majority were Saudis (75%), male (59%), and married (63%). About 35% reported current cigarette smoking, waterpipe smoking, or e-cigarette use. Overall, participants reported moderate intention to provide smoking cessation counseling to patients who smoke (Mean 6.54, SD 3.2, scale 0-10) and moderate attitudes towards cessation counseling, subjective norms of cessation counseling, and perceived behavioral control to provide cessation counseling (Mean 3.57, 3.27, 3.12; SD 0.59, 0.71, 0.61, respectively; scale 1-5). In multivariable analysis, we found no differences in intention to provide smoking cessation counseling by RTs' sociodemographics or tobacco use. However, the TPB constructs, including subjective norms (β=0.86, p = 0.03) and perceived behavioral control (β=1.62, p = 0.001) were associated with greater intention to provide smoking cessation counseling. The final model explained nearly 35% of the variance in our outcome. Conclusion: These findings highlight the importance of RTs' subjective norms and perceived behavioral control as potential cessation counseling determinants. These findings can help guide the development of new interventions and refinement of educational programs targeting health care providers such as RTs.

FUNDING: Unfunded

PPS4-5

PEER MENTORS' PERCEPTIONS OF BARRIERS AND FACILITATORS TO HELPING SMOKERS LIVING WITH HIV QUIT

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Introduction: Smoking prevalence among persons living with HIV is 2-3 times that of the general population. Smokers living with HIV (SLWH) encounter significant barriers to quitting cigarettes. Peer mentoring interventions are an established effective approach in HIV/AIDS services but have not been as commonly used for smoking cessation in general or for SLWH. The goal of this study was to explore HIV+ Peer Mentors' experiences working with SLWH, perceptions of the challenges SLWH face in quitting, and ideas on how Peer Mentors could help SLWH quit. Methods: We conducted semi-structured qualitative interviews with 16 certified Peer Mentors living with HIV who had experience mentoring SLWH. Seven Peer Mentors were current cigarette smokers, six were former smokers (with an average of 10 years abstinent) and three were never smokers. Peers ranged in age from 37 to 73 and had an average of nine years of peer mentoring experience. The interview guide covered perceptions of the barriers SLWH face in quitting smoking and how the peer role could best facilitate SLWH in the process of quitting and maintaining abstinence. Interviews were audiorecorded and transcribed. Using constant comparative analysis, we conducted thematic analysis of transcripts using deductive codes based on study constructs and inductive codes based on key themes emerging from the data. Results: Themes pertaining to barriers to cessation included lack of social support for quitting, concerns that quitting would disrupt SLWH's largely smoking social networks, prior trauma and stigma related to HIV status, and smoking to cope with experiencing stigma, anxiety, depression and stress. Ideas for the Peer Mentor role in facilitating cessation for SLWH included providing ongoing social support paired with support for smoker autonomy, educating SLWH on obtaining social support for quitting, ensuring psychological safety around smokers' HIV status, setting goals for quitting and cutting down, and addressing shame and guilt related to relapse. Peer Mentors' needs to better support SLWH in quitting included (1) more training on the health effects of smoking and effective methods for quitting for SLWH, (2) a structured and ongoing program for working with SLWH, (3) providing incentives to encourage client engagement. Conclusion: Peer Mentors elucidated barriers to quitting, opportunities and their own needs to better use the peer role to help SLWH achieve cessation and long-term abstinence. Research is needed on training and intervention programs that leverage the under-utilized Peer Mentor role to help SLWH quit.

FUNDING: Academic Institution

PPS4-6

TRAINING AND TELEMENTORING TO REMOVE THE BARRIERS TO KNOWLEDGE BETWEEN RESEARCH AND PRACTICE

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SIGNIFICANCE: With commercial tobacco use still the leading cause of preventable death and disease and a shifting landscape in electronic nicotine delivery products, there is great need for trained professionals equipped to help communities break their nicotine addiction. Project TEACH (Tobacco Education and Cessation in the Health System) ECHO is a virtual telementoring program for providers wanting to increase their knowledge of evidence-based best practices and share real-world strategies utilizing the an "all teach, all learn" model. TEACH began in 2015, aimed to provide free case consultation for treating tobacco addiction in Texas mental health facilities. In 2017, an increased demand for a virtual learning community, led to sessions opening to anyone interested. TEACH adapts to the needs of providers by modifying didactics to address health equity, including diverse subject matter experts to give lectures and offering scholarship opportunities for engaged participants to become a TTS. METHODS: TEACH sessions are held twice a month for one hour and divided into two sections: a case presentation and a didactic. Sessions have an attendance rate of 45-50 participants with CE credits offered. Evaluation data is collected at entry, 6-month and annually, measuring knowledge, practice change, and participant feedback. TEACH is primarily promoted to TTS from MD Anderson's course and the other accredited Certified Tobacco Treatment Training Programs in the US. RESULTS: Based on the latest annual survey completed by 87 participants, 95% of participants shared didactics and case presentations were both useful to their daily work. The level of work experience measured showed 62% of participants have less than 5 years of experience providing services. Additionally, 90% agreed TEACH sessions increased confidence and ability to treat nicotine dependence. Finally, sessions support providers' ability to obtain research grants and collaborate with other TEACH participants. CONCLUSIONS: Over 7 years, Project TEACH sessions have become a collaborative community reaching more than 600 professionals from 39 states and 5 countries. Participants value the connectiveness with other professionals who encounter similar scenarios with their patients. This in turn increases their confidence and ability to provide treatment services and are likely to share this resource with colleagues. TEACH aims to continue being a free resource for professionals who provide tobacco treatment services.

FUNDING: Academic Institution

RAPID RESPONSE PODIUM SESSION 1

RAP1

RAPID RESPONSE PODIUM SESSION 1 - SELECTED PRESENTATIONS ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. CLICK HERE.

PODIUM PRESENTATION 2

PAPER SESSION 5: TRENDS IN SMOKING AND E-CIGARETTE USE

PPS5-1

TRENDS IN VAPING AMONG YOUTH AND YOUNG ADULTS IN CANADA, ENGLAND, AND THE UNITED STATES BETWEEN 2017 AND 2022: RECENT CHANGES IN PATTERNS OF USE, VAPING PRODUCTS, AND INDICATORS OF DEPENDENCE

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Significance: The e-cigarette product market has been rapidly evolving in terms of brands, device types, and the nicotine profile of e-liquids. This presentation will examine changes in patterns of vaping among young people from three countries with different regulatory frameworks: Canada, England, and the United States (US). Methods. Repeat cross-sectional online surveys in England, Canada, and the US were conducted with youth aged 16-19 from 2017 to 2022 (N=86,263), and with young adults aged 20-29 in 2022 (N=2978). Logistic regression models assessed trends and country differences for three primary outcomes: vaping patterns (past 30-day prevalence, frequency of use), product characteristics (brand, device type, nicotine concentration), and indicators of dependence (perceived addiction, urges to vape), adjusting for age, sex, race/ethnicity, and perceived socioeconomic status. Results. Among youth, preliminary estimates from 2022 indicate substantial increases in past 30-day vaping in England, along with increases in the number of days per month and times per day vaping. In Canada and the US, vaping prevalence has rebounded following declines during the initial pandemic period. In England, substantial changes were observed in the types of vaping products used by youth: approximately half of past 30-day vapers reported using Elf Bar, and two-thirds reported using disposable vapes—double the 2021 prevalence. Fewer changes in vape products were observed in the US and Canada: disposables remained the most popular vape devices in the US, whereas pod/cartridge vapes remained more common in Canada. The proportion of youth reporting nicotine concentrations greater than 2% or 20mg/ml was greater in the US compared to Canada and England, both of which have implemented nicotine limits (of 20mg/ml). Finally, two-thirds of past 30-day exclusive vapers reported feeing 'a little' or 'very' addicted to vaping, similar to levels of self-reported addiction to smoking among past 30-day exclusive smokers; dual users reported similar or higher levels of self-reported addiction to vaping compared to smoking. The presentation will also report comparisons between youth and young adults in each country. Conclusion. Youth vaping in England underwent considerable changes between 2021 and 2022, including more frequent use and a marked shift towards disposable products, driven by the popularity of Elf Bar. Vaping trends in Canada and the US were less dramatic, but indicate a return to pre-pandemic vaping levels.

FUNDING: Federal

PPS5-2

TRENDS IN U.S. E-CIGARETTE SALES AND PRICES BY NICOTINE STRENGTH, OVERALL AND BY PRODUCT AND FLAVOR TYPE, 2017 - 2022

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Significance: E-cigarettes with higher nicotine levels (=5%) increased considerably in market share during 2013-2018, for all flavor categories and for rechargeable e-cigarettes. The U.S. e-cigarette market has evolved in recent years, resulting in changes in availability and use of e-cigarettes with varying characteristics. Given these shifts in the e-cigarette market, it is important to evaluate recent trends in nicotine strength of e-cigarettes. Therefore, this study assessed e-cigarette unit and dollar sales in the United States by nicotine strength, overall and by product and flavor type, during January 2017-March 2022. Trends in prices of e-cigarettes by nicotine strength were also assessed. Methods: U.S. e-cigarette retail sales data were licensed from IRI company. Nicotine strength was categorized as: <1 percent; 1 percent to <2 percent; 2 percent to <3 percent; 3 percent to <4 percent; 4 percent to <5 percent; =5 percent. E-cigarette flavor was categorized as tobacco, menthol, mint or other flavors. Product type was categorized as prefilled cartridge devices, disposable devices or e-liquid bottles. Trend analyses were performed using Joinpoint Regression Program. Results: During January 2017-March 2022, unit share of products containing =5 percent nicotine strength increased by 1486.3 percent, while dollar share increased by 1345.5 percent. By March 2022, 80.9 percent of total unit sales were composed of products containing =5 percent nicotine strength. By flavor, the percentage of units sold with =5 percent nicotine strength was 61.3 percent of tobacco-flavor sales, 79.3 percent of menthol sales, 87.4 percent of mint sales, and 96.1 percent of other flavor sales. By product type, the percentage of units sold with =5 percent nicotine strength was 90.6 percent of disposable e-cigarette sales and 74.2 percent of prefilled cartridge sales. During January 2017-March 2022, price of low nicotine strength e-cigarettes increased, while the price of high-nicotine products either decreased or did not change. Conclusions: The U.S. e-cigarette market continues to be dominated by relatively high nicotine strength products. Strategies to address factors that make these products particularly appealing to youth, including flavors and product innovations, are critical.

FUNDING: Nonprofit grant funding entity

PPS5-3

CHANGES IN NICOTINE VAPING PRODUCT DEVICE PREFERENCES AND SMOKING AND VAPING BEHAVIORS AMONG ADULTS IN SOUTH KOREA AFTER JUUL AND KT&G STOPPED SELLING PRE-FILLED CARTRIDGES: FINDINGS FROM THE 2020-2021 ITC KOREA SURVEYS

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Significance: In the wake of South Korea's stricter stance toward nicotine vaping products, including a 1% cap on nicotine strength, the two leading pre-filled cartridge device (PCD) producers (Juul Labs and KT&G) completely stopped selling their products by late 2020. In addition, major convenience stores began to limit their sales of disposable devices (DD), PCDs, and refillable tank devices (RTD). This study examined how these supply side changes in the NVP market may have affected device preferences, location of purchase, and smoking and vaping-related behaviors among adult Korean vapers. Methods: The cross-sectional data for this study are from the Wave 1 (W1, June 2020) and Wave 2 (W2, Nov-Dec 2021) ITC Korea Surveys. Respondents (aged 19+) included 808 vapers at W1 and 713 vapers at W2, all who were regularly vaping (vaping =weekly), and were either (1) exclusively vaping or (2) concurrently smoking cigarettes (=weekly). Next, transitions in vaping behaviors and their device type (used most often) were assessed using W1 respondents who were successfully resurveyed recontacted at W2 (n=326). Results: Between W1 and W2, there was no change in the use of DD (11.2% [7.7, 14.8] to 11.4% [7.7, 15.0]), whereas the use of PCD decreased (44.0% [37.7, 50.4] to 29.9% [21.7,37.9]) and RTD increased (44.0% [38.3,51.4] to 58.9% [50.8,67.0]). There was an increase in purchasing all device types online (33.9% [23.4, 44.4] to 46.2% [30.4,61.9]), in-person from tobacco shops (19.6% [8.3, 30.9] to 32.5% [16.8, 48.1]), and vape shops (49.0% [35.3, 62.7] to 53.0% [36.8, 69.3]). In contrast, in person purchasing from convenience stores declined significantly (25.6% [13.6, 37.3] to 6.2% [1.9, 10.4]). Between W1 and W2, among the cohort sample who were exclusively using NVPs (n=35), 54.8% continued vaping, 39.8% stopped vaping, and 23.1% started smoking. Among dual users (n=291), 54.8% continued vaping, 45.2% stopped vaping, 90.2% continued smoking, and 9.8% stopped smoking. Conclusion: The impact of supply side changes in the vaping product marketplace in South Korea are similar to those found in the US after the FDA prioritized enforcement of restrictions on pre-filled cartridge vaping devices in that many vapers switched devices and their purchase locations. However, in South Korea, a substantial percentage (~40%) of vapers stopped vaping; this did not occur in the US. Disconcertingly in Korea, a quarter of exclusive vapers transitioned to smoking, which is likely a significant incidental impact of reduced NVP supply, while among vapers who also smoked, almost all of them continued smoking.

FUNDING: Federal; Nonprofit grant funding entity

PPS5-4

CAPSULE CIGARETTE SALES IN MEXICO, 2018-2021

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Background: Cigarettes containing crushable capsules for added flavors are designed to customize smoking experiences and reduce cigarette smoke harshness . Capsule cigarettes are particularly appealing to youth, and have been associated with improved taste and smell, and misconceptions of reduced harm. Since their introduction in 2007, the global market for capsule cigarettes has grown rapidly, especially in Latin America. This research examined the trends and patterns of capsule cigarette sales in Mexico in recent years. Methods: National data on cigarette sales from supermarkets, convenience stores, pharmacies, government-owned retail outlets, traditional stores, minimarts, booths and kiosks in Mexico between October 2018 and September 2021 were acquired from NielsenIQ. Internet searches and cigarette packs collected from five major Mexican cities (Mexico, Leon, Guadalajara, Durango, Merida) in October and November 2021 as part of the Tobacco Pack Surveillance System project supplemented Nielsen product information to determine whether characterizing, concept, and action descriptors were used in product presentation. Market share in US dollars was calculated by product capsule and flavor status and descriptors for the whole time period and for each month. Results: Capsule cigarette sales in Mexico between October 2018 and September 2021 totaled US$4.29 trillion, accounting for 38% of all cigarette sales (US$11.38 trillion) and 98% of flavored cigarette sales (US$4.36 trillion). Over half of capsule cigarettes sold during this time period (market share 57%) had concept descriptors, 18% had characterizing flavor descriptors, and 16% had action descriptors (e.g. “activa”, “click”, “convertible”, “fusion”, “mix”, “remix”, “shuffle”) that indicated capsules. Longer sticks with a length of 99-100 mm were popular among capsule cigarettes (market share 91%). In comparison, unflavored cigarettes were more popular in lengths of 80 mm (58%) and 83 mm (33%). The monthly market share of capsule cigarettes among all cigarette sales in Mexico increased steadily from 35% in October 2018 to 40% in September 2021. Conclusion: Capsule cigarettes have a substantial market share in Mexico, with increasing popularity. Descriptors and other product characteristics such as cigarette dimensions might be used to increase the appeal, and target particular populations. Policymakers should consider banning capsules and flavors in cigarettes and regulating the appearance and design of tobacco products by adopting plain and standardized packaging.

FUNDING: Nonprofit grant funding entity

PPS5-5

RAPID GROWTH IN DISPOSABLE E-CIGARETTE VAPING AMONG YOUNG ADULTS IN GREAT BRITAIN FROM 2021 TO 2022: A REPEAT CROSS-SECTIONAL SURVEY

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Significance: We aim to estimate recent trends in the prevalence of disposable e-cigarette vaping in Great Britain, overall and across ages, in the context of changes in smoking and vaping prevalence. Methods: The Smoking Toolkit Study, a monthly representative cross-sectional survey in Great Britain. Between January 2021 and April 2022, 36,876 adults (=18 years) completed telephone interviews. Current e-cigarette vapers were asked which type of device they mainly use. We estimated age-specific monthly time trends in the prevalence of current disposable e-cigarette use among vapers and inhaled nicotine use (vaping/smoking), smoking, and vaping among adults. Results: From January 2021 to April 2022, there was an 18-fold increase in the percentage of vapers who used disposables, rising from 1.2% to 22.2% (prevalence ratio [PR]=18.0; 95%CI=9.18-49.0). Growth in disposable e-cigarette vaping was most pronounced in younger adults (interaction p-value=.013): for example, the percentage of 18-year-old vapers using disposables rose from 0.4% to 54.8% (PR=129; 95%CI=28.5-4520) while it rose from 2.1% to 10.0% (PR=4.73; 95%CI=2.06-23.6) among 45-year-old vapers. However, the overall percentage of people currently using any inhaled nicotine remained stable over time both among all adults (20.0% vs. 21.2%; PR=1.06; 95%CI=0.92-1.22) and among 18-year-olds (30.2% vs. 29.7%; PR=0.99; 95%CI=0.80-1.22). In 18-year-olds, vaping prevalence grew (11.3% vs. 17.7%; PR=1.57; 95%CI=1.12-2.29) and there was imprecise evidence for a decline in smoking (24.5% vs. 19.5%; PR=0.80; 95%CI=0.63-1.04). In 45-year-olds, there was relatively little change in vaping (PR=1.08; 95%CI=0.88-1.33) or smoking prevalence (PR=1.01; 95%CI=0.88-1.16). Conclusion: Use of disposable e-cigarettes in Great Britain grew rapidly between 2021 and 2022, especially among younger adults, but the overall prevalence of inhaled nicotine use was stable over time. Most young adult vapers in Great Britain now use disposable products.

FUNDING: Nonprofit grant funding entity

PAPER SESSION 6: CHANGE DUE TO POLICY: ESTIMATING REAL AND POTENTIAL EFFECTS

PPS6-2

"JUST LISTEN TO RESIDENTS": ENHANCING IMPLEMENTING APPROACHES TO SMOKE-FREE PUBLIC HOUSING WITH RESIDENT ENGAGEMENT

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Significance: Smoke-free policies in public housing are a critical policy strategy to address smoking disparities among socioeconomically disadvantaged populations. However, there is limited research on optimal implementation approaches to ensure that residents' needs and preferences are incorporated into smoke-free implementation strategies. Using qualitative methods, we sought insights from Executive Directors (EDs) of Public Housing Authorities (PHAs) that were early adopters of a smoke-free policy. Methods: EDs (N=36) were recruited from a survey of a nationally representative sample of 150 EDs from PHAs that had gone smoke-free as of 2015 to participate in semi-structured interviews. Interviews were conducted from November 2016 to February 2017. The Consolidated Framework for Implementation Research (CFIR) was used to guide data analysis. NVivo was used to code transcripts of interviews, and then the coding was reviewed to organize the data into themes. Results: Prominent emergent themes included the importance of resident engagement, and opportunities to support smokers transition to a smoke-free environment. EDs considered resident engagement as a key strategy to inform residents about the reasons for the policy and to ensure that residents' views were incorporated into implementation plans to avoid a "top-down mandate." EDs spoke of residents speaking up during meetings and telling personal stories to motivate other residents about the importance of the smoke-free policy. While high priority was placed on helping connect smokers with low cost, accessible cessation services, there was also recognition of the need to generate strategies to help smokers who are not ready to quit to comply with the policy. Conclusions: These findings highlight the need for close engagement with residents in properties that implement smoke-free rules. Emphasis must be placed on addressing the needs of smokers, on whom the burden of policy success is placed. Barriers to successful policy implementation can be substantially reduced by engaging residents to help clarify the rationale and requirements of the policy, and ensuring support for cessation or smoking in compliance with the rules. Future studies should continue to explore the nuances of the resident perspective to support implementation of smoke-free policies in public housing and other multi-unit residential settings.

FUNDING: Federal

PPS6-3

A MICROSIMULATION MODEL EXPLORING THE POTENTIAL IMPACT OF 'TOBACCO 21' AND E-CIGARETTE POLICY SCENARIOS ON SOCIOECONOMIC AND REGIONAL INEQUALITIES IN SMOKING PREVALENCE IN ENGLAND

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Background: Smoking is a leading cause of morbidity and mortality in England, with a higher burden falling on priority groups such as those with lower income or routine and manual occupations. Microsimulation models can provide estimates of projected changes in smoking prevalence according to socio-economic position under selected policy scenarios. We present the methods and some exemplar results from one such approach. Methods: Initiated using real-world data from adult (16+) respondents to the Smoking Toolkit Study (STS), the 'QuitSimX' microsimulation model projects individual-level smoking uptake and cessation in England over time. Each 'agent' in the model is assigned sociodemographic, smoking and quitting characteristics that determine the probability of transitioning between smoking states at each future time unit. General population dynamics such as mortality are also applied. The simulation can be run under two separate policy environments, raising the age of sale of tobacco products to 21 (simulations run from 2013 to 2023), and moving a proportion of all individuals quitting using a certain method (such as over the counter nicotine replacement therapy), or no method, to using e-cigarettes instead (simulations run from 2015 to 2025). Under each policy scenario, the size of effect is specified and the outcomes simulated and assessed by important indicators of socio-economic position. Absolute inequalities are examined by comparing the subgroups at the initial and final timepoint in terms of their absolute difference in smoking prevalence. Relative change in inequalities is examined by comparing the ratio of smoking prevalence among less advantaged and more advantaged groups at the start and the end of the simulation. Results: While absolute and relative inequalities in smoking prevalence declined across the simulated period under all policy scenarios and the counterfactual baseline (no scenario), at the final time point absolute and relative inequalities between social grades and regions were similar across all scenarios, with the exception that the relative (but not absolute) inequality under the most impactful tobacco 21 scenario (1.78) was marginally higher than under the baseline scenario (1.73). Conclusion: A microsimulation model of smoking in England illustrates that absolute inequalities are projected to decrease under a Tobacco 21 or a quitting with e-cigarette scenario but that some policy solutions (Tobacco 21) may result in an increase in relative inequalities.

FUNDING: Nonprofit grant funding entity

PPS6-4

DIFFERENCES IN CIGARETTES AND ENDS INITIATION RATES AMONG YOUTH AND ADULTS BEFORE AND AFTER FEDERAL TOBACCO 21 IN THE UNITED STATES: FINDINGS FROM THE PATH STUDY 2016/17-2020

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Significance: Effective Dec. 20, 2019, US federal Tobacco 21 (T21) became law, raising the minimum age for sale of tobacco products to 21 years. We evaluated tobacco product initiation rates before and after federal T21 among those living in states without prior statewide T21, stratified by age group. We also evaluated source of product access before and after federal T21 among product users ages 18-20. Methods: We used PATH Study data from 2016/17 (before T21), 2018/19 (also before T21), and 2020 (after T21). We evaluated longitudinal initiation rates (i.e., transition from no past 30-day use at baseline to past 30-day use at follow-up) for cigarettes (n=23,029 observations) and for ENDS (n=26,779 observations) using two wave pairs (2016/17-2018/19 and 2018/19-2020). Among product users, we evaluated cross-sectional differences in source of product access (retail sources [e.g., store] vs social sources [e.g., friend]). Weighted generalized estimating equations logistic regression analyses were conducted, stratified by age group at follow-up: 12-17; 18-20; 21-24; 25+. Analyses were adjusted for demographics and state taxes. Results were released from NAHDAP/ICPSR on 8/2/22. Results: Cigarette initiation rates were lower after federal T21 than before among those ages 12-17 (1.0% vs 2.8%; AOR=0.39, 95%CI:0.24-0.64) and 18-20 (4.2% vs 8.9%; AOR=0.45, 95%CI:0.30-0.68), and were unchanged among those ages 21-24 (4.8% vs 5.6%, p=0.73) and 25+ (2.0% vs 2.2%, p=0.62). ENDS initiation rates were lower after federal T21 than before among those ages 12-17 (2.5% vs 12.7%; AOR=0.20, 95%CI:0.15-0.25), 18-20 (7.9% vs 26.5%; AOR=0.24, 95%CI:0.18-0.31), and 21-24 (5.6% vs 13.7%; AOR=0.39, 95%CI:0.26-0.57); rates were 2.8% vs 3.7% for those ages 25+ (p=0.50). For those ages 18-20 who smoked cigarettes, retail vs social source of product access was unchanged between the two timepoints before federal T21, while retail access decreased after federal T21 (AOR=0.14, 95%CI:0.06-0.29 for cigarettes and AOR=0.47, 95%CI:0.23-0.73 for ENDS). Conclusion: Findings indicate age group-specific decreases in cigarette initiation rates and retail access after December 2019, consistent with the intended effect of federal T21. Findings also indicate decreases in ENDS initiation rates after federal T21, which is likely partially due to factors beyond T21, such as flavored/cartridge ENDS restrictions, COVID, or EVALI happening around the same time, as decreases in ENDS initiation rates were not specific to those under age 21. Funding: This research was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number R21DA053614. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. Ethical approval: The research reported was approved by the Roswell Park Institutional Review Board.

FUNDING: Federal

PPS6-5

FLAVORANTS AND ADDICTION: AN EMPIRICAL ANALYSIS OF TOBACCO PRODUCT BANS AND TAXATION

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Menthol cigarettes, and other tobacco product flavorants, have been the subject of much debate by policymakers and media alike; however, empirical research regarding flavorant bans has been limited. In my work, I evaluate the potential impact of the currently proposed menthol cigarette ban using aggregate-level retail data and micro-level household data under a random coefficient nested logit framework. While analyzing my household and retail level data, I find evidence of heterogeneous consumption and addictive behavior. I then incorporate the effects of household addiction and consumer heterogeneity in my model; in particular, I estimate a model of demand that ties consumer demographic characteristics to heterogeneous preferences for products and flavorants. I pay specific attention to both the Black American community - menthol consumption greatest among these consumers - and low income households. Using my model's demand estimates, I evaluate the impact of a proposed ban on cigarette consumption and product substitution. I find that in the absence of menthol cigarettes, overall cigarette usage reduces by 11% and the Black smoking rate falls by 28%; e-cigarettes and cessation products experience a 2.8% and 1.4% increase in demand, respectively. I contrast these results with changes in consumption and consumer surplus stemming from a national cigarette tax and a ban on all flavored nicotine products. Furthermore, I find a 7% cigarette sales tax as effective as the proposed menthol ban, with a similar reduction in consumer surplus. Finally, given the acquisitions of e-cigarette companies by cigarette manufactures, I reconsider my counterfactual results under a merger between these producers.

PPS6-6

ILLUMNIATING A PATH FORWARD FOR TOBACCO NATION: PROJECTED IMPACTS OF RECOMMENDED POLICIES ON GEOGRAPHIC DISPARITIES

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Introduction: Cigarette smoking has declined substantially in the US over the past two decades; however, smoking remains high in several states. Truth Initiative identified 13 states, termed "Tobacco Nation," in which cigarette smoking remains persistently high: Alabama, Arkansas, Indiana, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Ohio, Oklahoma, South Carolina, Tennessee, and West Virginia. Although residents of these states support tobacco control policies at similar rates to the rest of the US, they have weaker tobacco control policies than other US states. Research is needed to quantify the impacts of strengthening tobacco control policies in Tobacco Nation to encourage state policy that better aligns with established science and residents' wishes. Methods: We projected smoking-attributable (SA) outcomes in Tobacco Nation states and the US from 2022 to 2041 using a microsimulation model: HealthPartners's ModelHealth™:Tobacco. We simulated 500,000 individuals for each Tobacco Nation state and the US overall, representative of each population. Using policy impact estimates from the literature, we additionally projected the impact of simultaneously increasing cigarette taxes by $1.50 and increasing tobacco control expenditures to the CDC recommended level in each Tobacco Nation state and the US from 2022 to 2041. Results: Over the next 20 years, with no policy change, adult smoking is projected to fall from an average of 19.9% to 12.0% in Tobacco Nation and an average of 15.2% to 8.4% in non-Tobacco Nation states. Compared to a scenario in which there is no policy change, the combined policies would result in a 3.5% greater reduction in adult smoking prevalence, 2,361 fewer SA deaths per million persons, and a savings of $334M in healthcare expenditures per million persons in Tobacco Nation. The simulated policies are projected to have about twice the impact on SA outcomes in Tobacco Nation states compared to non-Tobacco Nation states. State level findings demonstrate similar impacts. Conclusions: The simulations indicate that, without policy change, Tobacco Nation states will continue to have higher smoking rates than other US states over the next 20 years; adopting the policies modeled in this study would substantially reduce the geographic disparity between these geographic regions. Tobacco control advocates and policymakers can use these findings to advance policies that align with evidence and residents' wishes in Tobacco Nation states.

FUNDING: Nonprofit grant funding entity

PPS6-7

INTERACTION OF TOBACCO 21 AND TAXATION POLICIES ON YOUTH CIGARETTE SMOKING OUTCOMES

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Significance: The majority of adult daily smokers begin smoking before age 18. Previous research has shown that the implementation of Tobacco 21 (T21) laws and higher state and federal cigarette taxes are associated with a reduction in youth tobacco use. We are interested in the interaction between T21 and taxation policies and the impact on cigarette smoking disparities, which have not yet been investigated. Methods: We used national, repeated cross-sectional Monitoring the Future (MTF) survey data from 2014 to 2020 to examine the association of county-level T21 coverage (defined as 100% vs. <100%) and state-level cigarette taxation on youth smoking outcomes, specifically 30-day cigarette smoking participation, daily and first cigarette initiation, and 5-year smoking intentions. We implemented grade-stratified modified Poisson regression models that accounted for complex survey design and tested for interactions between T21 coverage and taxation on each of the four outcomes. We also examined the triple interaction with sociodemographic covariates including sex, race/ethnicity, parental education, and college plans. Results: We found that taxation is associated with a lower probability of 30-day smoking participation among 8th graders living in counties with <100% T21 coverage compared to youth living in areas with 100% coverage (Average Marginal Effect (AME) = -0.005, CI = [-0.009, -0.002]). However, this association was not statistically significant for 10th and 12th graders. There were no other associations between the interaction of T21 and taxation with any of the other smoking outcomes for any grade level. Furthermore, joint additive triple interactions with sociodemographic variables did not provide evidence for differences by sociodemographic factors in any of the associations. Conclusion: We found that taxation is more effective for 8th graders living in areas with <100% T21 coverage than for youth living in areas with 100% T21 complete coverage. Our results provide no evidence of differences by sex, race/ethnicity, parental education level, or college plans in the association between the interaction of T21 and taxation and youth smoking outcomes. Future research is needed to examine the interaction of T21 coverage and other tobacco control policies, and evaluate sociodemographic differences between these associations.

FUNDING: Federal; Academic Institution

PPS6-1

LOW HANGING FRUIT: A CONTENT ANALYSIS IDENTIFYING NON-COMPLIANCE WITH INSTAGRAM, FDA AND FTC GUIDELINES ON POSTS BY VAPING INFLUENCERS

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Background: More than 50% of US youth report past 30-day exposure to vaping ads on social media. This exposure is associated with increased risk of initiation, and habitual use of vaping products. Instagram in particular is a platform where young people are exposed to a high level of pro-vaping content even though existing guidelines from the FDA, FTC, and Instagram's own policy against promoting tobacco use should limit the prevalence of vaping content. Identifying posts subjected to such guidelines is challenging, especially from seemingly organic users (influencers). Using replicable criteria to identify vaping ads posted by Instagram influencers this research documents the extent to which such posts follow existing content regulations. Methods: We identified Instagram vaping influencers using a definition of influencer as "third-party actors who have established a significant number of relevant relationships... to influence on organizational stakeholders through content production." In October 2021, we identified 54 unique influencers with 100,000 followers or more. For each influencer we downloaded up to 10 of their most recent posts, yielding a sample of N=262 vape-related posts. Each post and the 54 influencers Instagram home pages were content coded to identify compliance with existing regulations. A codebook of discrete features was validated by two coders on a sample of n=66 posts to obtain reliability of Krippendorff's alpha > .8. Results: The influencer accounts were comprised of individuals n=28 (51.8%), brands, n=15 (27.8%), and other commercial entities such as retailers or shops, n=17 (31.5%). A third of influencer bios included links to vaping stores n=17 (31.5%). Nearly all posts featured vaping products, n=239 (91.2%). Despite 186 posts (76.2%) explicitly promoting a brand, only 1 post complied with FTC requirements of disclosing brand relationships. Only 50 posts (20.9%) had warning labels with only 8 (15.1%) fully compliant with FDA rules. Finally, three posts used cartoon imagery in violation of the FDA's warning about use of youth appealing advertisement. Discussion: Findings indicate that compliance with established regulations is negligible. Instagram's claim in 2019 that they would no longer permit the promotion of vaping products is not enforced. Moreover, violations of minimal FDA and FTC guidelines for social media promotion also appear to remain unenforced among a highly visible population of vaping influencers.

FUNDING: Unfunded; Other

PAPER SESSION 7: EMERGING ISSUES IN NICOTINE POUCH RESEARCH

PPS7-1

ASSESSMENT OF NICOTINE DELIVERY AND SUBJECTIVE EFFECTS ASSOCIATED WITH ORAL NICOTINE POUCHES WITH VARYING R- AND S-NICOTINE ISOMERS

Brittney Keller-Hamilton[1], Hayley Curran[2], Mahmood Alalwan[2], Alice Hinton[2], Leanne Atkinson[2], Sriya Suraapaneni[2], Theodore L. Wagener[2], Marielle Brinkman[2], Ahmad El-Hellani[2], Darren Mays[2]. [1]The OH State University, Columbus, OH, USA, [2]The Ohio State University, Columbus, OH, USA.

Significance: Oral nicotine pouches (ONPs; e.g., *Zyn*) carry a lower toxicant burden than cigarettes and use tobacco-derived or synthetic nicotine. Tobacco-derived nicotine contains >99% of the S-nicotine isomer, whereas synthetic nicotine can contain a racemic, or 50:50, mixture of R- and S-nicotine isomers. Animal models indicate that R-nicotine is metabolized faster and is a less potent agonist of nicotinic receptors in the brain than S-nicotine; however, the effects of R-nicotine in humans are unknown. We compared nicotine delivery and product appeal of ONPs with >99% S-nicotine vs. racemic R-/S-nicotine isomers in a sample of smokers. Methods: We enrolled N=13 adult smokers into a randomized-crossover study. In three sessions, participants used one blinded, mint, 3mg nicotine ONP for 30 minutes following ≥12 hours of nicotine abstinence. Two study ONPs contained racemic R-/S-nicotine (collapsed in analyses), and one study ONP contained >99% S-nicotine. Blood samples for plasma nicotine assessments were drawn at t=-5, 5, 15, 30, 60, and 90 minutes. Participants completed measures of craving and withdrawal relief and product appeal. We tested associations between isomer and dependent variables using mixed effects regression models and used Holm's procedure to adjust for multiple comparisons. Results: Participants were 48-years-old on average, smoked 13 cigarettes/day on average, and 65% were male. Use of the ONP with >99% S-nicotine resulted in greater maximum plasma nicotine concentration than ONPs with racemic R-/S-nicotine (10.3 ng/mL vs. 6.4 ng/mL, respectively; p=0.003). However, use of ONPs with racemic R-/S-nicotine resulted in greater self-reported reduction in withdrawal symptoms during the first 15 minutes of product use (p=0.006). Craving relief and product appeal were similar across ONPs, although participants reported greater reward from using racemic R-/S-nicotine ONPs (p=0.038) and greater negative effects of using the >99% S-nicotine ONP (p=0.047). Conclusions: Use of ONPs with racemic R-/S-nicotine was associated with reduced nicotine delivery, but greater reward and reduction in withdrawal symptoms among adult smokers. These counterintuitive findings underscore the need to evaluate the effects of nicotine isomer on nicotine delivery and subjective effects across ONPs of varying nicotine concentration and form (i.e, free-base vs. salt)—particularly among smokers who could potentially see health benefits of switching from cigarettes to ONPs.

FUNDING: Academic Institution

PPS7-2

PILOT STUDY TO COMPARE NICOTINE DELIVERY, SUBJECTIVE EFFECTS, AND SENSORY EXPERIENCES OF CIGARETTE SMOKERS USING ORAL NICOTINE POUCHES AND ELECTRONIC CIGARETTES

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Significance: Oral nicotine pouches (ONP) are emerging nicotine products that may have potential to reduce health risks compared to smoking. Appeal is important to harm reduction potential, as products unappealing to cigarette smokers will have low uptake. Limited research has characterized the appeal of ONP to cigarette smokers, and extant work primarily comes from the tobacco industry. This pilot study evaluated the appeal and abuse liability of ONP, compared to e-cigarettes, in exclusive cigarette smokers. Methods: Using a cross-over within-subjects design, 10 daily cigarette smokers attended two lab sessions that differed by product used (order randomized): ZYN (an ONP, 6mg nicotine, cool mint) or Vuse Alto (an electronic cigarette, 5.0% nicotine, menthol). Following overnight abstinence, participants were permitted to use the session product *ad libitum* for up to 30 minutes. Before and after product use, participants completed subjective questionnaires (nicotine effects, withdrawal symptoms, sensory experience) and provided blood samples were collected to measure plasma nicotine levels. Results: Participants used ZYN for an average of 9.8 min (*SD*=10.9) and Vuse for 24.7 min (*SD*=8.2; *p*<.01). Mean nicotine boost was 4.0 ng/ml (*SD*=4.7) for ZYN and 2.8 ng/ml (*SD*=3.7) for Vuse (*p*=.30). Both products demonstrated limited ability to relieve nicotine withdrawal symptoms. For instance, mean Minnesota Nicotine Withdrawal Scale Scores (0-4 scale) decreased by 0.1 (*SD*=0.5) for ZYN and 0.4 (*SD*=0.6) for Vuse (*p*=.17). Participants reported "liking effects" (0-100 scale) less for ZYN (*M change*=-6.2, *SD*=28.5) compared to Vuse (*M change*=22.1, *SD*=40.4; *p*<.05). Some negative side effects, such as nausea, had higher mean scores for ZYN than Vuse (*p*<.05). Negative sensory effects (tingling, burning) had higher mean scores for ZYN, and positive sensory effects (smoothness, taste) had higher mean scores for Vuse (*p's*<.05). 60% of participants reported preferring Vuse to ZYN and 40% reported preferring neither product; 90% and 70% of participants reported it was unlikely they would purchase ZYN or Vuse in the future, respectively. Conclusion: ZYN was minimally appealing to cigarette smokers compared to Vuse, despite similar nicotine exposures. Future studies should examine the appeal of ONP in larger samples, with varying product characteristics (brand, flavor, nicotine content), in users of other tobacco products (e.g., smokeless tobacco), and for longer durations of use.

FUNDING: Federal; Academic Institution

PPS7-3

A PRELIMINARY RANDOMIZED CLINICAL TRIAL OF ORAL NICOTINE POUCHES IN TWO NICOTINE CONCENTRATIONS ON CIGARETTE SMOKING BEHAVIOR IN ADULTS WHO SMOKE CIGARETTES

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Background: Oral nicotine pouches are new non-combustible tobacco products manufactured with pharmaceutical-grade nicotine, flavors, and additives. Due to their unique features (e.g., greater nicotine delivery than medicinal replacement therapies), they may have appeal for cigarette substitution, but this hypothesis remains to be tested. Methods: We conducted a 4-week preliminary RCT of oral nicotine pouches in either LOW (3mg) or HIGH (6mg) nicotine concentrations in adults who smoke cigarettes (N=30). All participants sampled 2 flavors and then selected a final flavor to use for the remaining 4 weeks. We assessed smoking behavior, addiction, and patient reported health outcomes at intake and Week 4 and then repeated behavior and addiction scales at Week 8. Results: Enrolled participants were primarily female (60%) and non-Hispanic white (60%; 40% identified as black or mixed race). On average, they were 56.8 (11.6) years old and reported smoking 14.8 (9.3) cigarettes per day. Of the 30 randomized participants, 29 (97%) completed the trial and provided Week 4 smoking outcome data; 27 (90%) were retained at Week 8 follow-up. Mint flavors were the most selected flavors. Both groups significantly reduced their cigarettes per day over time from baseline to Week 4 ($F(2, 27.5)=25.4$, $p<.001$). There was no significant group effect on smoking, but those in HIGH had numerically greater reductions in cigarettes per day from baseline to Week 4 (7.2 vs. 6.5). Two HIGH participants and 1 LOW participant stopped smoking by Week 4. Similar effects of time but not group were observed for cigarette dependence and cigarette craving (p's<.05). The HIGH group used significantly fewer pouches per day than the LOW group across all study weeks ($t(28)=3.1$, $p=.002$), likely because the 6mg pouch delivered more nicotine so less was needed. However, for some, HIGH may have been too high leading to less frequent use. In this regard, more HIGH participants (n=3) stopped pouch use before Week 4 than LOW participants (n=1). Two HIGH participants reported aversive experiences; none were reported in LOW. Participants in both groups rated pouches as highly satisfying and similarly satisfying as cigarettes and expressed high interest in continuing pouch use. Conclusions: These preliminary results provide support for oral nicotine pouches as substitutes for smoking, potentially at higher nicotine doses, but also that lower concentrations may be helpful (for some) due to better tolerability

FUNDING: Federal

PPS7-4

HOW THE NEWS MEDIA DISCUSSES NICOTINE POUCHES IN LOW- AND MIDDLE-INCOME MARKETS

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Significance: Nicotine pouches were recently introduced in specific test markets in low- and middle-income countries (LMICs). British American Tobacco (BAT) marketed Lyft in Kenya and Velo in Pakistan (2019) and identified Bangladesh and Indonesia as test markets for Velo (2021). We examined how nicotine pouches are discussed in

the news media in these test markets. Methods: News articles published on or before Aug 8, 2022 were obtained by searching Tobacco Watcher (www.tobaccowatcher.org), a surveillance platform that compiles tobacco-related news. Articles published in Bangladesh, Indonesia, Kenya, and Pakistan that mentioned nicotine pouches were eligible and were assessed for the following themes: harm reduction, alternative to other tobacco products, youth, and health concerns. We also noted quotes from tobacco industry employees, public health or medical professionals, and other organizations. Results: We identified 101 eligible articles, with 46 (45.5%) published in Kenya, 40 (39.6%) in Indonesia, 11 (10.9%) in Pakistan, and 4 (4.0%) in Bangladesh. Seventy-five (74.3%) discussed nicotine pouches in the context of harm reduction, with 17 of these articles expressing disagreement that nicotine pouches are a viable harm reduction option. Fifty-seven (56.4%) discussed nicotine pouches as alternatives to smoking, and 31 (30.7%) discussed youth specifically, including concerns that the pouches are appealing, easily accessible to, or are specifically marketed to youth. Thirty-two (31.7%) discussed known or possible health concerns associated with nicotine pouch use, including addiction (27, 26.7%), harms to brain development (8, 7.9%), and suggestions that nicotine pouches could be a "gateway" to other tobacco products or other drugs (6, 5.9%). Forty-five (44.6%), 32 (31.7%), and 21 (20.8%) articles included quotes from public health or medical professionals, individuals affiliated with pro-vaping or harm reduction groups, and tobacco industry representatives, respectively. Conclusion: Most articles discussed nicotine pouches as harm reduction products or alternatives to smoking, consistent with BAT's website. None discussed them as alternatives to smokeless tobacco. Only about one-third discussed potential health concerns. Surveillance of real-time communications channels, including the news and social media, can provide timely information on specific products in LMICs and how various stakeholders perceive them, which can inform future public health actions.

FUNDING: Nonprofit grant funding entity

PPS7-5

OHIO APPALACHIA SMOKERS' AND SMOKELESS TOBACCO USERS' PERCEPTIONS OF NOVEL ORAL NICOTINE POUCHES

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Significance: Oral nicotine pouches (ONPs) are increasingly popular novel products marketed as alternatives to cigarettes and smokeless tobacco (SLT). They likely offer reduced harm compared to cigarettes and SLT, but their potential public health impact is unknown. We qualitatively examined the appeal of ONPs among cigarette smokers and SLT users from Ohio Appalachia, a region disproportionately burdened by tobacco use, to understand their potential role in tobacco-related health disparities. Methods: In 2022, we conducted 10 virtual focus groups with Ohio Appalachia smokers (n=19, 5 focus groups) and smokeless tobacco users (n=18, 5 focus groups) aged 21 and older. Focus groups followed a structured guide that explored participants' perceived risks and benefits of ONPs and perceived substitutability of ONPs for cigarettes and SLT. We transcribed focus groups verbatim, then developed a codebook through an iterative process applying simultaneous inductive and deductive analysis. We double-coded transcripts (kappas for themes > 0.70) and analyzed coded data for prominent themes. Results: Participants drew from their knowledge and experience with cigarettes/SLT to formulate perceptions of ONPs. Perceived risks included gastrointestinal disease and cardiovascular complications, but generally participants perceived ONPs to have similar or less risk than cigarettes/SLT. Participants recognized "nicotine is nicotine" and the potential for addiction. Overall, participants viewed ONPs to be situational rather than complete substitutes for cigarettes/SLT because they are "cleaner," more socially acceptable, and can be used discreetly when cigarettes/SLT are prohibited or not acceptable. Perceptions on switching to ONPs varied between smokers and SLT users, by knowledge and experience of alternatives (e.g., e-cigarettes, NRT), and by motivation to quit. Conclusion: Participants perceived ONPs to generally have similar or lower risk than cigarettes/SLT and associated them with gastrointestinal disease. They viewed them to be at least as addictive as cigarettes/SLT, and better suited for situational use. While situational substitution could further exacerbate disparities in Ohio Appalachia, complete substitution could reduce cancer disparities. Research is needed to understand how these perceptions translate to patterns of use and switching to clearly communicate ONPs' potential impact.

FUNDING: Academic Institution

PAPER SESSION 8: WHY IS IT SO HARD TO STAY ABSTINENT?: FACTORS PROMOTING OR COUNTERACTING CESSATION EFFORTS

PPS8-1

NEUROAFFECTIVE REACTIVITY PROFILES ARE ASSOCIATED WITH E-CIGARETTE USE

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Significance: Identifying the psychophysiological underpinnings of cue-induced compulsive nicotine use will provide new targets for relapse prevention treatments. We tested whether neuroaffective responses to motivationally relevant stimuli are associated with cue-induced nicotine self-administration. We hypothesized that smokers with stronger neuroaffective responses to nicotine-related cues than to pleasant stimuli (C>P) are more vulnerable to cue-induced nicotine self-administration than smokers with stronger neuroaffective responses to pleasant stimuli than to nicotine-related cues (P>C). Methods: Smokers (N=36) looked at pleasant, unpleasant, neutral, and nicotine-related images signaling that an electronic nicotine delivery system (ENDS) was immediately available for use. We measured event-related potentials (a direct measure of brain activity) and computed the amplitude of the late positive potential, a robust index of motivational salience. We used k-means cluster analysis to identify individuals characterized by the C>P or the P>C neuroaffective profile. We compared the ENDS use frequency in the two groups using quantile regression for counts. Results: Cluster analysis assigned 18 smokers to the C>P profile and 18 smokers to the P>C profile. Smokers with the C>P neuroaffective profile used the ENDS significantly more often than smokers with the P>C profile. Significant differences in the number of puffs persisted across different quantiles. Conclusions: These results support the hypothesis that individual differences in the tendency to attribute motivational salience to drug-related cues underlie vulnerability to cue-induced drug self-administration. By linking brain reactivity profiles to nicotine self-administration, we identified a neuroaffective biomarker that could guide the development of personalized treatments to prevent smoking relapse.

FUNDING: Federal; Academic Institution

PPS8-2

EFFECTS OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION TO PREFRONTAL CORTEX ON WITHDRAWAL AND STATE ANXIETY IN PEOPLE WHO SMOKE CIGARETTES

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Significance: Cigarette smoking is a leading cause of preventable disease and death worldwide. A barrier to smoking cessation is withdrawal and anxiety symptoms felt during abstinence. Repetitive Transcranial Magnetic Stimulation (rTMS) to the dorsolateral prefrontal cortex (dlPFC) may be an effective treatment for reducing both withdrawal and anxiety symptoms. The current study was designed to determine if rTMS to dlPFC reduced cigarette withdrawal symptoms and state anxiety (feelings of anxiety in the present moment). The two predictions were that 1) there would be a positive relationship between withdrawal symptoms and state anxiety and 2) rTMS to dlPFC would lead to a significant reduction in withdrawal symptoms and state anxiety. Methods: Participants (N = 39) were healthy adults ages 18 - 45 that reported daily use of 5+ cigarettes, presented urinary cotinine, and did not have a substance use or psychiatric disorder. After an in-person screening, participants received rTMS to dlPFC (experimental site) and the visual cortex (v5; control site) in a randomized, single-blinded, within-subjects design. They completed fMRI scans, the Shiffman-Jarvik Withdrawal Scale (SJWS), and the State-Trait Anxiety Inventory (STAI) form Y1 before and after each rTMS treatment. Results: There was a significant positive relationship between withdrawal and state anxiety, $r = 0.69$, $p < .001$, $R2 = 0.48$, providing support for the first prediction. To test the second prediction, SJWS and STAI scores were added as outcome variables in two separate linear mixed effects models. Time (pre/post rTMS) and stimulation site (dlPFC/v5) were included as factors in both models. Participants with pre-TMS scores less than 1 standard deviation (SJWS SD = 1.12, STAI SD = 12.04) below the mean (SJWS M = 3.50, STAI M = 36.69) were excluded from the analyses. For the SJWS model, there was a significant main effect of time on withdrawal symptoms, $F(1) = 5.39$, $p = .023$; however, no significant main effects of stimulation site ($p = .062$)

or interaction between time and stimulation site (p = .908) were detected. Similarly, for the STAI model, there was a significant main effect of time on state anxiety, F(1) = 4.41, p = .039, but no significant main effects of stimulation site (p = .442) or interaction between time and stimulation site (p = .648) were found. A power analysis (alpha = .05, 1 - beta = 0.8, Cohen's d = 0.24) indicated that data should be collected from 108 participants. Conclusion: Although more data is needed, these preliminary results are evidence that rTMS can reduce smoking-related withdrawal and state anxiety. The lack of main effect of stimulation site suggests that other stimulation sites should be explored. These findings are a step towards developing rTMS as a smoking cessation treatment. This study is preregistered at: https://osf.io/82s6p.

FUNDING: Federal

PPS8-3

COMPARISON OF WITHDRAWAL SYMPTOMS BETWEEN SYNTHETIC NICOTINE AND TOBACCO-DERIVED NICOTINE

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Significance: While natural nicotine is derived from tobacco leaves, synthetic nicotine is synthesized in a laboratory. Considering that youth vaping is still prevalent, and e-cigarettes may contain synthetic nicotine, it's important to determine how synthetic nicotine impacts use behaviors and withdrawal symptoms in adolescents. Using two nicotine e-liquids that are readily accessible on the market, we sought to compare the severity of nicotine withdrawal between tobacco-derived and synthetic nicotine. Methods: Male Sprague Dawley adolescent rats (n = 6-8/group) were exposed to passive vapor for five days using an e-vape machine with a 50W power setting at 400°F. Rats were exposed to commercial e-liquids containing pure S-stereo isomer nicotine in PG55/VG45 that included 6 mg/ml synthetic or tobacco-derived free base nicotine. Over the course of two hours, rats received a total of 15 vape puffs, each three seconds in direction. Somatic signs of spontaneous withdrawal were evaluated 24 hours after the last exposure. Animals were assessed in a light-dark apparatus, where the length of time spent on the light side was tracked for 10 minutes. Subsequently, animals underwent a 5-minute elevated plus maze test to determine time spent in the open arm. Then, all animals were injected with mecamylamine (1.5 mg/kg subcutaneously), and somatic signs of spontaneous withdrawal were re-evaluated 10 minutes after the injection. Results: Compared to PG/VG control rats, animals exposed to nicotine via tobacco or synthetic sources showed more physical symptoms of spontaneous withdrawal. When compared to PG/VG control, anxiety-like behaviors as seen in the elevated plus maze test and the light-dark box test were considerably greater after synthetic nicotine but not after nicotine obtained from tobacco. In mecamylamine-precipitated withdrawal, the number of somatic signs was higher in tobacco-derived nicotine group compared to synthetic nicotine group. Conclusion: With synthetic nicotine, the physical symptoms of nicotine withdrawal and anxiety-like behaviors were more pronounced. Our future studies will explore sex and age differences. Further research is required to determine the purity, trace amounts of minor alkaloids, and any other potential causes of the disparity in withdrawal symptoms between nicotine exposure from tobacco and that from synthetic sources.

FUNDING: Federal

PPS8-4

DEVELOPMENT AND INITIAL TESTING OF CONFEDERATE-DELIVERED VIRTUAL VAPING CUES IN DUAL USERS

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Significance: Prior research has shown that adult smokers who also vape e-cigarettes, i.e. "dual users", are sensitive to in-person, confederate-delivered vaping cues modeled in the laboratory. As the COVID-19 pandemic has normalized virtual platforms for interactions, we developed and provided initial testing of whether novel confederate-delivered virtual vaping cues would elicit smoking and vaping desire in young adult dual users. Methods: Cue-delivery procedures were developed from prior research and updated for virtual cue delivery via video conferencing software. These vaping cues were examined in a preliminary study of N=17 dual users (59% female; ages 33-50). Participants were recruited through social media advertisements across various U.S. metropolitan areas. They smoked an average of 8.9 (SD=5.8) cigarettes per day and vaped at least once day per week, with 47% of the sample reporting daily vaping. Study sessions were 1½ hour conducted remotely via Zoom. The study confederate portrayed the role of being another participant and engaged in two 5-minute social interactions with the participant. In the first interaction, the confederate presented the neutral cue (drinking bottled water) and after a short break, in the second interaction, they delivered the active cue (vaping a pod-mod e-cigarette). Main outcomes were pre-post changes in smoking urge, cigarette desire, and e-cigarette desire. Results: Virtual exposure to the vaping cue, compared with the water cue, evoked a significant increase in ratings of cigarette desire [$M_{increase}$ = +3.00 vs. -7.00 (water), p=0.032, $?^2$p=0.27]. There were also directional increases in smoking urge [$M_{increase}$ = +1.53 vs. 0.06 (water), p=0.294, $?^2$p=0.07] and e-cigarette desire [$M_{increase}$ = -2.40 vs. -7.20 (water), p=0.325, $?^2$p=0.07] but these were not statistically significant. Conclusions: Visual exposure to a vaping cue delivered in a virtual setting shows promise in eliciting cigarette desire in dual users. The novel method allows more flexibility in studying cue reactivity across various locations and subgroups of interest and may help circumvent live direct confederate-delivered cues that may pose a risk in a post-COVID world. Future studies should expand on these preliminary findings and determine whether virtual confederate-delivered cues are salient in a larger sample of adults with a range of smoking (e.g., sole smokers, former smokers) and vaping (e.g., cannabis vaping) behaviors.

FUNDING: Federal

PPS8-5

SEPARATE AND COMBINED EFFECTS OF NICOTINE AND NALTREXONE ON SUSTAINED ATTENTION IN MALE AND FEMALE ABSTINENT SMOKERS

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The neural mechanisms contributing to the arousal-eliciting actions of smoking and nicotine involve multiple neurotransmitter systems. The current study examined the role of opioid neurotransmission in modulating the neuroelectric- and mood-activating response to acute nicotine administration in overnight tobacco-deprived smokers. In a randomized, double blind, placebo-controlled design involving 18 (10 male, 8 female) overnight tobacco-abstinent smokers, performance on a measure of sustained attention (the AX version of the Continuous Processing Task; AX-CPT) was assessed in response to nicotine gum (4 mg) after pretreatment with placebo or with 50 mg of the opioid antagonist naltrexone. While no effects of nicotine were observed in the overall sample, stratification by biological sex revealed nicotine-associated increased task accuracy (p = .022, Cohen's d = 0.32) in males following placebo (vs. naltrexone) pretreatment only. Additionally, the combination of naltrexone and nicotine reduced reaction time in male smokers (vs. nicotine and placebo; p = .018, Cohen's d = 0.83), but not female smokers.. These findings suggest that nicotine has stronger effects in reversing withdrawal-related deficits in sustained attention in males compared to females. This also tentatively suggests that the opioid system is involved in sustained attention processes and opioid-cholinergic interactions may moderate these processes.

FUNDING: Nonprofit grant funding entity

PPS8-6

NOVEL ASSOCIATIONS BETWEEN CHRNA5-A3-B4 AND CYP2A6 GENETIC VARIANTS AND THE LIKELIHOOD OF SMOKING CESSATION THROUGHOUT ADULTHOOD: A LONGITUDINAL STUDY OF WOMEN

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Seven genes that influence nicotinic acetylcholine receptors (*CHRNA3, CHRNA5, CHRNB2, CHRNB4*), dopaminergic function (*DRD2* and *DBH*), and nicotine metabolism (*CYP2A6*) were selected based on the relevance of their biological mechanisms to smoking behavior and prior evidence of associations between these genes and nicotine dependence. This research aimed to identify novel or understudied single nucleotide polymorphisms (SNPs) within these genes that are associated with smoking cessation. A unique characteristic of this research was the examination of smoking cessation throughout adulthood by utilizing repeated smoking status measurements collected every 2 years over up to 38-years follow-up. Participants were from two all-female longitudinal cohort studies, the Nurses' Health Study (NHS) (n = 10,017) and NHS-2 (n = 2,793). A three step process was used to evaluate genetic associations: 1) using Haploview software, 108 tag SNPs were selected providing full coverage of the seven genes; 2) Generalized estimating equations (GEE) models evaluated SNP genotype associations with the probability of having quit smoking over time in NHS; 3) SNPs reaching statistical significance (p < 0.05) within NHS, were evaluated in NHS-2 using the same GEE model and a false discovery rate (FDR) < 0.05 to control for multiple testing. Ten of the tag SNPs met the criteria for steps 2 and 3. Women with the minor alleles of six SNPs within the *CHRNA3-A5-B4* gene cluster, *CHRNA5* SNPs rs637137 [OR

= 1.22, 95% CI 1.08 - 1.38], rs503464 [OR = 1.25, 95%CI 1.08 - 1.44], and rs684513 [OR = 1.20, 95% CI 1.06 - 1.37] and *CHRNB4* SNPs rs11072774 [OR = 1.24, 95%CI 1.06 - 1.45], rs12441998 [OR = 1.20, 95%CI 1.05 - 1.37], and rs12441088 [OR = 1.24, 95%CI 1.07 - 1.44], had higher odds of quitting smoking throughout adulthood. Women with the minor alleles of two SNPs within *CYP2A6*, SNPs rs56113850 [OR = 0.82, 95%CI 0.70 - 0.95] and rs56267346 [OR = 0.81, 95%CI 0.69 - 0.95], had lower odds of smoking cessation throughout adulthood. The minor alleles of two SNPs, *CHRNA3* SNP rs77478700 [OR = 1.33, 95%CI 1.04 - 1.69] and *CHRNB4* SNP rs4887074 [OR = 1.22, 95%CI 1.04 - 1.42], were associated with higher odds of smoking abstinence throughout adulthood in moderate-to-heavy smokers, whereas among light smokers, these minor alleles were observed to be associated with lower odds of cessation throughout adulthood in both cohorts. However, the associations in light smokers were not statistically significantly. The validity of these findings is supported by replication of the results in two, well-designed cohort studies. For the first time, SNPs within these genes were shown to be significantly associated with the likelihood of smoking cessation throughout adulthood. These long-term associations have translational implications suggesting that for some smokers the adoption of cessation interventions on the model of a chronic disease management approach may be optimal.

FUNDING: Federal; Academic Institution

PAPER SESSION 9: DEVELOPMENTAL EFFFECTS OF TOBACCO AND NICOTINE EXPOSURE

PPS9-1

AMNIOTIC EXTRACELLULAR RNA FROM FETAL LUNG AFFECTED BY PRENATAL NICOTINE EXPOSURE

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Significance: Cigarette smoking during pregnancy is associated with diverse range of developmental complications. Currently, it is not clearly known how nicotine interferes and disrupts normal physiology at the molecular and cellular level. Recently, cell-derived extracellular vesicles, including exosomes and microvesicles, have emerged as a mechanism of cell-to-cell communication. Extracellular vesicles can contain several species of extracellular RNAs (exRNAs) that have been demonstrated to act as paracrine/endocrine mediators, capable of modifying the phenotype of recipient cells with functional consequences. Moreover, diagnostic value of exRNAs have been demonstrated in various pathological models, especially for detecting pulmonary disease associated with smoking. This study is to define the effect of maternal nicotine consumption during pregnancy on the biogenesis of amniotic exRNA in the animal model of fetal nicotine exposure. Methods: We have established an animal model of prenatal nicotine exposure (PNE) and collected AF, lung tissue and fetal tail tissue from each embryo. To identify a subset of fetus that showed significant response to PNE, we have examined the level of molecular markers in the fetal lung that we have previously demonstrated as differentially regulated by PNE. Based on the results, we have selected matching AF and fetal lung tissue RNA from these identified subjects for RNA-Seq analysis. Bioinformatics analysis has been performed to profile and identify RNA signatures in AF and lung tissue concordantly affected by PNE. Results: We have examined fetal lung tissue RNA and AF RNA that are coherently affected by PNE. We found the presence of male or female specific RNAs that are specifically affected in either fetal lung or AF by PNE. We have identified 250 fetal lung tissue RNAs and 72 AF RNAs that were significantly affected ($p<0.05$) by PNE. Among them, we identified 10 potential RNA candidates in fetal lung tissue and AF that were coherently affected by PNE, which were mostly snoRNA species. We have then validated differential levels of top 10 candidate RNA species (SNORA79, SNORD11B, AY172581.24, SNORD15, Nop58, SNORD24, AY172581.9, AY172581.23, AY172581.3, Odc1). Top 10 candidate RNA species significantly affected by PNE in both fetal lung and AF were validated by RT-qPCR analysis on RNA samples from lung tissues from male and female fetus, and AF collected from male and female fetus. Conclusion: Defining the effect of maternal nicotine consumption on amniotic exRNA content may be used to develop clinical tools to monitor the effects of nicotine on the pregnancy progress and fetal development. More importantly the identification of exRNA species associated with fetal nicotine exposure will be beneficial towards development of biomarkers for early detection and interventions to prevent or mitigate nicotine's teratogenic effects.

FUNDING: State; Academic Institution

PPS9-2

FETAL GROWTH FOLLOWING ELECTRONIC CIGARETTE USE IN PREGNANCY

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Significance: Electronic cigarette (ECig) use in pregnancy is common, with 10-15% of U.S. pregnancies impacted. The potential effects of ECig exposure on fetal development are largely unknown, but due to the nicotine content may be similar to exposure to traditional smoking, the leading preventable cause of low birth weight. The goal of this pilot study was to examine the association between ECig exposure and fetal growth. Methods: Study data were extracted from medical charts in this single site retrospective study. The sample, which excluded those with known alcohol, illicit drug, and prescription opioid and benzodiazepine use, contained women who used ECigs throughout pregnancy (N=20) and non-ECig user controls (N=171). Fetal size measurements were available from second and third trimester ultrasounds (weight, femur length, head circumference) and at birth (weight, length, head circumference), all expressed as percentiles for ges-

tational age. Analyses controlled for potentially confounding demographic and medical factors. Results: Following adjustment for confounding, in the second trimester, only femur length differed significantly by group, with an adjusted percentile deficit of 11.5 percentile points for ECig exposed compared to the control group. Weight and head circumference trended lower in the ECig group but did not reach significance. By third trimester, the femur length difference was 28.5 percentile points, and the fetal weight difference was also significant (17.2 percentile points). At birth, all three size parameters were significantly lower in the ECig group (weight - 12.8 points; length - 19.3 points; head circumference - 13.3 points). Conclusion: Significant size deficits were associated with prenatal ECig exposure, becoming larger and impacting more parameters with increasing gestation. Due to a small and homogeneous sample, additional study is warranted to confirm and expand upon these findings. However, this study adds to emerging data pointing to specific harms following ECig exposure in pregnancy, and suggests that ECigs may not be a "safer" alternative to traditional cigarette smoking in pregnancy.

FUNDING: Unfunded; Academic Institution

PPS9-3

EXAMINING THE IMPACT OF MATERNAL CIGARETTE SMOKING AND EARLY WITHDRAWAL ON FETAL NEUROBEHAVIOR: A PRELIMINARY STUDY

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Introduction. Despite expansive research the impact of maternal smoking during pregnancy on infant behavioral outcomes, little is still known about the early signs of smoking withdrawal in utero. The current study examined the impact of maternal smoking versus overnight abstinence on multiple fetal neurobehavior outcomes to assess potential acute behavioral indicators of fetal nicotine withdrawal. Methods. Pregnant women (36-38 weeks of gestational age) who were smoking during pregnancy completed two ultrasound sessions (overnight abstinent vs. ad lib smoking) in which fetal neurobehavior was assessed before and after the presentation of a brief abdominal vibro-acoustic stimulus (VAS). Abstinence was biochemically verified by an expired CO of =5 ppm. Each ultrasound session was coded for multiple composite and individual fetal neurobehavioral outcomes using the Fetal Neurobehavioral Coding System. Using separate linear mixed effect models, we examined whether smoking withdrawal (i.e., overnight abstinence vs. ad libitum smoking) had a significant effect on each fetal neurobehavioral outcome. Session order (first vs. second), VAS stimulation (pre-VAS vs. post-VAS), abstinence status x time, and gestational age at each session were also included in models to account for potential effects of neurobehavioral outcomes. Results. Participants were 52 healthy pregnant women (M_{age}=24.2 years, *SD*=4.4, 10% Latina, 44% racial minorities) of whom 73% had =high school education, 71% had <$30,000/year household income, and 64% were unemployed. There was not a statistically significant effect of smoking status on any composite variables (*ps*>.05). Of individual behaviors, there was a statistically significant effect of smoking status on the percentage of recordings with fidgets (*p*=.039), with significantly more fidgets on days when participants were abstinent vs. smoking. Conclusions. To our knowledge, the current study is the first to provide preliminary data investigating fetal neurobehavior indicators of fetal nicotine withdrawal. Results suggest that increased fidgeting (i.e., repetitive, small jerky movements) present on days of maternal abstinence vs. smoking adlib may indicate increased fetal stress - potentially related to maternal withdrawal. Further research is needed to investigate and clarify the potential fetal neurobehavioral outcomes relating to the acute effects of smoking vs. abstinence during pregnancy.

FUNDING: Federal

PPS9-4

USING THE EXPERIMENTAL TOBACCO MARKETPLACE TO MODEL ADOLESCENT RESPONSES TO A REDUCED NICOTINE PRODUCT STANDARD

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Significance: Responses to a reduced nicotine product standard for cigarettes are being explored. This study used a validated experimental tobacco marketplace (ETM) task to understand whether exposure to very low nicotine content (VLNC) cigarettes may reduce demand for cigarettes and increase demand for other alternative tobacco products relative to normal nicotine content (NNC) cigarettes in daily cigarette smoking adolescents (15-20) who also used at least one other tobacco product. Methods: Participants (N=38, M age = 18.7) completed an ETM task after 4 weeks during which they were instructed to replace their usual brand cigarettes with study-provided research cigarettes. Participants were randomized to receive either NNC (15.8 mg/g nicotine, N=21) or VLNC (0.4 mg/g, N=17) research cigarettes matched to their usual menthol preference. In the ETM, participants were asked to purchase nicotine products as though they were making tobacco purchases for the week using a hypothetical budget based on their real-world use. The ETM task consisted of 8 trials, across which the price per study cigarette increased ($0.12, $0.25, $0.50, $1, $2, $4, $8, and $16). Study cigarettes were the only cigarettes available in the ETM; other products included cigarillos, JUUL, disposable e-cigarettes, and nicotine replacement gum to mimic real-world availability. Results: As the price of study cigarettes increased, cigarette purchasing decreased in both groups. Groups did not differ significantly in demand for study cigarettes, though overall milligrams of nicotine purchased were lower in the VLNC group. Combustible products (e.g. cigarillos) were the most frequently purchased alternative products, and purchases were similar across groups. Rates of purchase of noncombustible products were also similar across groups. Nicotine replacement gum was purchased least often. Conclusions: Assignment to VLNC cigarettes was not associated with an increase in purchase of alternative products after 4 weeks of exposure. The similar levels of study cigarette purchasing seen across groups suggests that some adolescents who use other tobacco products may continue to purchase VLNCs. Findings suggest the need for careful messaging about the risks of VLNC cigarettes and the relative risk of alternative tobacco products.

FUNDING: Federal

PPS9-5

HOME TOBACCO SMOKE EXPOSURE AND ROUTINE HEALTHCARE UTILIZATION AMONG U.S. CHILDREN

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Significance: Child secondhand smoke exposure has been associated with negative health outcomes and higher healthcare utilization, but less is known about thirdhand smoke exposure. This study examined the association between tobacco smoke exposure and routine healthcare utilization patterns among U.S. children ages 0-17 years. Methods: We performed a secondary analysis of National Health and Nutrition Examination Survey 2013-2016 data (N=4,035). Children were categorized into one of three home tobacco smoke exposure groups: nonexposed group (NEG) who did not live with smokers; thirdhand smoke exposed group (TEG) who lived with at least one smoker who did not smoke inside the home; and mixed exposed group (i.e., secondhand and thirdhand smoke, MEG) who lived with at least one smoker who smoked inside the home. Routine healthcare utilization patterns assessed whether children had a place they usually go when they were sick or needed health advice (no, yes). If yes, then they were asked to specify the type of place they usually go to for routine care: primary care, clinic, hospital emergency department, hospital outpatient department, or other. Weighted adjusted logistic regression models were conducted while controlling for child age, sex, race, household income level, and household factors (e.g., home ownership status). Results: Concerning home exposure, 15% of children were in the TEG and 8% were in the MEG. When compared to the NEG, the TEG (adjusted OR [AOR]=1.91, 95%CI=1.90-1.92) and MEG (AOR=1.65, 95%CI=1.64-1.66) were at increased odds to have worse health now compared with 12 months ago. Children in the TEG (AOR=0.46, 95%CI=0.46-0.47) and MEG (AOR=0.59, 95%CI=0.58-0.60) were less likely to have a routine place for healthcare compared to the NEG. However, compared to the NEG, when children in the TEG and MEG had a routine place for healthcare, they were more likely to be treated at a hospital emergency department (AOR=2.49, 95%CI=2.47-2.50; AOR=1.56, 95%CI=1.55-1.57) or outpatient department (AOR=1.35, 95%CI=1.33-1.36; AOR=1.25, 95%CI=1.23-1.27), respectively. Conclusion: Children exposed to home tobacco smoke were less likely to have a routine place for healthcare. Acute healthcare settings were identified as potentially having higher interactions with children exposed to tobacco smoke. These settings can be opportune to screen for tobacco smoke exposure and educate families about the potential dangers of exposure, including thirdhand smoke.

FUNDING: Federal

PPS9-6

INFLAMMATORY MARKER LEVELS AND ILLNESSES IN CHILDREN WITH TOBACCO SMOKE EXPOSURE

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Background: Tobacco smoke exposure (TSE) may result in altered levels of inflammatory markers that may be associated with pediatric illnesses. Objective: The primary objective was to examine the relationships between inflammatory marker levels and: 1) parent-reported and cotinine-confirmed child TSE; 2) illnesses in 0-11-year-old pediatric emergency department (PED) patients who lived with ≥1 smoker. Secondary objectives were to examine the associations between inflammatory marker levels and sociodemographic characteristics and whether changes in TSE levels were associated with changes in inflammatory marker levels. Methods: Saliva samples were obtained from 115 children with a mean (SD) age of 3.5 (3.1) years during the baseline PED visit (T0) and 6-weeks later (T1). Saliva was analyzed for CRP, IL-8, IL-10, and cotinine. Parents self-reported their tobacco use and children's TSE patterns; children's medical records were reviewed to assess and categorize PED discharge diagnoses. Linear regression models were utilized to find T0 associations of individual inflammatory markers and TSE or PED diagnosis. Mixed linear models were employed to detect associations with changes in inflammatory marker and TSE levels from T0 to T1. All models were adjusted for child race/ethnicity, age, sex, household income, and housing type. Results: At T0, the geometric mean (GeoM) of cotinine was 4.1ng/ml [95%CI=3.2-5.2]; the GeoMs of CRP, IL-10, and IL-8 were 3,326.0 pg/ml [95%CI=2,696.0-4,105.0], 1.1 pg/ml [95%CI=0.9-1.3], and 474.0 pg/ml [95%CI=386.0-583.0], respectively. CRP was positively correlated with parent-reported TSE (ß ^=0.012 [95%CI:0.004-0.020], p=0.004) at T0. At T0, cotinine was not correlated with any of the inflammatory markers. However, IL-8 was higher in children with a bacterial diagnosis (p=0.002). There was a significant positive association of CRP and IL-8 with older age (p=0.03 and p<0.0001, respectively). There were no significant associations with changes in TSE and inflammatory marker levels from T0 to T1. Conclusions: Results indicate that TSE increases expression of CRP in ill children and supports prior work demonstrating that IL-8 is higher in children with bacterial infections. Thus, TSE may impact children's immune responses and TSE reduction efforts are encouraged.

FUNDING: Federal

PODIUM PRESENTATION 3

PAPER SESSION 10: E-CIGARETTES FOR SMOKING CESSATION

PPS10-1

INTEREST, EXPERIENCE, AND STRATEGIES FOR E-CIGARETTE CESSATION: A SYSTEMATIC REVIEW

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Background: E-cigarette use has been increasing globally over the past decade. With advances in nicotine delivery technology, many individuals experience symptoms of dependence on these products and report prolonged e-cigarette use after achieving abstinence from smoking. Many report interest in quitting e-cigarettes; however, little is known about the most effective strategies for e-cigarette cessation. Methods: This systematic review sought to identify and evaluate all human subjects literature published on the outcome of e-cigarette cessation through September 2021. Outcomes captured include the following: 1) E-cigarette cessation at any point, by any measure including self-report; 2) E-cigarette reduction at any point, by any measure including self-report; 3) Making a past quit attempt or attempt to reduce e-cigarette use; 4) Intentions or plans to quit or reduce e-cigarette use behaviors; 5) Intervention methodology, study engagement, and study retention. Results: Of the 79 articles identified, 56 were cross-sectional, 6 were qualitative, 5 were cohort studies, 3 were experimental, 2 were mixed methods, and 7 reported intervention or case studies of e-cigarette cessation. Results showed youth generally had high intent to quit e-cigarettes (~43-85%), whereas results were mixed with adult samples (~25-77%). Youth were motivated to quit e-cigarettes due to health concerns whereas adults were motivated to quit e-cigarettes by cost, lack of satisfaction, and psychological factors. Adults were more likely to report past e-cigarette quit attempts, most commonly "cold turkey." Studies examining strategies for e-cigarette cessation were generally case studies and underpowered pilot trials, with a majority targeted for youth. Conclusions: Given the lack of information on e-cigarette cessation, recommendations for future studies are 1) prioritize development and testing of e-cigarette treatment interventions, including both behavioral and pharmacologic approaches; 2) focus on understanding dual users of cigarettes or other tobacco products; 3) draw upon empirically supported tobacco treatment interventions and apply them to e-cigarette cessation; 4) understand more about e-cigarette users who are not interested in quitting.

FUNDING: Federal

PPS10-2

DOES VAPING PREDICT SMOKING CESSATION AMONG YOUTH AND YOUNG ADULTS? A LONGITUDINAL POPULATION COHORT STUDY

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Introduction: E-cigarettes have been shown to be effective for smoking cessation among some smokers in randomized controlled trials but real-world studies of the effectiveness of e-cigarettes for smoking cessation mixed. Few studies have evaluated the impact of e-cigarette use on smoking cessation among youth and young adults. Methods: The Vaping Dependence Cohort included youth and young adults (16-25 years old) recruited during August 2020-March 2021 who were living in Canada and followed up every 3 months for up to 1 year. From the full sample of 3402 participants, 853 reported past month current smoking (74% of whom were also current, past month e-cigarette users). The effect of concurrent e-cigarette use on the probability of smoking cessation (for at least 30 days) at the subsequent survey was assessed using negative binomial regression modelling, controlling for exposure time, repeated measures, use of other tobacco products, use of alcohol and cannabis, and demographic characteristics. Participants could contribute between 1 and 4 sets of observations with an average of 1.9 observations per participant. Results: The average age of included participants was 19.9 years old. Most participants were female (65%) and white (83%) and smoked an average of 4.7 cigarettes per day. The overall incidence of smoking cessation among youth and young adults was 39.8%. After controlling for number of cigarettes smoked per day, use of other tobacco products, use of cannabis, use of alcohol, and demographic factors, smokers who were current e-cigarette users were less likely to report smoking cessation at the subsequent survey cycle (Incident rate ratio: 0.83; 95% CI: 0.69, 0.99). Conclusions: Among youth and young adults, e-cigarette use was an indicator of being less likely to stop smoking at a subsequent wave. While e-cigarette use may help some people quit smoking, use of e-cigarettes was not associated with smoking cessation in among Canadian youth.

FUNDING: Federal

PPS10-3

E-CIGARETTE USE PATTERNS, FLAVORS, AND DEVICE CHARACTERISTICS ASSOCIATED WITH QUITTING SMOKING AMONG A US SAMPLE OF ADULTS USING E-CIGARETTES IN A SMOKING CESSATION ATTEMPT

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Background: Many adults who smoke cigarettes use e-cigarettes to try to quit smoking, however some are not successful. Identifying factors that are associated with successfully quitting smoking using e-cigarettes is important for maximizing cigarette cessation. Methods: Online survey data were collected in 2021 from 857 adults in the U.S. who reported using e-cigarettes in a recent attempt to quit smoking. Survey items assessed patterns of e-cigarette use and device characteristics (flavors, device, nicotine) used when trying to quit smoking. Multivariable linear regression models examined characteristics associated with duration of smoking abstinence when using e-cigarettes to try to quit. Results: The average duration of smoking abstinence when using e-cigarettes during a quit attempt was 65 days (SD=104). In the multivariable model, greater frequency of e-cigarette use when quitting and abruptly switching to e-cigarettes from cigarettes (vs. gradually reducing) were significantly associated with longer durations of abstinence (ps<.001). Preference for non-tobacco (relative to tobacco) flavors and nicotine concentration were not associated with abstinence, although use of newer device types (vs. cig-a-likes) was associated with greater durations of abstinence. Conclusions: Patterns of e-cigarette use were related to abstinence duration, which may provide guidance for adults who are using e-cigarettes to quit smoking to encourage complete substitution and maximize smoking cessation. Findings indicate non-tobacco e-cigarette flavors and nicotine strength are not related to cessation success for adults, which may inform tobacco regulatory policies limiting these constituents to protect public health.

FUNDING: Federal

PPS10-4

EXPLORING THE ACCEPTABILITY OF AN SMS TEXT MESSAGING PROGRAM TO SUPPORT SMOKERS TO USE E-CIGARETTES IN A QUIT ATTEMPT

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Significance: Text messages have been used successfully to increase smoking cessation but no messages exist specifically about vaping. We have previously described the development and co-design of a text message support program for smokers to use e-cigarettes to quit smoking. As part of an online randomized optimization study, we further explored the acceptability and usefulness of the set of messages. Methods: 603/1214 participants were randomized to receive text message support. All participants received a voucher to purchase an e-cigarette starter kit online and participants were sent a link to complete a follow up survey after 12 weeks. Those who were allocated to the text message condition were sent 70 messages, twice daily for the first two weeks, one a day for the following four weeks, then every other day for four weeks, finally one a week for 2 weeks. These covered both technical advice and behavioral support related to e-cigarette use as well as some generic smoking cessation texts taken from the *iQuit* in Practice message bank. Results: Between 216 and 232 (36-38%) participants completed the 12-week follow up questions about text message support. 70% reported that they found the messages useful, 8% reported that they were not useful and 7% stated that they hadn't received the texts. 66% stated that the message frequency was about right, 32% stated that they were too frequent, and 1.4% reported that they were not frequent enough. 6.5% reported blocking the messages because

they were either too frequent, too annoying or too repetitive (based on 8 comments). 46 participants provided additional feedback about the messages; 55% were positive (encouraging, supportive, motivating, helpful, well-timed, factual, useful, helped to stay off cigarettes); 32% were negative (mainly relating to the volume) and 23% were mixed (helpful but too many or too repetitive). However, there was no difference in quit rates at 12 weeks between participants who had received the texts and those who did not (Chi square = .30, p = .58). Those who rated the text messages as useful were more likely to have quit than those who rated them as not useful (Chi square = 9.64, p = 0.002). Conclusions: A text messaging program designed specifically to support smokers to use e-cigarettes in a quit attempt was generally regarded as useful for those who returned to complete the follow up survey. The full set of messages can be found here: https://doi.org/10.32388/W0GEL2

FUNDING: Nonprofit grant funding entity

PPS10-5

CHANGE IN E-LIQUIDS FLAVOR USE AND NICOTINE CONCENTRATION OVER 6-MONTHS IN PARTICIPANTS OF A SMOKING CESSATION TRIAL WITH ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS): THE ESTXENDS TRIAL

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Significance: Electronic nicotine delivery systems (ENDS) are increasingly used for smoking cessation. The broad choice of flavors and nicotine concentrations among ENDS e-liquids may help in smoking cessation. We aimed to describe flavors and nicotine concentrations in e-liquids among participants of a smoking cessation RCT. Methods: This is a subgroup analysis from the Efficacy, Safety, and Toxicology of ENDS for smoking cessation trial, a RCT on 1243 adult smokers willing to quit smoking with the help of ENDS. We described the pattern of used e-liquids over 6 months among participants from the intervention group (n=620). We offered ENDS and six different e-liquid flavors (two tobacco flavors, menthol, green apple, raspberry, and red fruits) in four different nicotine concentrations (0, 6, 11, and 19.6 mg/ml) that could be mixed. We assessed the use of flavors and nicotine concentrations at 1 week and 6 months after target quit date, comparing participants who (previous 7 days) only vaped (ENDS-only users) to those who vaped and smoked (dual users). We applied multivariable adjusted logistic regression models to compute risk ratios of use of tobacco flavor and multivariable adjusted linear regression models for nicotine concentration. We used inverse probability weighting to account for attrition. Results: In the intervention group, median age was 38 years (IQR 29-52), and 53% identified as men. At week 1, there were 409 ENDS-only (n=266 at month 6) and 129 dual users (n=102 at month 6) that provided information on e-liquids. At month 6, other participants were quitters (n=62), smokers (n=120) or missing (n=70). At week 1, the proportions of participants reporting use of tobacco flavored e-liquids were similar between ENDS only and dual users (24% vs. 27%, p=.58). At month 6, ENDS only users reported fewer tobacco flavors than dual users (21% vs. 33%, RR 0.49, p<.001). Other flavor choices among the two groups were similar. The mean nicotine concentration used at week 1 was similar between ENDS-only and dual users (13.1 vs. 12.6 mg/ml, p=.90). At month 6, ENDS-only users used a lower mean nicotine concentration than dual users (6.2 vs. 8.3 mg/ml, p=.02). Conclusion: Flavor choices were similar in ENDS-only and dual users, with dual users using more tobacco flavors at 6 months. ENDS-only users reduced their nicotine concentration more than dual users. This knowledge can support smokers and health care professionals better understand the transition process from smoking to ENDS use.

FUNDING: Academic Institution

PPS10-6

EFFECT OF E-CIGARETTES FOR SMOKING CESSATION ON DEPRESSIVE AND ANXIETY SYMPTOMS: SECONDARY ANALYSES OF A RANDOMIZED CONTROLLED TRIAL

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Background: Previous observational studies showed associations between the use of e-cigarettes/electronic nicotine delivery systems (ENDS) and the occurrence of mental health problems. Robust empirical evidence of this association is still needed. Using a smoking cessation RCT, this study assessed differences in depressive and anxiety symptoms at 6-month follow-up between participants having received ENDS and smoking cessation counselling versus smoking cessation counselling alone. Methods: This is a secondary analysis of the open-label pragmatic RCT ESTxENDS: Efficacy, Safety and Toxicology of ENDS as an Aid for Smoking Cessation. Adults smoking at least 5 cigarettes/day and willing to quit smoking were recruited from July 2018 until June 2021. The intervention group received 2 ENDS and e-liquids for 6 months for free plus smoking cessation counselling, while the control group only received smoking cessation counselling. Participants completed the Patient Health Questionnaire-9 (PHQ-9, score range 0-27) and the General Anxiety Disorder-7 (GAD-7, score range 0-21) to assess self-reported depressive and anxiety symptoms at baseline and 6-month follow-up visit. Data were analyzed using linear regression models adjusting for baseline covariates and using inverse probability weighting to account for attrition. Results: We included 1243 participants (n=620 in the intervention group, n=623 in the control group) with a mean age of 41.1±13.5. A total of 910 participants (n=502 in the intervention group, n=408 in the control group) completed the PHQ-9 at 6 months follow-up. The mean PHQ-9 scores at baseline were 4.4±4.2 in the intervention group (3.6±3.9 at 6 months) and 4.4±4.3 in the control group (4.0±4.2 at 6 months). There was no evidence for an effect of the intervention on the PHQ-9 score in the main adjusted model (coefficient -0.033, 95% CI -0.072 to 0.005, p=.091). A total of 881 participants completed the GAD-7 at 6 months follow-up. The mean GAD-7 scores at baseline were 5.5±4.4 in the intervention group (4.6±4.3 at 6 months) and 5.3±4.6 in the control group (4.6±4.4 at 6 months). There was no evidence for an effect of the intervention on the GAD-7 score in the main adjusted model (coefficient -0.0005, 95% CI -0.038 to 0.038, p=.981). Conclusion: Among smokers participating in the ESTxENDS smoking cessation trial, there was no effect of e-cigarettes on depressive and anxiety symptoms at 6 months follow-up. Trial Registration: ClinicalTrials NCT03603340

FUNDING: Nonprofit grant funding entity

PPS10-7

E-CIGARETTES FOR SMOKING CESSATION THE LATEST COCHRANE LIVING SYSTEMATIC REVIEW EVIDENCE

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Significance: There is interest in the effectiveness, safety and long-term use of electronic cigarettes (EC) for quitting combustible cigarettes. We will present the latest available evidence on these outcomes from the Cochrane living review of EC for smoking cessation. Methods: Our review is a living review and we search monthly for studies testing EC interventions for smoking cessation in people who smoke combustible tobacco cigarettes (CC). Our main comparators are EC vs NRT; nicotine EC vs non-nicotine EC; and EC vs behavioural support or no support. Studies must report abstinence from CC at 6 months or longer and/or data on adverse events or other markers of safety at 1 week follow-up or longer. We carry out screening and data extraction in duplicate, according to Cochrane methods. Results: To date, we have identified 77 studies (n=21395) eligible for inclusion; an additional 16 studies since our last update. Evidence to date suggests that EC are an effective smoking cessation tool, and that substantial numbers of people who use EC to quit continue to use them for at least 6 months. Levels of carbon monoxide and tobacco-associated toxicants appear to be lower among people using EC compared to people who continue smoking, and to date we have not found evidence

of harms associated with EC use up to a maximum follow up of two years. An update of the evidence is currently underway incorporating data identified since June 2021. We will present the results of these analyses including evidence on the effectiveness, tolerability and safety of using EC to help people who smoke CC achieve long-term smoking abstinence. We will also report on patterns of longer-term EC use and potential health impacts, including levels of toxicants among people using EC compared to continued use of CC in smoking cessation trials. Conclusions: We will present the most up-to-date data from our living systematic review. Our current data consistently signal the benefits of nicotine EC for smoking cessation and show no clear evidence of short-term harms. These findings have influenced policy and practice. Further research is needed to establish drivers of variation in and implications of continued use of EC, including longer-term studies investigating potential harms.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PAPER SESSION 11: EQUITY-FOCUSED APPROACHES TO INVESTIGATING COMMERCIAL TOBACCO PRODUCT APPEAL, TOXICANT EXPOSURE, AND SENSORY EXPERIENCES

PPS11-1

INVESTIGATION OF TOBACCO TOXICANT EXPOSURE AMONG U.S. NON-HISPANIC BLACK, HISPANIC AND NON-HISPANIC WHITE ADULTS WHO SMOKE MENTHOL AND NON-MENTHOL CIGARETTES

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Significance: Tobacco-related diseases are among the leading causes of death among Black and Hispanic adults. Menthol cigarette use is common in these groups and may drive tobacco-related disease disparities. Investigation of tobacco toxicants stratified by race/ethnicity and menthol cigarette use is critical to understand race/ethnicity related differences in morbidity and mortality. Methods: Data from the nationally representative Population Assessment of Tobacco and Health Study Wave 4 (2016-2018) was used to examine associations of menthol cigarette use and race/ethnicity (non-Hispanic Black, Hispanic, and non-Hispanic White adults) with toxicants identified on FDA's list of harmful or potentially harmful constituents in tobacco products: urine mercapturic acid metabolites of nine volatile organic compounds and two tobacco specific nitrosamines. Separate weighted linear regression models were run for each biomarker and controlled for age, sex, income, body mass index, marijuana use, other tobacco use (blunt, e-cigarette, cigarillo), creatinine, and total nicotine equivalents. Results: Among those who smoked cigarettes in the past month (N=3,843), 706 were non-Hispanic Black (non-menthol: n=179, menthol: n=527), 532 were Hispanic (non-menthol: n=256, menthol: n=267), and 2,605 were non-Hispanic White (non-menthol: n=1932, menthol: n=973). Being Hispanic (vs non-Hispanic White) was associated with relatively lower levels of tobacco specific nitrosamines, acrolein, 1,3-butadiene, crotonaldehyde and higher levels of benzene. Being non-Hispanic Black (vs. non-Hispanic White) was associated with relatively higher levels of acrylonitrile, acrolein, vinyl chloride, ethylene oxide, ethylene dibromide and benzene. Those who used menthol cigarettes in the past month (vs non-menthol cigarettes) had lower levels of acrylonitrile and 1,3-butadiene. Conclusions: Compared to their White counterparts, Black and Hispanic adults had higher levels of several toxicants relative to nicotine intake. Further study of these toxicants is warranted to understand their relationship with differential disease outcomes and how they relate to the use of other tobacco products among Black, Hispanic, and White adults who smoke.

FUNDING: Federal

PPS11-2

RACE/ETHNICITY AS A MODERATOR OF THE ASSOCIATION BETWEEN E-CIGARETTE SENSORY ATTRIBUTES AND PRODUCT APPEAL

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Introduction: It is critical to understand differential drivers of e-cigarette appeal across disparate racial/ethnic groups to inform equitable regulatory policies and adapting interventions. This study pooled data from four product appeal testing experiments to examine whether the association of sensory attribute ratings (i.e., sweet, smooth, bitter, and harsh) of e-cigarettes and their respective product appeal was moderated by race/ethnicity. Method: Non-Hispanic White (*n*=175), Black (*n*=99), Asian (*n*=34), Hispanic (*n*=30), Other (*n*=12), and Multiracial (*n*=56) adult tobacco product users (37.9% dual users) completed product appeal testing. Participants self-administrated standardized doses of e-cigarette 8-40 different products varying in flavor, nicotine, device power, and other factors. After each administration, they rated the products' sensory attributes and appeal (liking, willingness to use again). Multilevel models examined race/ethnicity as a moderator of the association of sensory attributes with appeal ratings, using inten-

sive longitudinal analysis that partitioned between-subjects variance (person-specific; reflective of individual differences one's ratings averaged across all products) from within-subjects variance (product-specific; deviation from one's average rating for a specific product). Results: Specific products rated sweeter than one's average rating (within-subjects) were associated with enhanced e-cigarette appeal less robustly for Black vs. non-Hispanic White participants. Product-specific smoothness enhanced e-cigarette appeal more robustly for Multiracial vs. non-Hispanic White participants. Product-specific bitterness reduced e-cigarette appeal more robustly for Hispanic vs. non-Hispanic White participants. Product-specific harshness reduced e-cigarette appeal more for Hispanic and less for Asian participants compared to non-Hispanic White participants. There were no interactions between race/ethnicity and between-subjects sensory ratings on appeal. Discussion: Regulatory restrictions narrowing the market to primarily e-cigarettes with harsh or bitter qualities may deter Hispanic adults from e-cigarette use but may be less likely to deter Asian adults. Black adults were less impacted by sweet and thus could be less likely to be deterred by regulatory restrictions on sweet products.

FUNDING: Federal

PPS11-3

SEXUAL ORIENTATION AND GENDER DIFFERENCES IN AD PERCEPTIONS AND PRODUCT APPEAL IN RESPONSE TO ENDS ADVERTISING

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Introduction: Electronic nicotine delivery systems (ENDS) use is disparately high among sexual minoritized (SM) populations with 11-17% of adults reporting current use, nearly twice that of heterosexual adults. Research also suggests that there is heterogeneity in ENDS use, such that SM women report markedly greater ENDS use than heterosexual women and SM men. Though prior evidence links ENDS advertising exposure to product appeal and use, little is known about how ENDS advertising is associated with product appeal among SM (vs. heterosexual) populations. This is a critical gap, as the US Food and Drug Administration needs scientific evidence to regulate advertising that may exacerbate disparities. This study tested sexual-orientation and gender-based differences in response to ENDS advertising exposure on advertisement (ad) perceptions and product appeal. Methods: Adults (N=462; 17.8% heterosexual women, 30.7% SM women, 40.7% heterosexual men, 10.8% SM men) living in the US were crowdsourced via Prolific. Participants were randomized to see two ENDS ads from a pool of 173 ads. After viewing each ad, participants rated perceived ad effectiveness, ad liking, relevance, ENDS curiosity, and use intentions. Associations between sexual orientation and outcomes were estimated using linear mixed effects models, controlling for race, age, cigarette and e-cigarette use, income, and advertised ENDS brand. We tested interaction effects between sexual orientation and gender and ran Tukey posthoc tests for significant interactions (a=.05). Results: Perceived ad effectiveness, ad liking, and relevance were lower for heterosexual women, SM women, and SM men than heterosexual men (ps<.001). SM men also reported lower ad liking than heterosexual women (p=.02). For product appeal, heterosexual women, SM men, and SM women reported lower product curiosity and intentions to use ENDs than heterosexual men (ps <.001). No outcome differences were found between heterosexual and SM women, nor SM women and men. Conclusions: Contrary to our hypotheses, SM women and men did not report greater perceived effectiveness, liking, or relevance of real-world ENDS ads, nor did they report greater product curiosity or intentions to use ENDS. More evidence is needed to understand if and how ENDS advertising influences product appeal and use among SM populations, including whether specific advertising features or tactics are more persuasive to SM people and, thus, potential targets for regulation.

FUNDING: Federal

PPS11-4

SEXUAL MINORITY WOMEN DISPLAY GREATER CIGARILLO ABUSE LIABILITY AND GREATER PREFERENCE FOR ENDS THAN CISGENDER HETEROSEXUAL WOMEN: AN EXPERIMENTAL TOBACCO MARKETPLACE APPROACH

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Introduction: Sexual and gender minority (SGM) women have far greater odds of using tobacco products compared to SGM males and heterosexuals. The disparity appears far greater for cigar products, in particular. The aim of the current study was to compare SGM women and cisgender heterosexual (Cis-Het) women on measures of cigarillo and electronic nicotine delivery device (ENDS) abuse liability, or addictive potential, when varied flavor policies were in effect in a purchasing analog, The Experimental Tobacco Marketplace. Methods: Young adult (aged 21-28) SGM (n=88) and Cis-Het (n=162) women who use cigarillos completed four conditions in The Experimental Tobacco Marketplace: flavored cigarillos and flavored ENDS available, flavored cigarillos and unflavored ENDS available, unflavored cigarillos and flavored ENDS available, and unflavored cigarillos and unflavored ENDS available. They were endowed with an account balance based off weekly tobacco product spending and allowed to purchase any of 12 products in the marketplace (including those mentioned in the conditions above) without exceeding their budget. Data were compared across identity group and conditions using a 2 X 2 X 2 ANOVA. For substitution profiles, linear regressions were fit, and an ANOVA compared substitution by SGM identity. Results: SGM women purchased more cigarillos across all ETM conditions compared to Cis-Het women ($F(1, 12) = 57.41$, $p < 0.0001$). The effect of condition was not significant. When evaluating substitution profiles, there were significant differences by SGM identity. ENDS, both flavored and unflavored, functioned as complements for cigarillos with purchasing decreasing as cigarillo price increased. SGM women purchased more ENDS products than Cis-Het women ($F(23, 4800) = 492.1$; $p < 0.0001$). Conclusions: Abuse liability for cigarillos is greater among SGM women than Cis-Het women and substitution of ENDS varies by SGM identity. Policy approaches targeted toward this population and flavor availability of cigarillos, could decrease the disparity.

FUNDING: Federal

PAPER SESSION 12: EXPLORING THE COMPLEX RELATIONSHIPS BETWEEN COVID-19, NICOTINE USE, AND HEALTH

PPS12-1

FACTORS ASSOCIATED WITH THE CHANGES IN SMOKING AND E-CIGARETTE USE IN ADOLESCENTS DURING THE COVID-19 PANDEMIC: A LONGITUDINAL STUDY

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Significance: With the onset of COVID-19, schools around the world transitioned to remote learning, and smoking and e-cigarette (e-cig) use among students decreased. This study explored factors that may have contributed to these declines. Methods: Data were analyzed from cross-sectional surveys of Guatemalan students in 7th grade through high school (n=2,951), surveyed before (May-September 2019) and during (June-November 2020) the pandemic. Using separate logistic Generalized Estimating Equations, we regressed current use and susceptibility for both smoking and e-cig on survey wave, environmental risk factors (visiting stores where tobacco is sold, viewing online cigarettes and e-cigs ads, smoking and vaping among family and friends), substance use (alcohol, marijuana), smoking and e-cig risks perceptions, and demographics. Models for susceptibility were estimated separately for subsamples of non-smokers or non-cig users. Interactions between survey wave and environmental risk factors were assessed. Results: Over time, smoking (10.3% vs 3.4%, p<0.001), e-cig use (32.1% vs 15.5%, p<0.001), and susceptibility to use e-cigs (44.2% vs 33.8%, p<0.001) all decreased, but not susceptibility to smoke (39.0% vs 37.1%, p=0.374). In adjusted models, declines in current smoking (AOR=0.44, p=<0.001) and current e-cig use (AOR=0.42 p=<0.001) remained significant, while most environmental risk factors and substance use significantly increased risk for both outcomes. The unadjusted association between wave and smoking susceptibility was not significant; however, the adjusted association became positive (AOR=1.26, p=<0.013), and viewing online cigarette ads, having family or friends who use e-cigs, and marijuana use were no longer significant. By contrast, wave was inversely associated with e-cig use susceptibility in crude (OR=0.72, p=0.001), but not in adjusted models, where environmental risk factors and alcohol use were associated with greater susceptibility. No interaction between survey wave and environmental risk factors was significant. Conclusions: The prevalence of smoking, and e-cig use, and e-cigarette susceptibility (among never users) declined over time; however, changes in environmental risk factors and substance use only appeared to explain the declines for e-cig susceptibility. The relatively stable susceptibility to smoke among non-smokers suggests that consumption may increase once schools are re-opened, and environmental risk factors return to pre-pandemic levels.

FUNDING: Federal

PPS12-2

SMOKING AND SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH HOSPITAL MORTALITY AND READMISSION AMONG INPATIENTS WITH COVID-19

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Background: Smoking history is a risk factor for initial health complications from COVID-19, including hospitalization and mortality. The independent and interactive effects of smoking and sociodemographic factors in relation to acute and post-acute clinical outcomes in COVID-19 patients remains understudied. The current study examined smoking status and sociodemographic factors in relation to two indicators of disease severity, hospital mortality and all-cause 60-day hospital readmission. Methods. This retrospective cohort study included 115,926 patients with COVID-19 who were hospitalized between February 1, 2020, and November 30, 2021, at 21 US healthcare systems. Electronic health record data elements were abstracted from each health system and harmonized and included sociodemographic factors (sex, age, gender, race, ethnicity, insurance type, and area social deprivation), smoking status (current, former, never), co-morbidities, and clinical outcomes. Multivariate generalized linear regression analyses examined smoking, sociodemographic factors, and their interaction in relation to inpatient mortality at the first hospitalization and 60-day readmission. Results. At the first hospitalization, 11,133 (9.6%) patients with COVID-19 died. Patients who smoked at admission did not differ from patients who never smoked on in-hospital mortality after adjustment for age, sex, race, ethnicity, insurance type, area deprivation, obesity, and total comorbidities. Patients who formerly smoked had higher adjusted odds of death (aOR = 1.13; 95%CI, 1.06-1.17) than did patients who never smoked. Of patients discharged alive from the first hospitalization (N = 104, 793), 14.5% were readmitted within 60-days (n = 15,184). Patients who smoked at admission (aOR, 1.50; 95% CI, 1.41, 1.60) or formerly smoked (aOR, 1.19; 95%CI, 1.15, 1.24) had higher adjusted odds of readmission than did patients who never smoked. Interactions between smoking status and patient sociodemographic factors were not statistically significant for either initial inpatient mortality or 60-day readmission. Conclusion: Former smoking predicts mortality during initial COVID-19 hospitalization. Both current and former smoking predict higher risk for 60-day hospital readmission. Associations between smoking status and severe clinical outcomes did not vary significantly by sociodemographic factors.

FUNDING: Federal

PPS12-3

BEHAVIORAL AND PSYCHOSOCIAL PREDICTORS OF TOBACCO USE AMONG YOUTH DURING THE COVID-19 PANDEMIC

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Significance: The COVID-19 pandemic disrupted the lives of people across the globe. National surveys have indicated declines in youth tobacco product use during the pandemic compared to prior years, yet few studies have examined within-person changes in tobacco product use among youth or identified factors associated with these changes. The purpose of this study is to examine associations of COVID-19-related behavioral and psychosocial factors with cigarette and ENDS use in a nationally representative sample of youth during the early pandemic, accounting for their pre-pandemic use. Methods: We used data from 6,828 youth who were ages 12-17 at Wave (W) 5 (December 2018-November 2019; data collected in-person) of the Population Assessment of Tobacco and Health (PATH) Study who were followed up approximately a year later by telephone at W5.5 (July to December 2020). Poisson regressions estimated risk ratios (RR) and 95% confidence intervals (CI) of self-reported past 30-day cigarette and ENDS use at W5.5 associated with W5.5 measures of past-year internalizing and externalizing symptoms, past-year change in mental health, beliefs about COVID-19 severity for people who use tobacco, frequency of social distancing from friends and public places, and time spent with household during the pandemic. To assess risk of use specifically during the pandemic, models were adjusted for past 30-day tobacco use and past-year internalizing and externalizing symptoms at W5, as well as sociodemographic and household characteristics. The latest available PATH Study data will be included in the final presentation. Results: Risk of cigarette use was not significantly associated with any examined factors after adjustment. Risk of ENDS use was higher among youth with higher internalizing symptom severity (RR, high vs. low: 2.50; 95% CI: 1.80, 3.46; P, trend <0.0001) and lower among youth who believed COVID-19 illness was more severe for people who use ENDS compared to those who do not (RR, a lot more severe vs. about the same: 0.48; 95% CI: 0.29, 0.81; P, trend: 0.006) and youth who more frequently socially distanced from their friends (RR, always vs. never: 0.31; 95% CI: 0.19, 0.50; P, trend: 0.0001). Conclusions: Results suggest that decreases in youth ENDS use during the pandemic may have been related to social distancing and fears about COVID-19 illness. Potential increases in ENDS use among youth with internalizing symptoms may be obscured in population-wide estimates, and should be explored further given the negative impact of the COVID-19 pandemic on mental health. However, differences in mode and time period of data collection may have impacted our findings.

FUNDING: Federal

PPS12-4

ADOLESCENT TOBACCO, CANNABIS, AND ALCOHOL USE DURING IN-PERSON, REMOTE, AND HYBRID SCHOOL INSTRUCTION, 2020-2022

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Significance: The COVID-19 pandemic caused a sudden and prolonged shift away from in-person instruction for many US students, potentially affecting access to tobacco and other substances via decreased peer interactions. It also complicated adolescent tobacco use surveillance previously reliant on school-based surveys. We aimed to estimate how adolescent tobacco, cannabis, and alcohol use differed under various school instruction methods. Methods: We examined three semi-annual survey waves (spanning August 2020 - May 2022) of a prospective cohort of adolescents (N=1066 students; 2242 observations) from 8 Northern California high schools that used different instruction methods (in-person, remote, rotation/hybrid), including at different times during the pandemic. Past 30-day use of e-cigarettes, other tobacco (i.e., not e-cigarettes), cannabis, and alcohol were modeled as predicted by instruction method in separate generalized estimating equation models with robust variance and multiple imputation of missing covariables. Models adjusted for socio-demographic variables (e.g., gender, race/ethnicity, grade in school, parent education), a pandemic anxiety scale, survey wave, school identifier, and other substance use risk factors, including use of the other three substances. Results: Relative to in-person instruction, remote only instruction was associated with lower adjusted odds of e-cigarette use (OR: 0.4; 95%CI: 0.3, 0.8) but higher adjusted odds of cannabis use (OR: 1.5; 1.0, 2.2) and other tobacco use (OR: 3.4; 1.6, 7.5) and no association with alcohol use (OR: 1.1; 0.8, 1.7). Marginal predictions suggested that school instruction method was associated with a meaningful difference in past 30-day e-cigarette use (in-person: 16.6%; remote: 10.8%; rotation/hybrid: 13.0%). Conclusions: School instruction environments during the COVID-19 pandemic likely disrupted adolescents' substance use behaviors, decreasing e-cigarette use but possibly increasing use of other tobacco and cannabis. As in-person instruction resumes nationally, subsequent shifts in adolescent substance use may be expected.

FUNDING: Federal

PPS12-5

SMOKING STATUS, NICOTINE REPLACEMENT, VACCINATION AND COVID-19 HOSPITAL OUTCOMES IN THE CEC-UW PROJECT: AN UPDATE INCLUDING 41,354 ADDITIONAL PATIENTS

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Background: The COVID EHR Cohort at the University of Wisconsin (CEC-UW) project is a retrospective cohort study using electronic health record data from patients hospitalized with COVID-19 at 21 US health systems. A previous report (Piasecki, et al., in press, *NTR*) using CEC-UW data from February 2020 through September 2021 found that, compared to never smokers, former smokers and those with a missing smoking status had increased risk of mortality; current smokers did not. The study found that nicotine replacement therapy (NRT) prescription was associated with reduced mortality in current smokers and vaccination effects were more strongly associated with reduced mortality in current and former smokers than in never smokers. This study examines updated data collected through January 2022 with an additional 41,354 patients. Methods. Electronic health record data from all patients hospitalized with COVID-19 at each health system were extracted and harmonized (n=145,944). The study included sociodemographic factors (sex, age, gender, race, ethnicity, body mass index, insurance type, comorbidities), smoking status (current, former, never, missing), and clinical outcomes (in-hospital death). Generalized linear mixed model logistic regressions were used to examine how in-hospital mortality was related to smoking status, in-hospital NRT prescription, and vaccination status. Results. In-hospital mortality (n=13,036: 8.9%) was similar for never smokers and current smokers after adjustment for age, sex, race, ethnicity, BMI, insurance type, and comorbidities. Former smokers [adjusted odds ratio (aOR)] = 1.11; 95% CI, 1.07-1.16) and patients with missing smoking status (aOR = 1.11, 95% CI, 1.03, 1.19) had a higher adjusted odds of death than those who never smoked. NRT prescription for current smokers was associated with lower odds of death than those who were not prescribed NRT (aOR = 0.61; 95% CI, 0.50-0.75). COVID-19 vaccination reduced odds of death overall (aOR = 0.62; 95% CI, 0.57-0.68), an effect not moderated by smoking status. Conclusion: Former but not current smokers hospitalized with COVID-19 are at higher risk for mortality. NRT during hospitalization with COVID-19 for current smokers may be beneficial. In contrast to earlier findings, smoking status did not moderate mortality-protective effects of SARS-CoV-2 vaccination. This may reflect both rising rates of vaccination and the emergence of new viral variants during the later months of the study.

FUNDING: Federal

PPS12-6

CURRENT TOBACCO SMOKING AND RISK OF SARS-COV-2 INFECTION AND HOSPITALIZATION: EVALUATING THE ROLE OF SOCIO-DEMOGRAPHIC FACTORS AND COMORBIDITIES

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Introduction: Our recently published study of >2.4 million adults in Northern California indicated that current versus never-tobacco smoking was associated with lower risk of SARS-CoV-2 infection and less severe coronavirus disease 2019 (COVID-19). We extended this research by evaluating whether these associations were moderated by socio-demographic factors and medical comorbidities. Methods: This retrospective cohort study of 1,885,826 adults with current or never-smoking status in Kaiser Permanente Northern California from 3/5/2020 (baseline) to 12/31/2020 (pre-vaccine) included electronic health record-based socio-demographics (sex, age, race/ethnicity, neighborhood deprivation) and medical comorbidities (obesity, cardiovascular conditions, diabetes, renal disease, respiratory conditions). We estimated the adjusted risk of SARS-CoV-2 infection and hospitalization (=30 days of infection) associated with smoking status using Cox proportional hazard regression models. We estimated associations within subgroups of socio-demographics and comorbidities, and tested for effect modification using interaction terms. Results: During the study, 35,627 patients had SARS-CoV-2 infection. Current versus never-smoking status was associated with lower adjusted rates of SARS-CoV-2 infection (aHR ranging from 0.51 to 0.89) and hospitalization (aHR ranging from 0.32 to 0.70) within nearly every socio-demographic and comorbidity subgroup. Statistically significant interactions showed that the magnitude of protection for SARS-CoV-2 infection varied by sex, age, race/ethnicity, NDI, cardiovascular conditions and diabetes, and for SARS-CoV-2 hospitalization by age and renal disease. Conclusions: While some socio-demographics and comorbidities moderated the associations, the lower risk of SARS-CoV-2 infection and hospitalization associated with current versus never-smoking status persisted among patients regardless of socio-demographics or comorbidities.

FUNDING: State

PPS12-7

RACISM AND DISCRIMINATION: EXAMINATION OF SMOKING BEHAVIORS AMONG ADULTS DURING THE COVID-19 PANDEMIC

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Significance: Racial/ethnic disparities in tobacco use and related health consequences persist, and experiences with racial discrimination have been associated with increased smoking and worse cessation outcomes. We evaluated whether perceived discrimination mediated associations between race/ethnicity and smoking behaviors during the COVID-19 pandemic. Methods: Data came from an October-November 2020 U.S. nationally representative survey of current or recently quit cigarette smokers and e-cigarette users. These analyses focus on 1,223 current cigarette smokers. Participants reported changes in smoking frequency and motivation to quit, and whether they had made a serious quit attempt since February 2020. Discrimination was measured with the Everyday Discrimination Scale, with the item stating, "You are unfairly stopped, searched, questioned, physically threatened or abused by the police" and two items assessing worries about protests or experiences with racism, discrimination or police injustice, and being avoided or insulted because of race/ethnicity in 2020. Results: Participants identifying as Black, Hispanic, or other race/ethnicity (referred to "non-white" thereafter) were less likely to have made a serious quit attempt since the start of the pandemic, compared to non-Hispanic whites ($?^2$=24.97, p<.0001). Those who were non-white, compared to those who are white, reported a decreased motivation to quit smoking ($?^2$= 13.46, p=.03). Those who are non-white reported greater experiences with discrimination on all three measures. Increased worries about being unfairly stopped, searched, questioned, physically threatened, or abused by the police increased the odds of not making a serious quit attempt (standardized coefficient, ß=.019, p=.04). Those who are non-white are more likely to report increased experiences of people avoiding them or insulting them, which results in them being more likely to not have a serious quit attempt, compared to those who are white ((standardized coefficient, ß=.09, p=.001). Conclusion: Among U.S. adult cigarette smokers, racial/ethnic minorities were less likely to have made a serious quit attempt during the COVID-19 pandemic, and this was mediated by greater experiences with racial discrimination. Longitudinal studies are needed to further examine the role of discrimination in smoking behaviors, and efforts are needed to combat tobacco-related disparities during the pandemic.

FUNDING: Nonprofit grant funding entity

PAPER SESSION 13: VARENICLINE: NEW APPLICATIONS AND EFFECTS

PPS13-1

DOES EXTENDING THE DURATION OF PRE-QUIT TREATMENT WITH VARENICLINE ENHANCE EXTINCTION OF SMOKING BEHAVIOR AND IMPROVE SMOKING ABSTINENCE? A RANDOMIZED CLINICAL TRIAL

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Significance: Even with varenicline, the leading monotherapy for tobacco dependence, smoking abstinence rates remain low. Preliminary evidence suggests that extending the duration of varenicline treatment prior to quitting reduces smoking exposure before the target quit date (TQD) and enhances abstinence, particularly among women. Methods: To test these hypotheses, 320 adults reporting smoking 5+ cigarettes/day were enrolled (10/2017-12/2020) in a single-site, double-blind, randomized, placebo-controlled clinical trial (NCT03262662) and followed for 28 weeks. During Weeks 1-4 (preceding the target quit date [TQD]), the extended run-in group received 4 weeks of varenicline; the standard run-in group received 3 weeks of placebo, then 1 week of varenicline. During Weeks 5-15, both groups received open label varenicline. Both groups also received brief behavioral counseling at 6 clinic visits. Primary outcomes were pre-TQD change in biochemical exposure to smoking (cotinine) and cotinine-verified self-reported smoking abstinence during Weeks 12-15. Results: Participants were 179[56%] women and 141[44%] men, with a mean[SD] age of 54[10] years. Pre-quit cotinine reduction was greater among the extended (mean=54.1%; 95%CI=48.7%-59.5%) compared to the standard run-in group (mean=33.5%, 95%CI=28.2%-38.9%); this effect did not vary by gender. Peri-TQD varenicline concentrations were greater in the extended run-in group and higher among women. TQD craving and post-TQD withdrawal were lower among the extended compared to the standard run-in group, particularly among women. However, prolonged abstinence (Weeks 12-15) was not greater in the extended (39.3%[64/163]) vs. standard run-in group (36.3%[57/157], odds ratio[OR](95%CI)=1.13(0.72-1.78). Though the Group × Gender interaction was not significant, OR(95%CI)=0.52(0.21-1.28), post hoc Bayesian analyses provided moderate evidence that prolonged abstinence rates were enhanced for the extended vs. standard run-in among women (40% and 30%, respectively; Bayes factors=5.16-9.84), but not men (38.4% and 44.1%, respectively; Bayes factors=0.26-1.06). Conclusions: Men did not benefit more from extended vs. standard run-in varenicline for smoking cessation. There was some evidence that women did benefit from extended pre-quit varenicline; however, a larger multi-site study of women is needed to inform clinical practice.

FUNDING: Federal; Pharmaceutical Industry; Academic Institution

PPS13-2

DAILY CIGARETTE ABSTINENCE AND REDUCTION WITH VARENICLINE: RELATIONSHIPS WITH AFFECT, CRAVING, AND TREATMENT DURING THE FIRST WEEK OF THE QUIT

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Significance: Long term abstinence is the standard outcome for smoking cessation research. Dichotomizing outcomes as "abstinent" or "smoking" obscures potentially valuable information about changes to smoking behavior. Examining both the probability of abstinence and reduction from baseline smoking rate can be used as clinical outcomes that retain smoking information normally lost from dichotomization. Inclusion of smoking rate may inform cessation barriers (elevated craving, affect) and how treatments facilitate smoking reductions among individuals unable to quit. Methods: The present research used a two-part latent growth model to compare daily smoking probability and, among those still smoking, smoking reduction during the first week of the quit attempt using self-reported cigarettes per day (CPD). Differences in the time course of smoking, treatment effects, and correlations to affect and craving were examined among 828 treatment-seeking, cigarette using adults assigned to varenicline or placebo in a randomized controlled trial (NCT01314001). Results: Across all participants, the probability of smoking was 46% during the first week of the quit, which increased for several days after the target quit day (TQD) and then leveled off later into the week (p = .01). On average, participants that continued to smoke reduced by 81% during the first week of the quit which did not change significantly across days (p = .41). Varenicline treatment was associated with decreased smoking probability and greater smoking reduction (ps < .01). Lower negative affect and craving, and higher positive affect, were associated with decreased smoking probability (ps < .01). Higher positive affect and lower craving on the TQD were associated with greater smoking reduction (ps < .05). Conclusions: These results suggest varenicline is effective in both reducing cigarettes smoked per day and facilitating abstinence. The inclusion of smoking reduction provided key information normally omitted from smoking cessation trials. Individuals with greater smoking reductions experienced less intense craving and affect compared to participants that maintained higher smoking rates. This finding raises several possibilities: First, individuals experiencing less intense craving and affect may have been more able to significantly reduce their smoking rate. Additionally, participants may have adjusted their smoking rate to maintain a minimal level of CPD that did not produce aversive withdrawal effects.

FUNDING: Federal

PPS13-3

EFFICACY AND SAFETY OF COMBINATION BEHAVIORAL ACTIVATION FOR SMOKING CESSATION AND VARENICLINE FOR TREATING TOBACCO DEPENDENCE AMONG INDIVIDUALS WITH CURRENT OR PAST MAJOR DEPRESSIVE DISORDER: A 2X2 FACTORIAL, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL

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Significance: Treatment of depression-related psychological factors that maintain smoking behavior may improve rates of cessation among adults with major depressive disorder (MDD). This study evaluated the efficacy and safety of 12 weeks of behavioral activation for smoking cessation (BASC), varenicline, and their combination. Methods: Using a randomized, double-blind, placebo-controlled, 2x2 factorial design, we compared BASC vs. standard behavioral treatment (ST) and varenicline vs. placebo (NCT02378714). Participants were 300 diverse daily smokers with current or past MDD treated in research clinics at two urban universities. Randomization was stratified on clinical site, sex, and level of depression. BASC integrated behavioral activation therapy and standard behavioral treatment (ST) to increase engagement in rewarding activities by reducing avoidance, withdrawal, and inactivity associated with depression. ST was based on the 2008 Public Health Service Clinical Practice Guideline. Both treatments consisted of eight 45-minute sessions delivered between weeks 1 and 12. Varenicline and placebo were administered for 12 weeks between weeks 2 and 14. Primary outcomes were bioverified 7-day point-prevalence abstinence (CO level =6 ppm) at 27 weeks and adverse events (AEs). Results: Significant differences in intent-to-treat (ITT) abstinence rates ($?^2$[3]=21.39, p<.001) emerged across treatment arms at 14 weeks (11.8% for ST+placebo, 5.9% for BASC+placebo, 32.1% for ST+varenicline, 31.3% for BASC+varenicline), with results favoring varenicline over placebo (Diff=22.9%, 95% CI=14.3, 31.5). A similar pattern was observed for ITT rates at 27 weeks (8.8% for ST+placebo, 5.9% for BASC+placebo, 17.3% for ST+varenicline, 15.7% for BASC+varenicline). Although overall differences were deflated ($?^2$[3]=5.72, p=.092), varenicline continued to outperform placebo (Diff=9.1%, 95% CI=1.9, 16.3). ST and BASC did not differ at either timepoint, irrespective of treatment with varenicline. All statistically significant differences in AE rates after start of drug were higher for placebo than varenicline. Conclusion: Varenicline improved long-term cessation, without elevating AEs, among racially and socioeconomically diverse adults with varied psychiatric presentations. BASC did not outperform ST with or without varenicline. The intensity of behavioral treatment may be as important when treating smokers with MDD than whether the behavioral treatment specifically targets depression.

FUNDING: Federal; Academic Institution

PPS13-4

COMBINING VARENICLINE PRELOADING WITH ACCEPTANCE AND COMMITMENT THERAPY IN SMOKERS WITH SERIOUS MENTAL ILLNESS: THE ACTSLOW PILOT FEASIBILITY TRIAL

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Significance: Smokers with serious mental illness (SMI) such as bipolar disorder (BD) or schizophrenia spectrum disorders (SSD) have 35% (for BD) to 55% (for SSD) lower odds of quitting smoking using the first-line cessation medications and standard counseling compared with smokers without mental health conditions (MHCs). SMI smokers are also 3- to 5-times more likely to experience a clinically significant neuropsychiatric adverse event (NPSAE) when trying to quit compared with smokers without MHCs. New approaches are needed to bolster quit rates and further minimize NPSAEs. The purpose of this study was to pilot test the feasibility of combining two different dosing strategies of varenicline preloading with Acceptance and Commitment Therapy (ACT) for smoking cessation in smokers with BD or SSD. Methods: We performed a phase IV, 12-week, single center, randomized, double-blind, pilot feasibility trial of low (0.5 mg twice daily with slower titration over one full week) versus standard dose (1.0 mg twice daily with standard titration) varenicline in smokers with DSM-V BD or SSD with a 12-week post treatment follow-up. All participants received 10 sessions of ACT for smoking cessation. Participants were asked to preload with varenicline while still smoking for up to five weeks and set a flexible target quit day (TQD) by day 35. Results: Recruitment goals were hampered by research shutdowns caused by the COVID-19 pandemic and the worldwide varenicline recall. Retention goals were met. Treatment satisfaction was high across both dosing (low versus standard) and diagnostic (BD versus SSD) groups. The majority of participants adhered to instructions regarding varenicline preloading and the flexible TQD. Cravings to smoke, and nicotine withdrawal symptoms decreased similarly across both dosing conditions. Overall biochemically-confirmed 7-day point prevalence abstinence at week 12 was 33% for BD smokers (N=15) and 23% for SSD (N=13) smokers; and 28% for low dose (N=14) and 28% for standard dose (N=14). Conclusions: Although recruitment was affected by unanticipated world events, feasibility was demonstrated. Participants in both arms adhered to and were highly satisfied with the combination of pre-cessation varenicline plus ACT. Findings support testing this novel combined treatment approach in a fully powered trial of SMI smokers to evaluate efficacy.

FUNDING: State; Pharmaceutical Industry; Academic Institution

PPS13-5

INTENSIVE LONGITUDINAL DATA COLLECTION OF VARENICLINE ADHERENCE AND SIDE EFFECTS AS PART OF AN RANDOMIZED CONTROLLED TRIAL

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INTRODUCTION: Varenicline use yields the highest quit rates of any cessation medication mono therapy, but side effects may impede effectiveness by reducing adherence. The objective of this research was to examine how side effects and medication adherence vary within-subjects and are associated with dose in the first two weeks of medication use. Data are from an intensive longitudinal substudy embedded in a randomized controlled trial examining how varenicline may perform as an over-the-counter (OTC) medication and whether a lower standard daily dose could be effective in an OTC environment. METHODS: 310 adult smokers were recruited to the parent study, randomized to 1 of 3 conditions (1mg medication, .5 mg medication, or placebo); 60 were randomly invited to participate in the 2-week substudy. In addition to parent study assessments, substudy participants answered up to 7 micro-assessments sent to their phones about medication adherence, side effects, etc. Multi-level mixed effects logistic regressions described the average relationship between mean side effect score (nausea, sleep disturbance, and usual dreams) and day-level medication adherence among all participants and among participants in the active medication conditions only. RESULTS: Between May 2018 and November 2020, 62 participants participated in the substudy, yielding 830 days of data. The proportion of participants who reported nausea, poor sleep quality, or unusual dreams was 79%, 51.6%, and 48.4%, respectively. The odds of medication adherence was not associated with sleep-related side effects (poor sleep quality -- aOR 0.51; 95% CI: 0.10, 2.55; unusual dreams - aOR 0.67; 95% CI: 0.12, 3.44) or medication dose (poor sleep quality -- aOR 1.99; 95% CI: 0.52, 7.59; unusual dreams - aOR: 2.18; 96% CI 0.54, 8.72). However, increased reports of nausea throughout the measurement period were associated with a 65% lower odds of reporting medication adherence (aOR 0.35; 95% CI: 0.13, 0.93); the relationship between medication dose and adherence was not significant (aOR 1.32; 95% CI 0.32, 5.38). CONCLUSIONS: Advice to anticipate and treat nausea to smokers using OTC varenicline may increase adherence and improve outcomes. While sleep-related results were not significant, ORs were sample size and rare events may have limited power to detect differences.

FUNDING: Federal; Pharmaceutical Industry

PPS13-6

SAFETY AND EFFICACY OF VARENICLINE AS AN OTC MEDICATION

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BACKGROUND: Varenicline is the single most effective medication for smoking cessation and is available in the US by prescription. Because multiple studies have demonstrated that varenicline is more effective than nicotine patch (an over-the-counter [OTC] medication) and cause minimal side effects, increasing access to varenicline could help more smokers quit. The purpose of this study was to compare the safety and efficacy of varenicline 0.5mg b.i.d. and 1mg b.i.d. relative to placebo as an OTC medication. METHODS: 310 adult smokers (191 female, 119 male) were randomly assigned in double-blind fashion across 2 sites to either placebo (PLAC), 0.5 mg varenicline b.i.d., or 1mg varenicline b.i.d. The 0.5 mg dose, which is half the usual dose, was included to assess if it yielded comparable efficacy with fewer adverse events (AEs). Participants were provided study product and were not offered behavioral support other than the national toll-free number (800-QUITNOW) that offers generic smoking cessation guidance. Participants received product for 12 weeks and manufacturer recommendations on dosing. Follow-up visits were at weeks 2 (phone), 4, 8, 12, 13 (phone) and 26 (phone, unless abstinence reported). AEs, smoking status, and withdrawal were assessed at each visit, and breath CO was collected at all in-person visits. Due to COVID, the protocol was modified to allow virtual phone visits for 59 participants. Virtual participants who reported abstinence at 12 and 26 weeks were sent a kit to test for cotinine. RESULTS: End of treatment (12 week) intent-to-treat continuous (C) and point prevalence (PP) abstinence rates for each group were: PLAC (C=11.4%, PP=12.4%), 0.5mg (C=11.7%, PP=12.6%), and 1.0mg (C=20.6%, PP=27.5%). 1.0mg varenicline resulted in significantly greater quit rates than PLAC for both C (^{2} = 4.41, p = 0.02) and PP (?2 = 10.18, p= 0.001). The PP difference between 1.0mg and 0.5 was also significant (^{2}= 6.76, p = 0.005). No demographic variables were related to quit rates. There were no significant differences in adverse events between study conditions; events were minor and consistent with labeling. CONCLUSION: The approved dose of varenicline (1.0 mg b.i.d.) was safe and effective vs PLAC as an OTC medication in the current study. A larger study is needed to replicate this result.

FUNDING: Federal; Pharmaceutical Industry

PAPER SESSION 14: TOBACCO CONTROL POLICIES IN LMIC

PPS14-1

EXPLORING AN AFRICAN PERSPECTIVE TO TOBACCO ENDGAME

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Significance: The concept of tobacco endgame refers to permanently eradicating tobacco or decreasing the prevalence to less than 5%. Though Sub-Saharan African (SSA) has the lowest smoking prevalence globally, it remains a target of the tobacco industry as the region is seen as an opportunity for market expansion leading to aggressive marketing of tobacco products in this region. Not enough attention has been given to discussions about tobacco endgame and the possible strategies to achieve this goal in SSA. This study aimed to ascertain what tobacco endgame strategies tobacco control stakeholders in SSA perceive to be suitable for the continent and why. Method: Qualitative design using Key Informants Interviews were conducted. The sample was made up of stakeholders from academia, civil society, and government departments. A total of 29 participants from 12 SSA countries participated in this study. Participants were purposively sampled, and interviews were conducted in English and French (depending on the language of choice of participants), transcribed verbatim (those in French were transcribed in French then translated to English) and analysed with the aid of NVIVO. Results: Most tobacco control stakeholder in SSA support tobacco endgame strategies due to the impact tobacco has on health and the economy. However, one participant believe that smoking prevalence must be lowered first before SSA can embark on endgame strategies. Participants stated that there is an urgency to have endgame strategies in Africa. Proposed endgame strategies were categorized into 4 themes: Regulation-related, Education, Support, and other strategies. Under regulation, participants want SSA countries to strengthen tobacco control laws and regulations, and make sure that their laws meet FCTC standards. For Education strategies, awareness campaigns were proposed, and these campaigns were recommended to be targeted at both urban and rural areas in SSA. Support for cessation strategies and for these services to be made easily available by the government was also proposed. Other strategies included tobacco industry monitoring and reliable local research. Participants mention that the success of endgame strategies depends on the political will, multi-sectoral collaboration, availability of resources and the buy in from the public. Conclusion: Most tobacco control stakeholders in SSA showed support for tobacco endgame in Africa. The However, for strategies to work, collaboration from various departments and support from government and the public is key.

FUNDING: Nonprofit grant funding entity

PPS14-2

PROGRESS, GAPS, AND TOBACCO INDUSTRY INTERFERENCE TO TOBACCO ADVERTISING, PROMOTION, AND SPONSORSHIP IN THE WHO AFRICAN REGION

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Significance: The WHO African Region (AFRO) is projected to have the largest increase of tobacco users over the next decade. A key reason for this upsurge is the increase in tobacco advertising, promotion, and sponsorship (TAPS) in the region. Existing research on TAPS in AFRO consists mainly of multi-country case studies documenting TAPS bans. Only one regional analysis of TAPS bans in AFRO has been published to date (2011). We provide an updated and comprehensive assessment of TAPS bans in AFRO. Methods: A secondary analysis of TAPS laws evaluated by the Campaign for Tobacco Free Kids (CTFK)'s Tobacco Control Laws database was conducted to assess 27 types of TAPS based on FCTC Article 13 Guidelines in AFRO. Each TAPS type is coded by CTFK as "banned", "some restrictions", "allowed", or "uncertain". We developed a scoring system (ban=2 points; some restrictions=1 point; allowed/uncertain=0 points) to reflect the extent of a country's TAPS ban. Countries were then grouped into one of six categories: none, minimal ban, partial ban, expanded ban, comprehensive ban, and complete ban. Results: Among the 47 AFRO countries, 10 have no TAPS laws, 3 have laws not yet analyzed by CTFK, 2 have minimal bans, 3 have partial bans, 17 have expanded bans, and 12 have comprehensive bans. No country has a complete ban. Most countries ban traditional direct forms of TAPS including advertising via domestic TV and radio (33/44), outdoor advertising (32/44), and domestic newspapers and magazines (31/44). However, bans on point-of-sale (POS) advertising/promotion (22/44), product display (10/44), and advertising/promotion on packaging (2/44) remain the most under-adopted bans. Non-traditional direct bans such as international TV and radio (13/44) and international newspapers and magazines (13/44) have also been banned by less than half of AFRO. Transnational tobacco companies lobby against TAPS bans by making political donations and holding private meetings with policymakers; challenge TAPS laws using litigation; and promote their products on social media to undermine TAPS restrictions. Conclusion: Progress has occurred in AFRO, particularly in traditional direct TAPS bans, yet critical gaps in non-traditional direct bans and POS TAPS bans remain. Given sustained tobacco industry interference, local and global public health groups must continue to synergize efforts to support a unified approach, while working closely with governments to prioritize direct language from FCTC Article 13 Guidelines that ban all forms of TAPS.

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS14-3

SINGLE CIGARETTE PURCHASE AMONG PERSONS WHO SMOKE MANUFACTURED CIGARETTES AND RELATED SOCIO-DEMOGRAPHIC FACTORS IN EIGHT SUB-SAHARAN AFRICAN COUNTRIES, GLOBAL ADULT TOBACCO SURVEY, 2012-2018

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Loose or "single" cigarettes make manufactured cigarettes more affordable and accessible; they also undermine the benefits of warning labels on cigarette packaging and effective taxation policies. We examined the prevalence of "single" cigarette purchase and the socio-demographic factors related to the purchase among manufactured cigarette smokers in eight sub-Saharan African (SSA) countries. METHODS We used Global Adult Tobacco Survey (2012-2018) data for eight SSA countries (Botswana, Cameroon, Ethiopia, Kenya, Nigeria, Senegal, Uganda, and Tanzania). Single cigarette purchase was defined from the questions; "The last time you bought cigarettes for yourself, did you buy loose cigarettes, packs, cartons, or something else?" with responses (a) cigarettes, (b) packs, (c) cartons, (d) other (specify), (e) never bought cigarettes. Those who responded bought "cigarettes" were considered a "single" cigarette purchase. The source of a cigarette purchase was defined as the place from where they last purchased manufactured cigarettes for themselves. We estimated the weighted prevalence with 95% confidence interval (CI) for single cigarette purchase and source of purchase among persons who smoked manufactured cigarettes. We used logistic regression to calculate adjusted prevalence ratios (aPR) with 95% CIs to examine factors associated with single cigarette purchase. RESULTS The median prevalence of single cigarette purchases among persons who smoked manufactured cigarettes in the eight SSA countries was 82.7%, ranging from 61.4% (95% CI, 47.1-73.9) in Ethiopia to 92.0% (95% CI, 87.6- 94.9) in Tanzania. Single cigarettes purchase was associated with urbanicity in Kenya (rural vs. urban; aPR = 1.13, 95% CI, 1.05-1.22); age group 15-24 years vs. =45 years in Ethiopia (aPR = 2.14, 95% CI, 1.29-3.53), Nigeria (aPR = 1.30, 95% CI, 1.05-1.62), and Botswana (aPR = 1.29, 95% CI, 1.06-1.58); and age group 25-44 years vs. =45 years in Botswana (aPR = 1.21, 95% CI, 1.01-1.45) and Tanzania (aPR = 1.11, 95% CI, 1.00-1.23). Last cigarettes purchase from stores was prevalent in all eight countries with over 50% of the occurrences in five of the eight countries with Nigeria 56.1% (95% CI, 49.4%-62.6%); Kenya 65.3% (95% CI, 57.2%-72.6%); Cameroon 66.9% (95% CI, 59.3%-73.7%); Uganda 71.6% (95% CI, 64.8%-77.6%); Tanzania 84.6% (95% CI, 79.0%-89.0%). CONCLUSION Across the eight SSA countries, the purchase of single manufactured cigarette sticks among those who smoke ranged from 61.4% to 92.0%, and store was the most common source of cigarette purchase in five of the eight countries. This may indicate the need for public health measures restricting single cigarette stick sales, especially in stores, to combat the tobacco epidemic in SSA countries.

PPS14-4

EFFECTS OF CIGARETTE PRICE AND PACKAGING ON QUIT-SMOKING BEHAVIOR: RESULTS FROM A DISCRETE CHOICE ANALYSIS AMONG VIETNAMESE ADULT SMOKERS

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Significance. Approximately one in five Vietnamese adults currently smoke. Cigarettes remain highly affordable, where the average price of a cigarette pack is 15,000 Vietnamese dong (VND) or 0.64 USD. In addition, graphic health warning label (HWL) requirements have not changed since 2013. Policies to raise cigarette prices through taxation, increase the size of current HWL coverage from 50% to 85%, and require plain packaging could reduce cigarette demand. This study employed a discrete choice experiment (DCE) to estimate the potential impact of these policy options on smoking behavior. Methods. In Feb-May 2022, we conducted a phone-based survey of 1500 Vietnamese adults who currently smoke. Participants were randomly assigned to view one of eight blocks, each with four individual cigarette pack images. The four cigarette packs varied on two attributes: price (15,000 (*ref*); 20,000; 30,000; or 40,000 VND) and packaging (branded pack with a 50% HWL (*ref*); branded pack with a 85% HWL; plain unbranded pack with a 50% HWL; or foreign branded pack without a HWL). We selected the most popular domestic brand (Thang Long) and most common foreign brand (Jet) based on recent surveillance data. Participants viewed each cigarette pack image individually on their phone and responded whether they would quit smoking or continue to smoke if they could only purchase the cigarette pack shown. We used binomial logistic regression model to estimate the relative risk (RR) of the pack price and packaging attributes on hypothetically quitting smoking. Results. Participants had significantly higher likelihood of reporting they would quit when presented with packs that were 30,000 VND (RR=1.20, 95%CI: 1.07-1.34) and 40,000 VND (RR=1.38, 95%CI: 1.22-1.56) versus 15,000 VND. No significant difference for 20,000 versus 15,000 VND packs. Participants also had significantly higher likelihood of quitting when shown the branded pack with a 85% HWL (RR=1.28, 95%CI: 1.17-1.40) and plain, unbranded pack with a 50% HWL (RR=1.34, 95%CI: 1.21-1.48) compared to branded packs with the current 50% HWL coverage. Participants had significantly lower likelihood (OR=0.41, 95%CI: 0.36-0.48) when shown the foreign, branded pack without a HWL. Discussion. This study suggests that tax and packaging policies have the potential to decrease rates of current smoking in Vietnam, particularly tax initiatives that raise the cigarette prices to at least 40,000 VND and implementing plain packaging.

FUNDING: Nonprofit grant funding entity

PPS14-5

PREVALENCE OF POLICIES REQUIRING HEALTH WARNING LABELS ON ELECTRONIC NICOTINE DELIVERY SYSTEMS AND HEATED TOBACCO PRODUCTS AROUND THE GLOBE

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Significance: Electronic nicotine delivery systems (ENDS) and heated tobacco products (HTPs) are marketed in every region of the world. These products are subject to varying regulations. Health warning labels (HWLs) are a policy priority for tobacco control. While we know which countries require HWLs for cigarettes, there is no global assessment of the countries that require HWLs for ENDS and HTPs. This study reports the results of our global policy surveillance related to HWLs for ENDS and HTPs. Methods: The Institute for Global Tobacco Control's Policy Scan tracks federal/national ENDS and HTP policies. Currently, the scan includes information from 130 countries/jurisdictions. Specific policy information is reported by in-country contacts who are typically government bureaucrats or tobacco control experts working in civil society. Policies requiring HWLs were identified based on respondents' narratives and our review of associated policy documents. Policy details were collected through June 2022. We report the current state of regulation for HWLs for ENDS and HTPs and a breakdown of countries/jurisdictions by World Bank classifications as low-income economies (LIE), lower-middle-income economies (LMIE), upper-middle-income economies (UMIE), and high-income economies (HIE). Results: Of the 130 countries/jurisdictions surveyed, we identified 66 countries requiring HWLs for ENDS, HTPs, or both. In our sample, 50 countries/jurisdictions require HWLs for ENDS, and 41 require HWLs for HTPs. Of those requiring HWLs, 25 require HWLs for both ENDs and HTPs, 25 require HWLs for only ENDS, and 16 for only HTPs. For countries/jurisdictions regulating ENDS, 37 are HIE, 8 are UMIE, and 4 are LMIE; for countries/jurisdictions regulating HTPs, 20 are HIE, 11 are UMIE, and 8 are LMIE (Niue and Cook Islands were excluded due to their unclassified economic status with the World Bank). Conclusion: In our sample, each of the 130 countries surveyed has HWL policies for cigarettes; however, policy requirements for ENDS and HTPs are low in comparison. Some countries require HWLs for only ENDS (n=25) or HTPs (n=13), with only 25 countries requiring labels for both products. Furthermore, very few countries/jurisdictions with LMIE have HWL regulations for ENDS or HTPs—just 8% and 18.5%, respectively; not a single LIE in our analysis requires HWLs on ENDS or HTPs. Those residing in lower-income economies remain the least protected.

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS14-6

PREVALENCE OF VAPING-ASSOCIATED SYMPTOMS OVER SIX MONTHS AMONG PARTICIPANTS OF A RANDOMIZED CONTROLLED TRIAL ON SMOKING CESSATION WITH ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS)

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Significance: Electronic nicotine delivery systems (ENDS), also called e-cigarettes, are increasingly popular for smoking cessation. Some people switching to ENDS report respiratory symptoms associated with ENDS use. We aimed at assessing the prevalence and changes in self-reported vaping-associated symptoms among participants of a large RCT followed over 6 months. Methods: We included participants from the intervention group of the Efficacy, Safety and Toxicology of ENDS (ESTxENDS) randomized controlled trial. They received ENDS, e-liquids and smoking cessation counselling and were followed-up at 1 week and 6 months after target quit date. Following symptoms were assessed at each visit: dry mouth, mouth/throat irritation, cough, shortness of breath, headache, dizziness, and/or heart palpitations/tachycardia while vaping. We used descriptive statistics to report prevalence and multivariable adjusted mixed-effect models to analyze changes in symptoms in ENDS-only users. We used inverse probability weighting to account for attrition. Results: We included participants from the intervention group in our analyses (n=620). Participants' median age at study entry was 38 years; 53% identified as men. After 1 week, there were 405 (65%) ENDS-only users that completed the questionnaire on vaping-associated symptoms. The most commonly reported symptoms were dry mouth (34%, 95% CI: 29-39%), mouth/throat irritation (23%, 95% CI: 19-27%), and cough (25%, 95% CI: 21-29%). Participants rarely reported headache (7%, 95% CI: 4-9%), shortness of breath (3%, 95% CI: 1-5%), dizziness (4%, 95% CI: 2-6%), and heart palpitations/tachycardia (2%, 95% CI: 1-3%). After 6 months, 256 (41%) ENDS-only users completed the questionnaire. The most commonly reported symptoms were less frequent compared to the week 1 visit: dry mouth (18%, 95% CI: 14-23%, OR=0.27, 95 % CI 0.17 to 0.43), mouth/throat irritation (11%, 95% CI: 7-15%, OR=0.36, 95 % CI 0.22 to 0.59), cough (12%, 95% CI: 8-16%, OR=0.50, 95 % CI 0.33 to 0.77). Other symptoms displayed no statistically significant changes after 6 months. Conclusion: The most common vaping-associated symptoms were dry mouth, mouth/throat irritation, and cough. After 6 months, reported prevalence of most symptoms dropped by about half in ENDS-only users. Physicians who recommend ENDS as a smoking cessation strategy can alert patients to the possibility of these symptoms and their gradual reduction over time.

FUNDING: Academic Institution

PPS14-7

SOCIO-ECONOMIC STATUS (SES) DIFFERENCES IN CHANGING AFFORDABILITY OF TOBACCO PRODUCTS FROM 2011-12 TO 2018-19 IN INDIA

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Background: The economic burden from tobacco use is enormous and more catastrophic in low- and middle-income countries (LMICs) as compared to high income countries. Increasing taxes on tobacco products reduces their affordability. This is one of the most cost-effective measures for reducing tobacco use, especially among young and the poor. However, the impact of taxes on tobacco use can be reduced if the consumers' income increases significantly. Objective: We studied the change in affordability of tobacco products across the different socio-economic status (SES) in India from 2011-12 to 2018-19. Methods: We calculated affordability in the form of relative income price (RIP-cost of tobacco products relative to income) for years 2011-12 and 2018-19 using three different denominators, i.e., per capita Gross Domestic Product (GDP) and Net State Domestic Product (NSDP) at national and state levels, respectively; monthly per capita consumer expenditure (MPCE); and individual wages. We investigated RIP for cigarettes, *bidis*, and smokeless tobacco (SLT) across different SES (caste groups, type of employment and education). Results: RIP increased marginally for cigarettes, *bidis* and remained almost constant for SLT products across daily wage earners. However, when RIP was adjusted with SES variables, there was no significant change ($p>0.05$) in affordability of products for daily wage earners in year 2018-19 as compared to 2011-12. For regular wage earners, cigarettes and *bidis* became marginally less affordable, whereas affordability remained constant for SLT products. All products became more affordable for backward caste groups within regular wage earners. When RIP was calculated using MPCE all tobacco products became less affordable in year 2018-19. However, after adjusting for SES variables, SLT products reported no change in affordability. There was a marginal increase in affordability for all products when RIP was calculated with GDP. Conclusion: Although implementation of GST has increased the price of tobacco products, it is still not sufficient in reducing the affordability of tobacco products, particularly SLT and especially for the lower SES. There is a need for increased and uniform taxation across all the tobacco products for successful and sustainable tobacco control in India and other LMICs to curb tobacco use among vulnerable populations.

FUNDING: Academic Institution

PAPER SESSION 15: BREATHING IT IN: IMPACT OF NICOTINE AND CONSTITUENTS ON LUNG AND BLOOD HEALTH

PPS15-1

EXOSOMES ARE PATHOGENIC ENTITIES THAT DRIVE TISSUE REMODELING DURING CONVENTIONAL SMOKING

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Significance: Lung diseases associated with conventional smoking are leading causes of death and pose a heavy economic burden worldwide. Despite the distinct strides made in understanding the pathology associated with smoking, the therapies available for smoke-induced lung diseases remain limited. Thus, investigations into novel drivers of the tissue destruction prompted by smoking are imperative to expand the therapeutic arsenal. Exosomes are small, extracellular vesicles that are released by most cells. While the biochemical composition of exosomes can vary, exosomes act as important mediators of intercellular communication by carrying protein and nucleic acid cargo. In addition to these homeostatic roles, external stimuli can alter the exosome signature among tissues to drive the initiation and progression of disease. Methods: To examine the effects of smoking on the airway exosome milieu, exosomes were quantified and characterized from human and smoke-exposed mice. Proteolytic activity was measured using FRET-based enzymatic assays. To further examine the degradative potential of all exosomes, we implemented murine models of exosome transfer. Results: We found that smoke exposure creates a population of pathogenic exosomes that carry surface-associated proteases with increased degradative potential. We found that this deleterious population becomes evident early in smoke-exposed mouse models with the population arising as early as 2 weeks. Moreover, upon transferring the smoke-associated exosomes, we can recapitulate features of lung disease, including tissue remodeling and damage. Conclusions: Taken together, our investigations have uncovered novel drivers of smoke-associated lung damage with the potential to inform new therapeutic strategies.

FUNDING: Federal

PPS15-2

COMPARATIVE HAZARD CHARACTERIZATION OF E-CIGARETTE AEROSOL EXPOSURE UNDER PRE-EXISTING RESPIRATORY DISEASES IN VITRO

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Rationale: Electronic cigarettes have become widely popular as a cessation and harm reduction approach to traditional combustible tobacco use. Exposure to e-cigarette aerosol constituents in healthy (normal) or individuals with pre-existing respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD) may affect differently. At present the modified risk of exposure to these products in users with pre-existing lung diseases is unknown. We hypothesized that exposure to e-cigarette aerosols in asthma and COPD tissues would have greater cytotoxicity and dampened immune response compared to normal tissues. Methods: EpiAirway 3D tissues from healthy (normal) and asthma, and COPD donors who nonsmokers and smokers were exposed to propylene glycol/vegetable glycerin (PG/VG), tobacco, menthol, and spearmint from 10-90 puffs (55 mL, 3 puffs/min, 30s inter puff interval) using Vitrocell air-liquid interface aerosol exposure system. Further, EpiAirway3D tissues were treated with predominant flavoring chemicals of these flavors, pulegone, and eugenol at 500 µM. Twenty-four hours later, mucosal rinse, conditioned media, and the tissues were collected. Inflammatory mediators in conditioned media and mucosal rinse were determined. LDH assay on conditioned media was performed for cytotoxicity assessment. Results: Exposure to PG/VG, menthol/mint, and tobacco flavored aerosols elicited dose-dependent cytotoxicity and inflammatory responses. In healthy nonsmokers a significant increase in inflammatory cytokines, IL8, IL6, GM-CSF, G-CSF, PDGF-BB, IP-10, and IL1Ra were seen. IL-1Ra, in particular, was altered in COPD tissues. Overall compared to air exposure, PG/VG, menthol/mint (cooling), and tobacco flavors showed an increased mucosal immune response. However, in smokers, these responses were differential but augmented compared to nonsmokers. Conclusion: We comparatively characterized the aerosol hazard by cyto-

toxicity, inflammatory mediators, and lung injury response. E-liquid aerosols, including humectant (PG/VG), menthol/mint (cooling), and tobacco flavors, affected tissues with disease (asthma/COPD) phenotypes differently compared to healthy (normal) tissues. Our data suggest that vaping e-cigarettes or switching to e-cigarettes adds a modified risk to lung disease pathogenesis in both smokers and nonsmokers, especially under pre-existing lung disease conditions. Comparative hazard characterization is crucial in regulatory toxicity assessment of flavors in normal and disease models. This study was supported by K99ES033835 and U54CA228110.

FUNDING: Federal

PPS15-3

CHRONIC EXPOSURE TO AEROSOLS FROM ALTERNATIVE TOBACCO PRODUCTS IQOS AND EC INDUCES DAMAGE AND INFLAMMATORY CHANGES IN THE LUNGS

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Alternative tobacco products including electronic cigarettes (ECs) and heated tobacco products (IQOS) were designed to reduce the toxicant exposure from combustible cigarettes (CC). However, recent reports reveal that these products are not risk-free. We thus evaluated in a side-by-side design the impact of chronic exposure to aerosols emitted from IQOS, EC and CC on lung inflammation and damage using a mouse model of vaping/smoking. Various markers of inflammation and damage were measured in the BAL and lung tissue. IQOS, EC and CC exposure all induced significant pulmonary immune cell infiltration compared to air. Numbers of neutrophils were significantly augmented following inhalation of IQOS aerosols and CC smoke compared to EC aerosol. IQOS-exposure significantly induced $CD68^+$ macrophages compared to EC, CC and air. Alveolar, pulmonary interstitial and $arginase1^+$ macrophages were more in the lungs of IQOS-exposed mice compared to EC or CC inhalation. All exposures augmented $CD19^+$ B, $CD8^+$ and $CD4^+$ T cells compared to air control. Augmented $CD19^+$ B cell infiltration was equivalent following IQOS, EC and CC exposures, however $CD8^+$ T cell infiltration was greater following EC versus IQOS or CC. Augmentation of $CD4^+$ T cell-infiltration following IQOS exposure was lower compared to EC. Pro-inflammatory $IL17A^+$ T cell-infiltration was greater following exposures to all these products. $Foxp3^+$ T regulatory cells were augmented with all exposures versus air. Exposure to all 3 products resulted in lung epithelial cell as well as lung endothelial damage compared to air control. IQOS and CC, but not EC, augmented MPO activity in lung tissue compared to air exposure. NE levels were elevated in lung tissue and BAL following IQOS versus air exposure, which in the BAL were also higher compared to EC and CC exposures. Exposures to IQOS, EC and CC decreased lung antioxidant activity, with the highest inhibition resulting from CC. IQOS inhalation augmented inflammatory cytokine/chemokine levels including IP-10 (CXCL10), MIP-1a, KC and G-CSF in the BAL. Detrimental effects due to chronic exposures was observed in the following decreasing hierarchal order: CC, IQOS, EC, air. In conclusion, chronic exposure to alternative tobacco products IQOS and EC induces a strong pulmonary proinflammatory response and damage. Regular use of those products might influence existing lung diseases and could be detrimental for responses to infections.

FUNDING: Federal

PPS15-4

E-CIGARETTE AEROSOLS MODULATE THE EXPRESSION OF ANTIOXIDANT AND INFLAMMATION MARKERS IN HUMAN BRONCHIAL CELLS

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Background: The use of electronic cigarettes (e-cigs) is increasing rapidly worldwide. E-cigs are commonly used by young adults, who perceive them as a safer alternative to traditional cigarettes. Reports show that e-cig users increase their risk of respiratory disease. E-cig aerosols contain significantly fewer chemicals than cigarette smoke, but they still contain potentially harmful substances and reactive oxygen species (ROS). Our previous *in vitro* studies showed that e-cig aerosols induce oxidative stress. However, the molecular mechanisms underlying e-cig induced oxidative stress and altering immune responses are unknown. Aims: To assess whether e-cig aerosol alters the expression of antioxidant and detoxification enzyme expression, and contributes to inflammatory signaling in bronchial cells. Methods: Human normal bronchial epithelial cells (Nuli1) were exposed to e-cig extracts every other day for 2 weeks. E-cig aerosols extracts were prepared from two different e-cig brands with similar e-liquids (18 mg/ml of nicotine; tobacco flavor). Standard tobacco extracts were used as a positive control. Quantification of 37 key biomarkers of inflammation was performed on Nuli1 cell extracts and media using a BioRad multiplex kit. The expression of SOD2, HMOX1, CYP1B1, TLR3, and RIG1 proteins was quantified by Western blotting. Data were analyzed by Student's t-test. Results: Exposure to e-cig aerosol extracts resulted in altered expression of proteins involved in defense against oxidative stress. HMOX1 protein was increased after exposure to specific e-cig extracts. A significant increase in CYP1B1, TLR3, and RIG1 proteins was consistently observed after exposing to e-cig aerosols extracts. Significant changes in cytokines were observed after exposure to e-cig aerosol extracts, including significant decreases in the expression of IL8, IL10, and IL22 proteins. Conclusion: HMOX1 increase might modulate inflammation and immune response by altering cytokines levels. CYP1B1 is a protein with a key role in the bioactivation of tobacco pro-carcinogens and the regulation of redox homeostasis. TLR3 is an immune modulator with downstream targets including RIG1 and interferons. Overall our data suggest that e-cig use alters the expression of critical modulators of oxidative stress and immune response which can have major biological and clinical implications.

FUNDING: Federal; State; Academic Institution

PPS15-5

EXPOSURE TO THIRDHAND E-CIGARETTES MODULATES IN VITRO AND IN VIVO PLATELET FUNCTION

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Cigarette smoke toxicants that are deposited on and absorbed by the surrounding environment- such as furniture surfaces, dust, carpets, curtains etc.- are a major source of environmental exposure to tobacco. They are collectively referred to as thirdhand smoke and are of particular concern to nonsmokers. To this end, there is evidence that e-cigarettes are a potential source of thirdhand toxicants, much like cigarettes, and therefore there is an urgent need to investigate their impact on health. In the current study, we employed a validated whole-body animal exposure protocol to determine the long-term impact of thirdhand e-cigarette exposure (THEC) in the context of thrombotic disorders. We first confirmed delivery of the thirdhand exposure marker, cotinine, which is a nicotine metabolite, using ELISA, which was only detectable in the THEC mice, but not the clean air controls. Next, our in vivo characterization provides evidence, for the first time, that THEC shortens the tail bleeding time, suggesting a prothrombotic phenotype. Indeed, we found that THEC increases the risk of thrombosis in the $FeCl_3$ thrombosis model, as the occlusion time was also significantly reduced. Importantly, we found no differences in the platelet or other blood cell counts between the THEC and clean air mice. As for the underlying mechanism, additional experiments revealed enhanced platelet aggregation and dense granule secretion in response to different agonists, including thrombin. Moreover, flow cytometry analysis showed enhanced alpha granule (P-selectin) secretion, integrin/GPIIb-IIIa activation and phosphatidylserine exposure. Interestingly, we also found platelet spreading to be enhanced, suggesting that THEC also modulates platelet outside-in signaling. Taken together, these studies support the notion that THEC is detrimental to cardiovascular health, and should inform cessation efforts as well as policies and means to limit exposure to this form of tobacco.

FUNDING: Federal

PPS15-6

THE IMPACT OF HOOKAH TOXICANTS ON PLATELETS: GENES, PHENOTYPES AND PATHWAY PREDICTIONS

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It is evident that cigarette smoking causes increases in the risk of thrombotic diseases, but whether hookah (also known as waterpipe) produces similar/any effects remains largely unknown. Thus, despite the heavy advertisement that claims that hookahs are associated with less negative health effects- and owing to their increasing popularity- there is a growing interest to understand the adverse effects of hookah, including in the context of cardiovascular disease (CVD). To this end, we have previously shown that a short-term exposure to hookah can produce a hyperactive platelet phenotype in mice, in addition, others have shown that hookah use is associated with other phenotypes that are linked to CVD. Nonetheless, there is still a major knowledge gap regarding specific cardiovascular outcomes induced by hookah, as well as the pathways and phenotypes that underlie these thrombotic outcomes. To address this critical issue, we analyzed the Comparative Toxicogenomic Database (CTD) to predict the throm-

botic disease outcomes that are linked to 58 chemicals known to exist in hookah's mainstream smoke. Hence, we analyzed chemical-gene, chemical-phenotype, and chemical-disease interactions, as well as associated phenotypes and pathway enrichment, to identify potential molecular mechanisms and the disease states associated with hookah use. Our results reveal that CVD is the second category of diseases that emerged as having high interaction with hookah's chemicals; with heavy metals and particulate matter having the highest curated interaction followed by nicotine. On this basis, we chose those three chemicals and three thrombotic CVDs, namely myocardial infarction, stroke, and pulmonary embolism for further investigation. Our data shows that particulate matter, heavy metals and nicotine drive thrombotic disease by triggered "phenotypes" such as oxidative stress, apoptotic processes, inflammation, amongst others. Our analysis/predictions show that the main signaling pathways enriched are MAPK and chemokine signaling. As for platelets, our predictions based on CTD curated data indicate that PM impacts 17 important protein coding genes that are highly enriched for platelet aggregation and activation signaling, as well as those related to the platelet degranulation. Taken together, our findings provide valuable insight into negative health effects of hookah in the context of thrombotic CVD, as well as the genes, chemicals and pathways underlying these effects.

FUNDING: Unfunded; Academic Institution

RAPID RESPONSE PODIUM SESSION 2

RAP2

RAPID RESPONSE PODIUM SESSION 2 - SELECTED PRESENTATIONS ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. CLICK HERE.

PODIUM PRESENTATION 4

PAPER SESSION 16: ILLICIT TRADE AND SMUGGLING

PPS16-1

PERCEPTIONS OF ILLICIT TOBACCO TRADE FOLLOWING LARGE REDUCTIONS IN TOBACCO RETAIL OUTLETS: A QUALITATIVE ANALYSIS OF NEW ZEALAND SMOKERS

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Significance: Aotearoa New Zealand's (NZ) tobacco endgame goal aims to reduce smoking prevalence and tobacco supply to minimal levels by 2025. Proposed policies include large reductions in tobacco retail outlets, denicotinisation, and the introduction of a smokefree generation policy. Tobacco companies have responded by arguing illicit tobacco trade and crime networks run by gangs will increase, and that citizens' safety will decrease. Discarded pack studies and analyses of Customs border intercept data suggest tobacco companies have exaggerated the likely impact of endgame policies on illicit tobacco trade; however, few studies have explored whether endgame policies stimulate interest in illicit tobacco among people who smoke. Methods: We undertook online in-depth interviews with 24 people who currently smoke (average length 37 to 119 minutes) to explore their current tobacco outlets and why they purchased tobacco at these outlets, and their likely response to a retail reduction strategy, including their potential interest in illicit tobacco. We used a reflexive thematic analysis approach to interpret the data. Results: Only a small minority had any experience of illicit tobacco markets and purchases of contraband or stolen tobacco were typically serendipitous and short-term; only one participant reported longer-term access to illicit tobacco. Most had tried home grown tobacco, though found smoking this tobacco harsh and highly unappealing; some reported they would rather quit than switch to using home grown tobacco. Although several participants thought that illicit tobacco trade would increase as tobacco became less easily available from commercial outlets, very few had any knowledge of how they would access black markets and most had little interest in searching for illicit tobacco sources. Some questioned the safety of illicit tobacco products. Conclusions: Tobacco companies have seeded media discussion about the likelihood illicit tobacco markets will proliferate in response to a retail reduction strategy. Participants' views reflected this discourse and highlight opportunities for government communications that promote endgame measures and smoking cessation, and note enhanced border security.

FUNDING: Other

PPS16-2

DIFFERENCES IN ILLICIT CIGARETTE TRADE BETWEEN URBAN AND RURAL AREAS OF PAKISTAN, A HIGH TOBACCO BURDEN COUNTRY: FINDINGS OF A NATIONAL SURVEY

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Background: Illicit tobacco trade subverts tobacco control efforts and increases tobacco consumption. The associated revenue loss leads to significant budgetary deficits, in particular for struggling economies with high tobacco-burden e.g., Pakistan. Furthermore, there may be significant differences in the extent and drivers of illicit tobacco trade between rural and urban economies of such countries. We estimated the extent of illicit cigarette trade in Pakistan and compared it between its urban and rural areas. Methods: We analysed cigarette packs collected from 10 cities and 85 villages of Pakistan as part of a nationally representative cross-sectional consumer survey of 7,511 smokers (6,014 in cities and 1,228 in villages). We employed a two-stage random sampling strategy to recruit adult tobacco users, asked them to show their cigarette packs and photographed those available. We classified cigarette packs as potentially illicit if these were missing any one of the following: text health warning, pictorial health warning, underage sale prohibition warning, retail price and manufacturer's name. We also estimated the proportion of smokers that purchased loose cigarettes (illegal) and cigarette packs sold below the minimum retail price. Results: Only 35% (429/1,228) of rural and 40% (2,416/6,014) of urban smokers showed their cigarette packs. Out of these, 89% (382/429) of packs in rural and 17.8% (454/2,416) packs in urban areas were considered potentially illicit. In rural areas, 83% packs didn't have graphic pictorial health warnings and 31% didn't have printed retail prices as compared to 11.2% and 9.6% in urban areas, respectively. Among urban consumers, 29.5% bought loose cigarettes and 13.8% paid less than the minimum retail price printed on the packs. Among rural users, 26.4% bought loose cigarettes but 29.6% paid prices below what were printed on the packs. Conclusions: We found profound differences in the proportion of potentially illicit cigarette packs between those purchased in urban and rural areas (17.8% vs. 89%). This indicates a vast urban/rural divide in the implementation of tobacco control policies in Pakistan. This calls for a better understanding of the drivers of illicit cigarette trade in rural areas and to assess if such differences also exist in other high tobacco-burden countries. The absence of graphic health warnings in most packs observed in rural Pakistan has serious implications for tobacco uptake and its control efforts.

FUNDING: Nonprofit grant funding entity

PPS16-3

HOW DO ADULTS GET E-CIGARETTES WHEN THEY ARE BANNED? A CASE STUDY OF MEXICO

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Significance: In countries like Mexico that have banned e-cigarettes (e-cigs), people still use e-cigs. This study aimed to understand where adult e-cig users get their e-cigs and whether the e-cigs they use contain nicotine. Methods: Data were analyzed from an open cohort of Mexican adult smokers and e-cigarette users who were surveyed every four months between November 2018 to March 2021. The analytic sample was n=2390 dual users. Participants reported how they obtained their current e-cig, and those who purchased it were asked the source, and if the e-cig they use most frequently contained nicotine. Multinomial regression models were estimated to identify the factors associated with: obtaining e-cigs (ref=bought; gift from a friend; free sample); place of purchase for those who bought it (ref=other retail locations; online; vape shops): and use of e-cigs with nicotine (ref=no; yes; don't know). Covariates included socio-demographics and smoking and e-cig-related perceptions and behaviors. Results: The 47.8% of the sample bought their e-cig, 47.7% received as a gift, and 3.6% as free sample. Compared to young adults, being 50+ years was positively associated with obtaining e-cigs as a gift (ARRR=1.81) or free sample (ARRR=3.55). Online was most common way of purchase (52%), followed by vape shop (24%) and other (23%). Having a partner who used e-cigs was positively associated with buying their e-cig online (ARRR=1.91) or in vape shops (ARRR=2.02). Compared to have tried during the past month, those who first tried e-cigs 1 to 4 months prior had lower likelihood of having bought online (ARRR=0.51) or at a vape shop (ARRR=0.56). About half the sample reported that their device contained nicotine (52.7%), which was associated with more frequent smoking (ARRR=1.97), higher smoking dependence (ARRR = 1.35), having friends who use e-cigs (ARRR= 1.34), and use of closed e-cig devices (ARRR=1.41). Compared to those who bought their e-cigs, obtaining e-cigs as a gift or free sample was positively associated with not knowing if their e-cig contained nicotine (ARRR= 2.14). Conclusions: Despite the sales e-cig ban in Mexico, about half of participants purchased their e-cigs, mostly doing so online. Having spouses and close friends who also use e-cigs appears to be a key correlate of purchasing e-cigs and using e-cigs with nicotine; hence, social norms and influence appear particularly important, perhaps because e-cigs are illegal.

FUNDING: Federal

PPS16-4

ASSESSING CIGARETTE SMUGGLING AT A TIME OF BORDER CLOSURE TO INTERNATIONAL TOURISTS: NATIONAL SURVEY OF LITTERED PACKS

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Significance: Aotearoa New Zealand (NZ) has a tobacco endgame action plan that includes radical measures such as denicotinisation of tobacco. There are concerns that such measures could increase smuggling of foreign tobacco products into NZ. However, foreign tobacco products can also be legally imported by overseas visitors and citizens returning to NZ complicating assessment of the level of smuggling. We aimed to provide data on tobacco smuggling in NZ through collecting littered tobacco packs during a "natural experiment" when no international tourists and relatively few NZ travellers arrived due to Covid-19 related border controls. Methods: Members of

the study team collected tobacco packaging litter between May 2021 and April 2022 through convenience sampling while on routine travel around the country, supplemented with purposeful sampling in key cities and major ports. We assumed that during this period, the proportion of littered packs which were foreign was likely to reflect levels of smuggling. Results: We collected 1590 tobacco packs from 12 regions, 17 cities (111 suburbs/CBDs), 18 towns and 12 rural localities. Of these packs, 36 were foreign (2.3%) (excluding Australian packs that can be legally sold in NZ). The city with by far the highest proportion of foreign packs was Auckland (15.2%). Source countries were: China (n=25; 1.6%), South Korea (9; 0.6%), Turkey (1) and the UK (1). None of 41 roll-your-own pouches were foreign. Adjusting by population distribution resulted in an estimated national prevalence of foreign packs of 5.4% (95%CI: 4.4 - 6.6). This is similar to estimates from two previous surveys in NZ (3.2% in 2008/09 and 5.8% in 2012/13). All these estimates are less than one for illicit trade for all high-income countries of 9.8%. Conclusions: The 5.4% estimate for smuggled cigarette packs is similar to previous estimates for NZ, although the problem is highly locality-specific. Our findings suggest that contrary to tobacco industry predictions tobacco smuggling has not greatly increased over recent years and that greater locality-targeted enforcement and more intensive cargo inspection schedules for imported goods originating from selected countries could reduce tobacco smuggling. Nonetheless, an enhanced and comprehensive system to monitor tobacco smuggling is also warranted and needs to be built into the country's tobacco control programme as the action plan for Smokefree Aotearoa 2025 is implemented.

PPS16-5

THE IMPACT OF TOBACCO CONTROL POLICIES ON THE ILLICIT TOBACCO TRADE: A SCOPING REVIEW

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Objective: There are concerns that increasingly stringent tobacco control policies will increase the illicit tobacco trade (ITT). We reviewed the international current evidence base to understand the impact of tobacco control polices on the ITT. Data sources: Guided by JBI scoping review methodology, we searched six databases (PubMed, CINAHL, EMBASE, PsycINFO, Scopus, and Web of Science) for original research published in English between 2000 and 2022. Study selection: One reviewer screened titles and abstracts, and two reviewers screened full-text articles against inclusion criteria. Data extraction: We report the results according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews Checklist. Data synthesis: We identified 51 articles examining the impact of five policies or combination of policies on the ITT, including tobacco tax (n=41); menthol bans (n=1); standardised packaging (n=4); a tobacco sales ban (n=1); a very low nicotine content standard for cigarettes (n=1); and multicomponent policy interventions (n=3). Conclusions: The available evidence predominantly focused on the impact of tobacco tax increases on the ITT. More than half of these studies described an increase in the ITT due to tobacco tax, largely as a consequence of tax-induced price differentials between neighbouring interstate or international jurisdictions. Evidence on the impact of other tobacco control policies on the ITT is limited. Collaborative efforts to develop accurate and consistent methods to assess the ITT are needed.

FUNDING: Unfunded; Federal; Academic Institution

PPS16-6

IDENTIFICATION AND CHARACTERIZATION OF ILLEGAL SALES OF CANNABIS AND NICOTINE DELIVERY PRODUCTS ON INSTANT MESSAGING SERVICE PLATFORM TELEGRAM

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Significance: Unregulated sales of different tobacco, nicotine, and cannabis-related products has been reported and detected on various web-based platforms, including social media, e-commerce sites, online retailers, and the dark web. New and interactive instant messaging services that offer end-to-end encryption are also becoming popular among online users and present opportunities for marketing, trading, and selling of various emerging nicotine, synthetic nicotine, and cannabis delivery products with little oversight. This study sought to identify and characterize selling activity on the popular messaging platform Telegram. Methods: This study was conducted in three phases: (1) identifying keywords related to nicotine and cannabis delivery products for purposes of detecting Telegram groups and channels; (2) automated data collection from public Telegram channels to identify and characterize selling activity; and (3) manual annotation and classification of posts marketing and selling product to consumers. Results: We identified four keywords ("Nicotine", "Vape", "Cannabis", and "Smoke") that yielded twenty-one Telegram groups. Active subscribers totaled 262,506. Total volume of posts was 70,884 comprised of 43,959 unique posts that included 3,564 (5.0%) marketing/selling posts confirmed through manual annotation. A plethora of products were detected including various e-cigarettes, synthetic vapes, cigarettes, cigars, and cannabis-derived products. Marketing tactics included posting pictures of products available, providing contact information to enter a transaction, use of product reviews, linking to external websites for product availability, multiple languages used by sellers, and varying options to pay for product (e.g., cryptocurrencies). A mix of seller accounts were observed, though most appeared to be individual suppliers. No known age verification process was observed on these channels. Conclusion/Discussion: Telegram is a global online messaging application that allows for custom channel creation and global connectivity. Our study also found that the platform enables a robust nicotine and cannabis selling marketplace. As local, state, and national tobacco control regulations continue to advance tobacco and nicotine product sales bans and restrictions, easily accessible and unregulated channels of access must be further studied to ensure that they do not act as conduits for underage and high-risk access to these addictive products.

FUNDING: State

PAPER SESSION 17: THE DRIVING FACTORS: NEUROBIOLOGICAL MECHANISMS UNDERLYING DRUG USE AND NOVEL THERAPEUTIC APPROACHES

PPS17-1

AVERSION AND PREFERENCE IN MICE TOWARDS NICOTINE ENANTIOMERS IN SYNTHETIC NICOTINE

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Significance: Manufacturers recently introduced synthetic nicotine in e-cigarettes and smokeless products. While tobacco-derived nicotine consists almost exclusively of S-nicotine, the most widely added form of synthetic nicotine is racemic nicotine, consisting of 50% S-nicotine and 50% R-nicotine. Products containing racemic nicotine may have different sensory properties from equivalent products containing tobacco-derived nicotine, modifying initiation and addiction behaviors. Methods: The two-bottle choice assay was used to characterize aversion and preference in male and female C57BL/6 mice to a range of S- and R-nicotine concentrations and racemic nicotine. Mice were presented with choice solutions overnight on 4 consecutive days, given water ad libitum during the day Nicotine enantiomers were validated using gas chromatography / mass spectrometry (GCMS) with a chiral column. Results: On all four days of testing, mice consumed as much from the bottle containing R-nicotine (100 µg/ml, 200 µg/ml) as from the bottle containing plain water. In contrast, S-nicotine was strongly avoided at the same concentrations, with plain water preferred. Racemic synthetic nicotine was preferred over S-nicotine when offered at the same concentrations (100 µg/ml). When racemic synthetic nicotine was offered at twice (200 µg/ml) the concentration of S-nicotine (100 µg/ml), mice consumed equal amounts from both bottles. Conclusions: In mice, the aversive effects of racemic nicotine are determined by its S-nicotine content. R-nicotine did not diminish or strengthen the aversion to S-nicotine. Tobacco products containing racemic nicotine are likely less aversive compared to products containing S-nicotine at identical amounts. Such products might be preferred by beginning users. Since synthetic nicotine products are often labeled inconsistently (for S-nicotine only, or for S- + R-nicotine), consumers may be misled and confused about nicotine content. This study can inform regulatory decisions on tobacco products containing synthetic nicotine, their palatability and product use initiation and addiction.

FUNDING: Federal

PPS17-2

SELF-ADMINISTRATION OF NICOTINE OR COTININE ALTERED PROTEIN LEVELS OF MOLECULAR MARKERS OF THE DOPAMINE SYSTEM AND GLIAL CELLS WITHIN KEY REGIONS OF THE MESOCORTICOLIMBIC PATHWAY

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Background: Nicotine is the primary addictive tobacco component. Cotinine is the major metabolite of nicotine that also shows reinforcing effects in rats. Studies have shown that nicotine alters extracellular dopamine (DA) levels and DA receptor expression within the mesocorticolimbic pathway. Evidence indicates that cotinine can also alter mesolimbic DA levels. However, effects of cotinine on DA receptor levels remain unknown. In addition, glial cells, including microglial cells and astrocytes, are important components of and play important roles in the central nervous system. However, the involvement of glial cells in nicotine and cotinine's effect has been largely unknown. The current study aimed to investigate effects of nicotine and cotinine self-administration on molecular markers of the DA system and glial cells within the mesocorticolimbic pathway. Methods: Adult male Wistar rats were trained to self-administer saline, nicotine, or cotinine under a mixed fixed-ratio (FR) and progressive-ratio (PR) schedule for a total of 5 weeks. Following the last PR session, brains tissue was harvested from key mesocorticolimbic regions including ventral tegmental area (VTA), nucleus accumbens shell (NACsh), nucleus accumbens core (NACcr), prelimbic (PL) and infralimbic (IL) cortices. Total protein was isolated and was subject to Western blotting for determination of astrocytes and microglial cells makers, i.e., glial fibrillary acidic protein (GFAP) and ionized calcium-binding adaptor marker 1(IBA1), respectively, as well as DA markers including tyrosine hydroxylase (TH), D_1 and D_2 receptors (D1R & D2R). Results: Rats readily developed self-administration of nicotine and cotinine. Nicotine and cotinine induced similar infusions during FR schedules, but nicotine induced greater breakpoint than cotinine during the PR schedule. Cotinine self-administration increased GFAP expression in the VTA, and nicotine self-administration increased GFAP expression in the NACcr. Cotinine self-administration also reduced D2R expression in the NACcr. On the other hand, neither nicotine nor cotinine altered IBA1, TH, or D1R expression. Conclusions: These results indicate that nicotine or cotinine self-administration is associated with altered GFAP and/or D2R protein expression within selective mesocorticolimbic regions, suggesting that these molecular alterations may be involved in reinforcing effects of nicotine and cotinine.

FUNDING: Federal

PPS17-3

TARGETING THE D3R-NACHR HETEROMERIC COMPLEX FOR NICOTINE CESSATION

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Tobacco dependence remains one of the largest preventable causes of disease and death worldwide. Unfortunately, currently available therapeutics are only modestly effective in assisting individuals to achieve long-term abstinence. Thus, there is a critical need to identify novel targets for therapeutic intervention. It has been recently shown that nicotinic acetylcholine receptors (nAChRs) and dopamine D3 receptors (D3Rs) form heteromeric complexes on dopaminergic neurons, and a novel compound, HyNDA-1, can enhance the interaction between the nAChR-D3R complex. Thus, in these studies, we sought to examine whether HyNDA-1 modulation of the nAChR-D3R complex could serve as a novel target for therapeutic intervention to promote nicotine cessation. In the first study, mice were examined for the effects of HyNDA-1 on nicotine intake with the intravenous nicotine self-administration protocol. Subjects were tested across a range of HyNDA-1 doses (0-30 mg/kg) in a within-subject Latin-square manner. Based on these findings, we next examined whether HyNDA-1 would alter general operant responding for food reward in a separate cohort . Finally, a third cohort of mice were examined in the conditioned place preference protocol (CPP) to determine if HyNDA-1 infers rewarding or aversive properties at the effective dose for nicotine self-administration. We found that pre-administration of HyNDA-1 attenuated nicotine self-administration in a dose-dependent manner. Interestingly, the effective dose of HyNDA-1 was ineffective in altering food self-administration and did not induce a chamber preference in the CPP test. These data reveal that modulation of the D3R-nAChR complex by HyNDA-1 decreases nicotine self-administration. Importantly, these effects were specific for nicotine, as HyNDA-1 treatment did not alter food self-administration. Moreover, the HyNDA-1 compound does not appear to infer any rewarding or aversive properties by itself, as no differences were found with CPP. Taken together, these findings reveal that modulation of the D3R-nAChR complex has the potential to be an effective novel target for smoking cessation. *Supported by the National Institute on Drug Abuse (NIH DA039658 to CDF) and Tobacco-Related Disease Research Program (TRDRP T30FT0967 to VL).*

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PPS17-4

NICOTINE SELF-ADMINISTRATION IS INVERSELY RELATED TO MEDIAL HABENULAR NEURONAL EXCITABILITY

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Background: Over 23 million people in the United States are dependent on nicotine. However, of the over 70% that wish to quit, only around 7% are successful. One key reason for poor cessation from nicotine is the strong withdrawal and craving that occur after nicotine abstinence. These symptoms have been increasingly attributed to activity in the habenular-interpeduncular nucleus circuit. Our goal is to understand how activity in the medial habenula is altered by changes in nicotine self-administration. Methods: Using C57/B6 adult male and female mice, we employed an e-Vape® self-administration (EVSA) assay using either 6 mg/mL nicotine, 6 mg/mL nicotine + 15 mg/mL menthol, or 60 mg/mL nicotine (with or without menthol). Mice were assigned to fixed ratio 1 (FR1), fixed ratio 3 (FR3), and progressive ratio (PR) responding to measure reinforcement-related and motivation-related behaviors. Following EVSA, brains were extracted for electrophysiology. Neurons in the medial portion of the MHb were identified via a6 nAChR tagged fluorescence and excitability was measured via ex vivo whole-cell patch-clamp electrophysiology. Neuronal excitability was measure through rheobase

(minimum current necessary to elicit and action potential) and maximum spikes then correlated to FR3 EVSA behavior. Results: We observed that as mice increased their reinforcement-related behavior (FR3 active nosepokes), there was a decrease in the firing frequency and increased rheobase (current required to trigger an action potential) of medial MHb neurons. Similarly, we observed a significant correlation where increased motivation-related behaviors (PR active nosepokes) were accompanied by a decrease in firing frequency (and increase in rheobase) of medial MHb neurons. Together, these data suggest that as self-administration increased, excitability of medial MHb neurons decreased Conclusions: Our results point to an inverse relationship between nicotine self-administration and neuronal excitability in the medial portion of the medial habenula. These results shed light on the cellular consequences of nicotine dependence. Our results could also implicate medial MHb neurons as key modulators for nicotine intake and show that more excitable neurons in this region result in a decreased nicotine intake.

FUNDING: Federal

PPS17-5

PURINERGIC SIGNALING MEDIATES CELLULAR FUNCTION IN THE MEDIAL HABENULA IN BOTH MALE AND FEMALE MICE

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Tobacco smoking remains a leading cause of preventable death worldwide, and nicotine is the primary reinforcer underlying tobacco dependence. In these studies, we sought to investigate the role of purinergic signaling on neuronal activity in the medial habenula. First, we examined ATP release in the medial habenula by utilizing the GRABATP sensor to observe real-time ATP release. To understand how this ATP release effects neuronal activity, brain slices from male and female wildtype mice were sectioned, and neuronal activity in the medial habenula were recorded with patch clamp electrophysiology. Initial studies characterized the baseline firing rates and the effects of a receptor agonist on cholinergic habenular neurons. Next, since the medial habenula has been highly implicated in mediating symptomology associated with nicotine withdrawal, we then accessed the effects of purinergic receptor signaling on neuronal firing during a state of nicotine withdrawal in both sexes. We found that purinergic signaling mediates neuronal activity of the medial habenula, with differential effects occurring specifically during nicotine withdrawal. Together, these data provides further understanding of the factors mitigating withdrawal effects that may underlie the nicotine dependence state.

FUNDING: Federal

PPS17-6

EVALUATION OF NOVEL EPIBATIDINE ANALOGS IN RATS DISCRIMINATING NICOTINE

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Significance: Tobacco use is a persistent public health issue. One of every three cancer deaths is linked to tobacco use, including nearly 90% of all deaths related to lung cancer. Nicotine is the primary psychoactive component in tobacco, and nicotine has been identified as the primary compound responsible for maintaining tobacco dependence in humans. Drug discrimination is a pharmacologically selective bioassay, utilized in the past for elucidating the receptor pharmacology of nicotine. If a test compound shares discriminative stimulus effects with nicotine, then it might serve as an effective substitution pharmacotherapy. Epibatidine reliably substitutes for nicotine in the drug discrimination assay but has a side-effect profile that limits its therapeutic potential. Thus, considerable efforts are underway to produce derivatives of epibatidine. Methods: We tested three epibatidine derivatives, 2'-fluoro-3'-(4-nitrophenyl)deschloroepibatidine (RTI-7527-102; i.e., RTI-102), 2'-fluorodeschloroepibatidine (RTI-7527-36; i.e., RTI-36), and 3'-(3?-dimethylaminophenyl)-epibatidine (RTI-7527-76; i.e., RTI-76). A total of 4 male and 4 female Sprague-Dawley rats were trained on a fixed-ratio 10 schedule to discriminate nicotine (0.32 mg/kg base) from vehicle. Results: All compounds dose-dependently substituted for nicotine, without significant decreases in response rates. There is abundant evidence that the a4ß2* subtype is of particular importance to the abuse potential of nicotine. Thus, we examined the relative contribution of the ß2 subunit with the antagonist by dihydro-ß-erythroidine (DHßE). DHßE (3.2 mg/kg, s.c.) antagonized the discriminative stimulus effects of nicotine. However, relative to antagonism of nicotine, DHßE produced less antagonism of RTI-102, RTI-36 and RTI-76. Thus, it is likely that RTI-102, RTI-36 and RTI-76 possess differing activity at nicotinic receptor subunits. To confirm that the discriminative stimulus of these compounds was due to non-ß2 subunit nicotinic receptor activity, we examined these compounds in the presence of the non-selective nicotinic receptor antagonist mecamylamine. Mecamylamine (0.56 mg/kg, s.c.) pretreatment abolished nicotine-paired lever responding for all compounds. Conclusion: These novel epibatidine analogs may prove to be useful tools in the fight against nicotine dependence.

FUNDING: Federal; Academic Institution

PAPER SESSION 18: NOVEL TREATMENTS FOR SMOKING CESSATION

PPS18-1

THE USE OF PSYCHEDELIC SUBSTANCES FOR SMOKING CESSATION: A SYSTEMATIC REVIEW

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Introduction: Smoking is the leading cause of preventable death and disease worldwide. Although treatment for nicotine addiction is widely available, successful quit rates are less than 5%. Emerging evidence highlights psychedelic substances' potential for nicotine dependence treatment. The current systematic review aims to examine existing evidence regarding the potential for psychedelic substances to support smoking cessation. Aims and methods: To identify studies on the use of psychedelic substances for nicotine dependence treatment, the databases EMBASE, MEDLINE, and APA-PsycINFO were searched, yielding 2154 results. Results were assessed for suitability by two independent authors. After full-text review, seven studies (three animal and four human) were deemed eligible. Risk of bias for animal studies was assessed using the SYRCLE risk of bias tool and the NHLBI quality assessments tools were used for human studies. Results: Of the animal studies, two focus on ibogaine-related compounds and one focuses on ketamine. All three studies provide evidence for their ability to attenuate nicotine administration in rats. The risk of bias in these studies is low to high. Of the human studies, one reported positive effects following psilocybin-guided therapy for smoking cessation; one reported small reductions in tobacco cravings following an expert-led ayahuasca retreat; and two cross-sectional studies report reductions in tobacco consumption associated with psychedelic use. The quality of the human studies is low to moderate due to reasons such as small sample size, study design, and sampling bias. Conclusions: Current evidence suggests psychedelics have potential in smoking cessation and nicotine dependence treatment; however, more robust data is needed.

FUNDING: Unfunded

PPS18-2

EFFICACY AND SAFETY OF CYTISINICLINE FOR SMOKING CESSATION: A RANDOMIZED PLACEBO-CONTROLLED PHASE 3 CLINICAL TRIAL OF A NEW REGIMEN

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Significance: The number of effective medications to treat smoking is limited. New options are needed. Cytisinicline (cytisine), a partial agonist at a4ß2 nicotinic acetylcholine receptors, has been used in Eastern Europe for decades with evidence of efficacy for treating smoking at a dose of 1.5 mg in a 25-day downward titration schedule starting at 6 doses/day. Guided by pharmacokinetic data, we developed a new regimen with a 3 mg dose and simpler 3 times/day (TID) schedule. A 25-day course of this regimen had short-term efficacy in a Phase 2b randomized clinical trial. The current study tested the longer-term efficacy and safety of this regimen vs. placebo when given for 6 or 12 weeks (wk). Methods: This 3-arm double-blind placebo-controlled phase 3 trial conducted at 17 U.S. sites randomized 810 adults smoking >10 cigarettes daily who committed to quit smoking. Participants were randomized (1:1:1) to receive 12 wk of placebo (Arm A, n=271) or cytisinicline 3mg TID for 6 wk followed by placebo for 6 wk (Arm B, n=269) or cytisinicline 3mg TID for 12 wk (Arm C, n=270). All groups had brief behavioral support at each visit. Primary outcomes were continuous biochemically-verified (breath CO<10ppm) smoking abstinence during the last 4 wk of cytisinicline treatment (Arms B and C) vs. placebo (Arm A). Secondary outcomes were continuous abstinence to wk 24, risk of relapse between the 6- and 12-wk treatment schedules, and incidence of adverse events. Results: CO-verified continuous smoking abstinence rates were 25.3% vs. 4.4% during wks 3-6 for Arm B vs. A (cytisinicline-6wk vs. placebo; OR 8.0, 95% CI 3.9-16.3, p <0.0001) and 32.6% vs. 7.0% during wks 9-12 for Arm C vs. A (cytisinicline-12wk vs. placebo; OR 6.3, 95% CI 3.7-11.6, p <0.0001). Continuous abstinence rates through 6 months were 8.9% vs. 2.6% during wks 3-24 for Arm B vs. A (OR 3.7, 95% CI 1.5-10.2, p=0.0016) and 21.1% vs. 4.8% during wks 9-24 for Arm C vs. A (OR 5.3, 95% CI 2.8-11.1, p<0.0001). Treatment-related adverse events were reported by 166 participants (61.5%) in the placebo group, 172 (63.9%) in the 6-wk cytisinicline group, and 184 (68.2%) in the 12-wk cytisinicline group. Nausea, abnormal dreams, and insomnia each occurred in <10% for each group's participants over 6 months. No treatment-related serious adverse events were reported. Conclusions: When combined with behavioral support, both a 6- and a 12-wk course of a new cytisinicline treatment regimen were more effective than placebo for smoking cessation, and both regimens were well tolerated. These cytisinicline regimens offer a new option for treating tobacco dependence.

FUNDING: Pharmaceutical Industry

PPS18-3

DO MEDICATIONS INCREASE THE EFFICACY OF DIGITAL THERAPEUTICS FOR SMOKING CESSATION?

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Significance: Digital therapeutics are an emerging treatment modality for smoking cessation that deliver evidence-based interventions for smoking cessation through highly accessible digital platforms (e.g., smartphone applications or "apps"). The iCanQuit smartphone app is the only known digital therapeutic proven efficacious for smoking cessation in a Phase III randomized controlled trial (RCT) with long term follow-up. Using data from the iCanQuit parent RCT, the aim of this study is to examine whether FDA-approved medications for smoking cessation would further enhance the efficacy of iCanQuit. Methods: Parent trial was a 2-group, stratified, double-blind RCT comparing the iCanQuit app with the NCI QuitGuide app. The iCanQuit app follows Acceptance and Commitment Therapy (ACT) which teaches skills for allowing cravings to pass without smoking, as distinct from the QuitGuide app which follows standard behavioral approaches which teach avoidance of cravings. Both apps provided information on cessation medications. The current study compared all trial participants who reported using an FDA-approved cessation medication within the first three months following randomization into the trial (n = 619) versus those who reported no use of cessation medications during this period (n = 1469). Baseline characteristics: Mean age: 38.5; 71.0% female; 32.0% minority race/ethnicity; 40.5% high school or less education; residing in all 50 US States; mean number of cigarettes/day: 19.2; mean FTND: 5.6. The primary outcome was 12-month self-reported 30-day point prevalence abstinence (PPA), with 94.0% outcome data retention (1962/2088). Results: Seventy five percent of all medication users reported using some form of nicotine replacement therapy (NRT; nicotine patch, 39.0%; nicotine gum, 33.5%; lozenges, 2.5%; varenicline, 14.6%; bupropion, 10.5%), and use did not differ by app treatment assignment (all p>.05). There was a significant (p=.049) interaction between any FDA-approved medication use and app treatment assignment on PPA. Specifically, PPA rates were 34% for iCanQuit vs. 20% for QuitGuide (OR = 2.12; 95% CI: 1.45, 3.10; p<.001) among participants reporting any FDA medication use, whereas among participants reporting no FDA medication use PPA rates were 28% for iCanQuit vs. 22% for QuitGuide (OR = 1.35; 95% CI: 1.06, 1.73; p=.016). Results were similar for those reporting using NRT: 37% PPA for iCanQuit vs. 17% PPA for QuitGuide (OR = 2.84; 95% CI: 1.84, 4.38; p <.001). Conclusions: Cessation medications might enhance the efficacy of iCanQuit for smoking cessation. iCanQuit was more efficacious than QuitGuide, regardless of whether participants used medications to aid cessation. Given the strong participant preference for NRT and the efficiencies of broadly disseminating NRT, a full-scale randomized trial testing whether NRT enhances the efficacy of iCanQuit is needed.

FUNDING: Federal

PPS18-4

AUGMENTED REALITY AS A NOVEL APPROACH FOR ADDICTION TREATMENT: DEVELOPMENT OF A SMOKING CESSATION APP

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Background: Augmented reality (AR) is a rapidly developing technology that has substantial potential as a novel approach to facilitate smoking cessation. AR can facilitate the delivery of cue exposure therapy (CET), as individuals can engage in the treatment in their natural smoking environments using mobile devices - addressing the limited generalizability of extinction learning. We developed a basic AR app for smoking cessation and demonstrated that the AR smoking cues, compared to neutral cues, elicited

substantial cue reactivity (i.e., increased urge) and that repeated exposure to the AR smoking cues reduced urge (i.e., extinction) in comparison to a control condition in a laboratory setting. Here, we report usability and acceptability of the app among daily smokers in their natural environments. Method: Daily smokers (N=23, 78.3% female, Mean Age=43.4, Mean Cigarettes/Day=14.9) - currently not attempting to quit - were instructed to use the AR app in locations and situations where they smoke (e.g., home, bar) at least 5 times per day over one week. Self-report measures of usability (e.g., reality/co-existence of AR cues) and acceptability (e.g., learnability, ease of app use), as well as app data were collected. Although the app was not provided to this sample with the intent of smoking cessation, changes in cigarettes per day from baseline to follow-up were also assessed. Results: High usability and acceptability were reported. Most of the participants (74%) used the app on at least 5 days. Participants found the AR cues realistic and well-integrated in their natural environments. The app was perceived as easy to use (Mean=4.1/5). The mode was 1 day to learn to use the app. Overall satisfaction was also high with 70% reporting being mostly or very satisfied with the app. Furthermore, 57% of participants reported reduced smoking, with an average 26% reduction in cigarettes per day at follow-up within this group. Conclusion: These findings set the stage for a randomized controlled trial testing the AR app as an adjuvant therapy for treating tobacco dependence, with potential applicability to other addictive behaviors.

FUNDING: Federal

PPS18-5

CO-QUIT: A MOBILE APP BASED COGNITIVE DISSONANCE INTERVENTION FOR SMOKING CESSATION

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Significance: New, innovative, theory-driven approaches are needed to improve the overall abstinence and long-term quit rates, and increase the reach of effective interventions. Cognitive dissonance approaches have also shown success in treating substance use, reducing the initiation of smoking, and improving smoking cessation but has never been delivered via a mobile app. Methods: The primary goal of the CoQuit app was to induce cognitive dissonance through a series of group-based mobile app activities with the overall goal of decreasing cigarette use and increasing overall quit rates. Development of the prototype app included 6 video-based modules, each of which presented instructions for a smoking cessation "activity" that users were required to record using their phone and then post within the app. Modules included instructions for choosing a quit date, outlining the pros and cons of their smoking behavior, drafting a letter to a loved one stating their commitment to quit smoking, telling an adolescent the reasons they should avoid starting to smoke. Each participant in the group could view the posted video of other group members. Results: Decreases in smoking from pretest to posttest was evaluated with participants who completed both the pretest and posttest assessment (n= 54). Results show that there were significant increases in cognitive dissonance after downloading and watching the content for four of the five content areas. Readiness to quit scores increased, the increases were all medium or medium to large in magnitude. From pretest to posttest, 41 (72%) participants reported lower daily smoking rates at posttest and showed an overall decrease in number of cigarettes smoked per day was significantly lower at posttest. All correlations between change in number of cigarettes smoked and readiness to quit scores were negative, indicating the greater the readiness to quit smoking, the less cigarettes smoked at posttest. Conclusion: Overall, results indicate promise of effectiveness of the CoQuit app. The evaluation also demonstrated promise that the CoQuit app could invoke meaningful increases in both cognitive dissonance for each of the five content areas (average effect and meaningful increases in readiness to quit smoking for four of the five content areas. The study demonstrates the efficacy of delivering a cognitive dissonance based smoking cessation intervention via mobile app.

FUNDING: Federal

PPS18-6

DEVELOPMENT OF A VAPING CESSATION TEXT MESSAGING INTERVENTION FOR LATINO YOUNG ADULTS: A PARTICIPATORY RESEARCH APPROACH

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Introduction: Latino young adults have higher rates of e-cigarette use (vaping) compared to Black and white young adults. Evidence supports the effectiveness of text messages for vaping cessation among young adults. However, their effectiveness among Latino young adults remains unknown given their low representation in vaping cessation trials. Objective: To describe the participatory research procedures of developing *Kick Vaping*, a vaping cessation text messaging intervention for Latino young adults, available in English and Spanish. Methods: Using community-based recruitment strategies, we convened a Community Advisory Board (CAB) of eight Latino young adults (ages 18-25) with different vaping experiences (i.e., never users, ex-users, and current users of e-cigarettes). Members held a series of working meetings to adapt *Decídetexto*, a smoking cessation text messaging intervention, for vaping cessation. Members provided iterative feedback on the text messages until reaching a consensus on content. Proposed terminology in Spanish was also provided by members to translate the text messages. Results: At baseline, members' mean age was 22.6 years old (SD 3.1), 75% were female, 75% were heterosexual, and 50% used both English and Spanish equally. Three members (37.5%) were ex-users and one member (12.5%) was a current user of e-cigarettes. Eighteen meetings provided sufficient opportunities for iterative feedback on the text messages for developing the intervention. The Kick Vaping intervention consists of four consecutive phases: 1) Pre-quit (15 days), 2) Quit Day, 3) Post-quit Intensive (28 days), and 4) Post-quit Maintenance (7 weeks). The final library consists of 208 text messages. Proposed terminology in Spanish includes the words "cigarrillo electrónico" for "e-cigarette, "vaporizador" for "vape", and "vapear" for "vaping". Conclusion: It is feasible and practical to build participatory research among Latino young adults focused on vaping cessation. Members of the CAB added innovation and creativity to the development of the vaping cessation text messaging intervention. Future research is needed to evaluate the impact of the intervention on vaping cessation.

FUNDING: Nonprofit grant funding entity

PPS18-7

THE NICOTINE INHALER: POSSIBLE NEW FRONTIER IN TOBACCO TREATMENT

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SIGNIFICANCE Established in August 2019, University of Maryland Medical Center's Tobacco Health Practice (UMMC THP) provides comprehensive tobacco health evaluation and treatment to patients. All patients are given tobacco dependence counseling as well as prescribed medications. The rescue medications of choice initially were the nicotine lozenge/gum due to availability via samples from state grant funding and the Maryland Quitline. However, the practice pattern later changed to prescribing the nicotine inhaler as a rescue medication. Here we report our experience on the use of the nicotine inhaler as a rescue medication in a socioeconomically disadvantaged population. METHODS In our initial experiences with prescribing the nicotine lozenge/gum, patients reported underusing it due to taste, dentures, and side effects and did not find it an effective rescue medication. When our practice pattern changed to prescribing the nicotine inhaler as the rescue medication, patients who received it via insurance reported better tolerance and effectiveness. The lack of taste and hand-to-mouth gesture encouraged compliance. While the medication is prescription-only and many insurances do not cover it, patients can apply for Pfizer's Patient Assistance Program. Many of our patients are of a lower socioeconomic status and were able to obtain free medication via this service (81.96% are on Medicare/Medicaid). RESULTS Of the patients seen from January 2022-July 2022, 90% were prescribed the nicotine inhaler as a rescue medication (n=61). We reached an undeserved population, with 95.08% of patients living in an area with a high/moderate Area Deprivation Index. 88.52% identify as Black, the mean age is 59.21 years, and 55.74% are female. A Fisher's exact test was conducted to examine whether medication compliance was associated with changes in tobacco use. The results were significant (p<.001). 34.43% of patients were fully compliant with their dual medication plans and 29.51% were partially compliant, with 19.67% non-compliant and 16.39% unknown or lost to follow-up. Of those who were fully or partially compliant, 17.94% had stopped using tobacco and 61.53% had cut down. Of those who were non-compliant, one patient quit, one patient cut down, with the remaining 83.33% using the same or higher amount of tobacco. 73.77% received the nicotine patch as their only controller (due to lack of availability of Chantix and limited insurance coverage of apo-varenicline). CONCLUSION When available and used correctly, the nicotine inhaler shows effectiveness in helping patients cut down or quit. Some barriers remain, including the out-of-pocket cost, it is prescription-only, and lack of insurance coverage. UMMC THP has found that the outcomes associated with the nicotine inhaler supports offering it as a first-line rescue medication. Further work needs to be done to ensure the accessibility of this medication.

PAPER SESSION 19: MECHANISMS FOR COMMUNITY ENGAGEMENT IN COMMERCIAL TOBACCO USE AND DEPENDENCE RESEARCH

PPS19-1

ASSESSING THE FEASIBILITY OF CONDUCTING SMOKING CESSATION OUTREACH IN FOOD PANTRIES: A PILOT INTERVENTION STUDY

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Introduction: In the U.S., smoking prevalence is disproportionately high among low-income adults who have unmet social needs, such as food insecurity. As smoking cessation services remain underutilized by persons who are socioeconomically disadvantaged, we sought to explore how food assistance settings, such as food pantries, can serve as a community-based venue to reach food insecure adults who smoke. In this study, we aimed to evaluate the feasibility of leveraging food pantries as a nontraditional venue for smoking cessation outreach. Methods: In partnership with a local hunger relief organization, we conducted health and social needs assessment surveys of food pantry clients in Cuyahoga County, Ohio (telephone and web-based surveys, Oct 2020 to Apr 2021). In mid-2021, select survey participants (i.e., participants with personal experience with smoking and food pantry use) served as advisors, to provide insights on the value of smoking cessation outreach in food pantries. From February to May 2022, we conducted in-person outreach events in food pantries to connect people who smoke to an evidence-based smoking cessation resource, the Ohio Tobacco Quitline. Results: The needs assessment survey included 132 participants who visited a food pantry (M age=47; 74% women; 39% African American/Black), of whom 35% were currently using tobacco and 31% were currently smoking cigarettes. Nearly half of participants with very low food security were currently smoking (46%). Among current smokers (M cigs/day=9), 76% intended to quit in the next 6 months, and 82% had not used nor heard of the quitline. Following the findings of the surveys and the advisory group meetings, we conducted a total of 22 outreach events at four pantries (collectively serving approximately 760 individuals/month), to connect people to the quitline. Through our pantry-based outreach efforts, a total of 30 participants provided consent to be referred to the quitline. Discussion: While it was considered feasible to leverage food pantries for smoking cessation outreach, the overall reach was low, and primarily involved individuals who were more highly resourced, such as a having their own telephone number. Despite high interest in quitting, there was limited effectiveness of our outreach model without specific adaptations to each pantry setting and in recognition of the immediate food needs addressed in food pantries. There continues to be a critical need to address high rates of smoking among populations experiencing food insecurity.

FUNDING: Federal

PPS19-2

INTERPERSONAL ETHNIC-RACIAL DISCRIMINATION AND TOBACCO PRODUCTS: THE MODERATING ROLE OF CRITICAL ACTION

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The current study aimed to understand the role of critical action: sociopolitical participation, an essential form of consciousness, on the relationship between interpersonal discrimination and the use of tobacco products. Specifically, this study aims to examine if critical action plays a role in interpersonal ethnic-racial discrimination and the use of tobacco products among 164 Black American emerging adults (*Mage* = 19.86, *SD* = .28). Results suggest the overall model had good fit: $?^2$ (*df* = 2) = 1.21, *p* = .55; RMSEA = 0.00 [90% C.I. = 0.00 - 0.13]; CFI = 1.00; SRMR = .02 (Figure 1). Findings indicated that critical action was not associated with tobacco use (*b* = -.56, *p* = .21). Interpersonal ethnic-racial discrimination predicted greater tobacco use (*b* = .41, *p* = .02), however, this association was significantly moderated by critical action (*b* = -1.46, *p* = .01). Simple slopes analysis indicated that interpersonal ethnic-racial discrimination predicted greater tobacco use at low levels of critical action (b = 1.04, p < .001), but this relation was not significant at high levels of critical action (b = -.22, p = .49; Figure 2). The study highlights the moderating effect critical action has on interpersonal ethnic-racial discrimination and the use of tobacco products. This pattern suggests that when critical action is low for those who experience interpersonal ethnic-racial discrimination, tobacco product use is more frequent. The relation between experiences of interpersonal ethnic-racial discrimination and tobacco product use no longer exists when critical action is high. Overall, moderation findings suggest participating in critical action is beneficial for dealing with negative experiences such as interpersonal ethnic-racial discrimination and coping mechanisms such as tobacco use. Results suggest that interpersonal ethnic-racial discrimination is related to increased tobacco use. Critical awareness and understanding of sociopolitical systems can act as a strategy to lessen the negative physical and psychological consequences of interpersonal ethnic-racial discrimination. Results provide insight into critical action benefits for individuals who experience increased interpersonal ethnic-racial discrimination and tobacco use. Professionals who work with these communities would do well to consider these findings to better support dealing with negative ethnic-racial experiences and mitigate negative coping responses such as smoking. This knowledge supports the reduction of tobacco-related inequalities.

FUNDING: Federal

PPS19-3

IMPACT OF PROVIDER PERSPECTIVES ABOUT CONCURRENT TOBACCO AND SUBSTANCE USE CARE ON THE DELIVERY OF TOBACCO TREATMENT WITHIN AGENCIES PROVIDING SUBSTANCE USE CARE: A MIXED METHODS STUDY

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Significance: Despite smoking rates that are 4-6X higher (~65-90%) than the general population (~14%), patients with substance use problems rarely receive tobacco use disorder care where they are treated for their non-nicotine substance use. Provider misconceptions on concurrent treatment of tobacco and other substance use may underlie these trends. Here, we examine the association of provider beliefs with their delivery of the 5As intervention (Ask, Advise, Assess, Assist, Arrange) for smoking. Methods: Data were from a 2021 Texas statewide needs assessment about tobacco use care provision for adults with substance use disorders. A convergent mixed methods design was used to understand providers' attitudes about concurrently treating tobacco and non-nicotine substance use, enablers and obstacles to treating tobacco, and current practice of the 5As. Direct service providers across various centers (9 federally qualified health centers, 6 substance use treatment programs in Local Mental Health Authorities [LMHAs], 16 global LMHAs, 55 standalone substance use treatment centers) completed 86 surveys; a subset of 27 were also interviewed. Logistic regression analyses revealed associations between constructs, controlling for center characteristics; thematic analysis was used to explore providers' perspectives on concurrent treatment and barriers/facilitators to providing treatment. Results: Providers who did not support concurrent treatment were less likely to ask patients about smoking (OR=0.18, p=.006), advise them to quit (OR=0.17, p=.005), assess their interest in quitting (OR=0.30, p=.025), or assist them to quit through intervention or referral (OR=0.32, p=.021). Qualitative results revealed barriers including beliefs that patients need to smoke to relieve the stress of substance use recovery, are disinterested in quitting, and fears that concurrent treatment would lead to increased substance use and/or relapse; additional training and education resources was the key facilitator theme. Conclusion: Results showed that provider misconceptions that treating tobacco and substance use concurrently was harmful to patients' recovery and/or that patients were disinterested negatively impacted smoking cessation efforts, necessitating the correction of these beliefs through educational efforts. The integration of evidence-based smoking interventions into routine patient care is a vital unmet clinical need, critical to improve the health, well-being, and recovery efforts of adults with substance use disorders.

FUNDING: Federal; State; Nonprofit grant funding entity

PPS19-4

ANALYZING CLUSTERING OF TOBACCO RETAILERS NEAR PUBLIC SCHOOLS USING A NOVEL GEOGRAPHIC METHOD: RESULTS FROM NORTH CAROLINA

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Significance: Proximity to tobacco retailers is associated with youth tobacco use. There is evidence that tobacco retailers cluster near schools, but few studies account for whether this is in part due to all types of retailers locating near each other and institutions. This study aimed to assess whether tobacco retailers cluster nearer to schools than expected in North Carolina by accounting for potential retail space. Methods: Using 2018 business data we identified 11,495 probable tobacco retailers based on store type and US Economic Census data. We then created a list of 121,527 businesses comparable to tobacco retailers in land use and business type, representing the universe of potential places retailers could sell tobacco. We assigned tobacco retail locations randomly among locations of comparable businesses and calculated 1) distance of schools to the nearest tobacco retailer and 2) count of tobacco retailers within 800 meters (m) of schools. We repeated this 500 times to create expected sampling distributions if tobacco retailers located randomly in potential retail space. For each measure, we compared the mean for actual retailers to the random distribution and used z-scores to assess statistical significance. We stratified analyses by urbanicity, percent of students in the free and reduced-priced lunch program (FRLP), and percent of Hispanic/Latino, non-Hispanic Black, and non-Hispanic white students. Results: Tobacco retailers are 690m closer to schools in rural areas (p<.001), 99m closer in towns (p<.01), and 33m further in cities (p<.05) compared to a random distribution in potential retail space. There are 0.27 more tobacco retailers within 800m of schools than expected in rural areas (p<.001), 0.38 more than expected in towns (p<.001) and 0.59 fewer than expected in cities (p<.001). Schools in the highest quartile of FRLP students had more retailers within 800m than expected (1.91 vs. 1.54, p<.001) as did schools in the lowest quartile of white students (2.40 vs. 2.11, p<.001). Schools in the lowest quartile of FRLP students had fewer than expected retailers (1.59 vs. 2.13, p<.001). Suburban schools with more Black students, fewer white students, and more FRLP students had closer tobacco retailers and more within 800m than expected. Conclusions: There are geographic, racial, and socioeconomic inequities in tobacco retail clustering near schools. Policies addressing proximity of tobacco retail to schools should aim to reduce these inequities.

FUNDING: Federal; State

PPS19-5

QUITLINE SMOKING CESSATION ENGAGEMENT AND OUTCOMES IN DIFFERENT RACIAL AND ETHNIC GROUPS IN 5 U.S. STATES, 2018-2020

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Significance: Free telephone smoking cessation services (Quitlines) provide evidenced-based counseling, with a broad reach and are adaptable to diverse tobacco users and products. Some previous studies have found non-Hispanic Black and Hispanics/Latino callers have lower quit rates as compared with non-Hispanic Whites when using Quitlines. This study aimed to examine the characteristics, participation and short-term outcomes of Quitline callers in 5 U.S. states in order to identify whether any between-group differences persist after controlling for baseline differences in tobacco use and other demographic characteristics. Methods: Data was combined for 5 U.S. states, using de-identified data from the National Jewish Health Quitline database, to include every caller who enrolled in Quitline support from January 2018 through June 2020. Participants included in analyses were cigarette smokers who completed one registration call, participated in at least one counseling call, and had no missing data on key baseline variables (e.g. age, gender, race, ethnicity, CPD, education etc). Main outcomes were (a) completed at least 3 counseling calls (b) receivied an FDA-approved smoking cessation medicine and (c) self-reported they had quit smoking on a call between 2-6 weeks after the registration. Results: The final sample (n=43,510) comprised 32,037 smokers identifying as White (non-Hispanic), 7902 identifying as Black (non-Hispanic), 2,132 identifying as Hispanic and 1,439 identifying as belonging to other racial/ethnic groups. There were statistically significant differences between the racial/ethnic groups on all of the outcomes, as well as most of the baseline variables (e.g. mean age was 45 for Hispanic callers versus 55 for Whites and 56 for Blacks). The short-term quit-rate was 17.3% for Whites, 15% for Blacks, 15.2% for Hispanic/Latinos and 14.9% for other racial/ethnic groups, with White smokers having a significantly higher quit rate than each other group. When the outcomes were entered in multivariable linear/logistic models using step-wise selection, many variables remained in the model and Black smokers had a lower quit rate than white smokers (OR=0.85, 95% CI=0.79-0.91). Black smokers were equally likely to receive NRT, but less likely to complete at least 3 counseling calls as compared to White callers: OR=0.88 (95% CI=0.83-0.94). Conclusion: There are small but consistent differences between racial and ethnic groups in engagement and quitting smoking with free Quitline services, and these differences remain after controlling for a host of baseline differences.

FUNDING: Nonprofit grant funding entity

PPS19-6

ADAPTING A TOBACCO CESSATION TRAINING CURRICULUM TO PROMOTE INTERVENTION DELIVERY AMONG COMMUNITY HEALTH WORKERS: RESULTS FROM A MIXED METHODS COMMUNITY-ENGAGED STUDY

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Significance: Stark disparities in tobacco use and related morbidities exist in disadvantaged communities in spite of overall declines in tobacco rates in the U.S. An unresolved issue is that these communities have no or low access to evidence-based tobacco cessation treatment. To address this issue, the current study sought to take a community-engaged, iterative approach to work with community health workers (CHW), who have a unique model of care designed to address patient barriers to healthcare access, to understand how to better train CHW to support their patients. The aim was to develop a culturally-sensitive tobacco cessation training curriculum to increase knowledge among CHW and promote delivery of brief interventions to patients experiencing tobacco-related disparities. Methods: This mixed methods study from 2017-2021 aimed to adapt an established tobacco cessation curriculum (i.e., 5A's) for use by CHW. We conducted a quantitative needs assessment survey (N=53) and focus group (N=6) and used the data to create an outline tailored to the CHW care model. Next, qualitative data from CHW (N=11) and stakeholders (N=3) were collected on the training's content and delivery; these data were analyzed and results were integrated to develop an adapted curriculum. Preliminary implementation data were assessed using the Acceptability of Intervention Measure and the Intervention Appropriateness Measure (range: 4-20). We have partnered with CHW from the local community to develop the survey and iteratively integrate feedback to improve the training. Results: A majority of CHW discussed tobacco use (73%), but lacked confidence (34% "some" or no confidence) and knowledge [M=4.31/10 (SD=1.66)] in treating tobacco. Qualitative results showed that CHW wanted a more condensed overview of background tobacco information, and had strong interest in motivational interviewing for smoking cessation to address patients' ambivalence about quitting. CHW also reported that existing trainings did not account for their patients' comorbidities, such as dual marijuana use. Results showed that a tailored curriculum is both acceptable to CHW (M=18.23; SD=2.27) and appropriate for their patient population (M=18.62; SD=2.22). Conclusion: An adapted tobacco cessation curriculum is warranted to build capacity in the CHW workforce to promote tobacco cessation among their patients. More so than learning strategies to assist patients, CHW were interested in learning motivational techniques. Our study highlights the critical need to use a community-engaged approach to better provide adequate, evidence-based care to underserved communities.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PAPER SESSION 20: FROM MARGIN TO CENTER: SEXUAL AND GENDER MINORITY HEALTH IN NICOTINE AND COMMERCIAL TOBACCO RESEARCH

PPS20-1

EMERGING TOBACCO PRODUCTS: PREVALENCE AND HARM PERCEPTIONS ACROSS SEXUAL AND GENDER IDENTITY

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Significance: Cigarette use disparities persist for transgender and gender diverse (TGD) people, though most research omits sexual orientation when studying differences by TGD identity. This is a critical gap, as combustible tobacco disparities are also pronounced among sexual minorities (SM). Emerging lower harm tobacco products have the potential to reduce combustible cigarette use disparities in TGD groups, if TGD smokers switch completely to these products. Yet little is known about patterns of use and perceptions of emerging tobacco products in TGD communities. We examined use prevalence and harm perceptions of cigarettes and three emerging products (low nicotine cigarettes [LNC], e-cigarettes, and snus) among US adults by gender identity and sexual orientation. Methods: Using the Population Assessment of Tobacco and Health Wave 5 data (2018-2019), we calculated weighted prevalence of past 12-month use of cigarettes, e-cigarettes, and snus (LNC prevalence data unavailable). Multinomial logit models, controlling for sociodemographic characteristics and lifetime cigarette use, compared relative harm perceptions of emerging tobacco products (vs cigarettes) between cisgender/heterosexual, cisgender/SM, TGD/heterosexual, and TGD/SM participants. Results: TGD/heterosexual participants reported the lowest weighted prevalence of past 12-month e-cigarette (2.0%) and snus use (0.0%), but the highest prevalence of past 12-month cigarette use (11.5%). Compared to cisgender/heterosexual participants, TGD/heterosexual participants had greater odds of rating LNC (OR=4.40, 95% CI=2.12-9.15), e-cigarettes (OR=2.68, 95% CI=1.28-5.58), and snus (OR=4.47, 95% CI=1.95-10.21) as lower harm than conventional cigarettes. No differences in harm perceptions were found between TGD/SM and cisgender/heterosexual participants. Conclusions: While TGD/heterosexual participants used cigarettes at a higher rate than cisgender/heterosexual participants, they also viewed emerging tobacco products as less harmful than combustible cigarettes, which may be leveraged in future initiatives to reduce cigarette use disparities. Future research investigating the conditions in which TGD populations view emerging tobacco products as acceptable substitutes for combustible cigarettes is needed to inform cessation interventions and public education efforts. Additional research investigating distinctions in tobacco product perceptions and use between TGD/heterosexual and TGD/SM populations is also needed.

FUNDING: Federal

PPS20-2

GENDER-AFFIRMING SURGERY AND TOBACCO USE: A SYSTEMATIC REVIEW

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Significance. Transgender and gender diverse (TGD) people experience exhibit disparities in tobacco use, including increased odds of ever use and past 30-day use of cigarettes, cigars, and e-cigarettes. Explanations for these disparities usually cite minority stress, where TGD people experience unique stressors related to their gender identity or presentation. Gender-affirming (GA) surgery, designed to ameliorate experiences of minority stress by aligning a person's external physical appearance with their innermost sense of self, is considered medically necessary and life-saving care for those who desire it. While smoking is an established risk factor for postsurgical complications, very little is known about the association between tobacco use and GA surgeries. The purpose of this study was to conduct a review of the existing literature on GA surgeries and tobacco use. Methods. We conducted searches in five databases (PubMed, Embase, PsycInfo, Google Scholar, and Mednar) in February 2022. Data screening, extraction, and analysis were conducted in summer 2022. Results. 251 studies met our keyword search criteria. Twenty duplicates and 10 irrelevant studies were removed. 158 studies were excluded for being review articles, position statements or commentaries, or not having original data, leaving 63 studies in the final sample, comprised of articles that focused on GA surgery for TGD people and mentioned tobacco use prevalence and/or tobacco-related complications post-surgery. Smoking prevalence, included in 60 studies, ranged from 3.1% to 59.5%. However, only 22 studies specifically named tobacco, cigarettes, and/or nicotine products. For 41 studies, there was no definition given for "smoking." Only 11 studies listed smoking or tobacco/nicotine cessation as an eligibility requirement for GA surgery. In 9 studies physicians strongly recommended quitting to patients, with no mention of assistance in quitting. Finally, 34 studies explored some association between tobacco use and post-surgical outcomes. In 14 studies, smoking or tobacco use was associated with increased odds of complications or required revisions. For 17 studies, there were no significant associations between smoking/tobacco use and surgical outcomes. Two studies reported a decreased odds of tobacco use following GA surgery. Conclusions. The increased tobacco burden in TGD populations, coupled with the necessity of GA surgeries for some TGD people, makes the association between tobacco use and GA surgeries a critical area needing more research. Only half of the existing studies that mention tobacco use in TGD surgical populations explored any association between tobacco use and surgical outcomes. GA surgeries may be a promising avenue for cessation interventions.

FUNDING: Federal; Academic Institution

PPS20-3

APPLYING NATURAL LANGUAGE PROCESSING (NLP) TOOLS TO ASSESS LGBTQ RESEARCH GAPS IN TOBACCO CONTROL LITERATURE

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Significance: Currently, 30% of lesbian, gay, and bisexual (LGB) adults, 40% of transgender adults, and 31% of LGB high school students reported using tobacco, at a rate much higher than the general population. There is an urgent need for synthesizing published evidence to inform tobacco control policies in order to better serve marginalized populations. The objectives of our study are to develop algorithms to automatically identify peer-reviewed articles that study LGBTQ tobacco use and that are published at leading tobacco research journals from 2015 onward, and to extract textual and non-textural information from these articles. Methods: Our team has compiled tobacco-specific journals and built a tobacco research domain-specific semantic database. We then use that database to identify and extract data from articles by study populations (LGBTQ or not). Our database does not contain published articles in their original forms; instead, it contains data points that allow researchers to conduct evidence synthesis (i.e., systematic review or meta-analysis). Therefore, we will be able to make the database publicly accessible to ensure the transparency and auditability of data. Results and Conclusion: We will test the following hypotheses: 1) LGBTQ populations are understudied in leading tobacco research journals; 2) the scope of LGBTQ studies is limited and is less comprehensive than the studies of the general tobacco using population. We have developed a flow chart to present the selection of papers for our analysis. We have identified 2,604 papers with tables, and we apply algorithms to identify papers with tables containing statistics of LGBTQ populations; we then extract information from those tables and exclude queried entries from review articles or meta-analyses. Those extracted data allow us to construct measurable outcomes using Named Entity Recognition (NER). We will then present i) sample representativeness (indicated by whether the aggregated sample is smaller than the percentage of the LGBTQ population among the general US populations); ii) sample comprehensiveness (measured by the breakdowns of sample sizes by distinct groups as mentioned above); iii) analytical methods; iv) behavioral outcomes (use status, quitting, etc.); v) policies or interventions being studied; and vi) relational constructs in the conclusion statement (e.g., support, not support, significantly increase, no relationship at all, etc.).

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS20-4

SEXUAL MINORITY YOUTH INEQUITIES IN COMBUSTIBLE TOBACCO USE DURING PREGNANCY

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Significance. Sexual minority youth are at greater risk of tobacco use and adolescent pregnancy than those who identify as completely heterosexual, but there is very little research on tobacco use in younger pregnant people who are sexual minorities. The goal of this analysis was to examine rates of prenatal nicotine and tobacco use as a function of sexual minority status in a cohort of younger pregnant people. Methods. Pregnant people ages 14-21 (mean = 19 years) were recruited for a cohort study of prenatal tobacco and cannabis use (N = 299, 77% Black or Biracial). Participants reported substance use, race and ethnicity, sexual orientation, attraction, and behavior, and psychosocial correlates of tobacco use. Clinical urine samples provided to obstetric providers were screened for cotinine. We compared sexual minority youth (those who reported any non-heterosexual identity or same-gender sexual behavior or attraction) to completely heterosexual youth on their use of nicotine and tobacco. A logistic regression was conducted on prenatal tobacco use as measured by any self-reported combustible tobacco product use or a urine screen that was positive for cotinine during pregnancy. Results. One-third reported same sex attraction, behavior, and/or sexual orientation, with 21% of the sample identifying as bisexual, 9% as mostly heterosexual, 4% not sure, 1% gay or lesbian, and 1% asexual. Sexual minority participants were more likely to use combustible cigarettes (30% vs 20% before pregnancy and 22% vs 9% during pregnancy) and little cigars and cigarillos (22% vs 9% before pregnancy and 11% vs 3% during pregnancy) than participants who were not sexual minorities. There were no differences in vaping. Sexual minority status was associated with prenatal tobacco use (Adjusted Odds Ratio = 2.01, confidence interval = 1.06-3.83), controlling for age and prenatal cannabis use. Conclusions. Inequities in tobacco use seen in sexual minority youth persist during pregnancy, a key window of opportunity for intervention. Higher levels of stress, emotional distress, and intimate partner violence and lower levels of social support reported by the sexual minority participants were not related to prenatal tobacco use in multivariate analysis. Longitudinal research is needed to elucidate the psychosocial and minority stress mechanisms of tobacco disparities in this community that perpetuate health inequities during pregnancy and across the lifespan.

FUNDING: Federal

PPS20-5

ADVERSE CHILDHOOD EXPERIENCES AND CIGARETTE AND VAPE USE AMONG SEXUAL AND GENDER MINORITY YOUNG ADULTS

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Significance: Adverse childhood experiences (ACEs) can have a devastating impact on an individual's emotional and physical health well into adulthood. ACEs include a variety of adverse childhood experiences ranging from having divorced parents to experiencing violence or sexual abuse. There has been very limited research on ACEs and cigarette use among 2SLGBTQI+ young adults in Canada. We outline results from an online survey that examines the relationship between ACEs and smoking and vaping practices. Methods: Online survey participants were recruited from November 2020 until April 2021. Eligibility for the online survey included: being between the ages of 16 and 29, living in Ontario or Quebec, and identifying as 2SLGBTQI+. Respondents could participate regardless of their smoking or vaping status. A convenience sample of 1,284 participants who agreed to respond to the online adverse childhood experience questions were included in the final sample. We report on the baseline of a longitudinal survey with four survey rounds total. Participants were compensated with a $10 electronic gift card. Multivariate logistic regression analysis was used to examine the association between ACEs and outcome variables of smoking and vaping status, adjusted for sociodemographic and health-related variables including gender, orientation, age, education and income as well as mental health status. Results: Participants who reported ever having smoked were significantly more likely to report childhood emotional abuse (AOR = 1.53, 95% CI 1.14-2.06), physical abuse (AOR = 1.72, 95% CI 1.27-2.31), or sexual abuse (AOR=2.68, 95% CI 1.87-3.83) as well as other ACEs. All significant associations for smoking also existed for vaping. 89% experienced at least one ACE, 36% experienced 4 or more ACEs. A significant positive dose-response relationship was observed between the number of ACEs and the odds of vaping and cigarette use. Adjusting for demographics and depression, participants experiencing 4 or more ACEs were significantly more likely to have ever smoked (AOR = 2.79, 95% CI 1.70, 4.59) and to have ever vaped (AOR = 2.71, 95% CI 1.67, 4.37) compared to those having experienced no ACEs. Conclusions: In this first Canadian study to look at the association of ACEs and cigarette and e-cigarette use for 2SLGBTQI+ young adults, we found that a significant percentage of the community has experienced childhood trauma and that a significant association of childhood traumatic incidents and smoking and vaping behaviours exists among 2SLGBTQI+ young adults. Individuals exposed to ACEs may use nicotine to control stress, anxiety, and undesirable mood states. These findings point to the need for trauma-informed smoking and vaping prevention and cessation services for 2SLGBTQI+ youth and young adults

FUNDING: Federal

PPS20-6

CHANGING SEXUAL IDENTITY AMONG YOUTH AND EMERGING ADULTS AND RISK OF TOBACCO PRODUCT USE FROM WAVE 1 THROUGH WAVE 5 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Introduction: Young adults who change their sexual identity over time are more likely to become current smokers compared to individuals who do not change their sexual identity. However, few studies have examined the association of change in sexual identity and use of e-cigarettes. In this study, we examined the association between changes in sexual identity over time and current use and dual use of cigarettes and e-cigarettes. Methods: We used data from Wave 1 to Wave 5 of PATH study Restricted Use Files to identify youth and emerging adults (age 14 to 25 at baseline) who were non-tobacco users at baseline and changed their sexual identity from Wave 1 through Wave 5. We examined the association of change in sexual identity and current use of cigarettes, e-cigarettes and both by Wave 5 adjusting for age, sex, race, ethnicity, US census region, and mental health using multivariable logistic regression. Analyses were weighted and conducted using SAS version 9.4. Results: A total of 6,210 participants were non-tobacco users at Wave 1. Overall, 6 types of sexual identity changes were identified: 1) Came out as LGB+ (6.4%), 2) Transitioned once after coming out (2.4%), 3) Transitioned two or more times after coming out (0.6%), 4) LGB+ to Heterosexuals (2.5%), 5) Consistently LGB+ (5.4%) and 6) Consistently Heterosexuals (82.8%) from Wave 1 to Wave 5. Of the 6,210 participants who were non-tobacco users at Wave 1, 8% became current smokers with the highest among individuals who transitioned twice or more after coming out (18%) and 15% became current e-cigarette users with highest among individuals who came out as LGB+ (26%) by Wave 5. Dual use was observed in 4.8% of the population with highest among individuals who came out as LGB+ (11%). After adjusting for covariates and compared to consistently heterosexuals, the odds of current smoking was higher in those who came out as LGB+ (OR: 2.1, CI:1.5-2.9) and individuals transitioning twice or more after coming out (OR:2.6, CI: 1.4-4.8), while the odds of current use of e-cigarettes (OR: 1.7 CI: 1.3-2.2) and of dual use (OR: 2.3, CI: 1.6-3.3) were higher in those who came out as LGB+. Conclusion: Individuals who came out as LGB+ as well as individuals who transitioned multiple times had the highest risk of becoming current users of tobacco products in PATH. Recognizing the most vulnerable group is important to develop effective interventions focusing on prevention and providing support.

PODIUM PRESENTATION 5

PAPER SESSION 21: PATTERNS, PREVALENCE AND IMPACT OF FLAVORED E-CIGARETTES AND TOBACCO PRODUCTS

PPS21-1

USE PATTERNS OF FLAVORED NON-CIGARETTE TOBACCO PRODUCTS AMONG US ADULTS, 2014-2019

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Significance: Flavored non-cigarette tobacco product (NCTP) use is prominent among US adult tobacco users. To update the estimates of use patterns of flavored NCTPs with more recent data and to provide benchmark estimates for future monitoring and regulatory activities, this study assessed the current adult users of NCTPs by flavor use and flavor type from 2014-2019. Methods: We analyzed the 2014-2019 Tobacco Use Supplement to the Current Population Survey (TUS-CPS) to estimate the weighted proportions of adult NCTP users by flavor use, by product type. Flavor use (excluding tobacco flavor) was defined as past 30-day use of any menthol/mint flavor or fruity/other flavors including clove, spice, herb, fruit, alcohol, candy, sweets, chocolate, or other flavor. Differences in flavor use between TUS-CPS waves 2018-2019 and 2014-2015 were examined using Chi-square tests. We also restricted the data to 2018-2019 to evaluate the differences between any use of menthol/mint flavor and fruity/other flavors versus exclusive use of tobacco flavor by demographic and tobacco use characteristics using Chi-square tests, respectively, by product type. Results: In comparison to 2014-2015, ENDS users were more likely (79.0% vs. 66.6%, p<0.001) to report flavor use in 2018-2019; whereas cigar (26.9% vs. 31.2%, p=0.030) and pipe (56.3% vs. 65.5%, p=0.015) users were less likely to report flavor use in 2018-2019. In 2018-2019, the most prevalent flavor types were any use of fruity/other flavors among users of ENDS (64.9%, 95%CI: 62.5, 67.3), cigars (24.7%, 95%CI: 21.9, 27.7), and pipes (48.4%, 95%CI: 42.3, 54.6), and any use of menthol/mint flavor among smokeless tobacco users (42.0%, 95%CI: 39.4, 44.6). For some NCTPs, menthol/mint and/or fruity/other flavored users were significantly more likely to be younger adults aged 18-24 or 25-34 years (ENDS, cigars, pipes, smokeless tobacco), Non-Hispanic Black or Hispanic (ENDS, cigars, pipes), and never cigarette smokers (ENDS, pipes) compared to exclusive tobacco flavored users. Conclusion: ENDS users were more likely to report using a flavored product in 2018-2019 compared to 2014-2015. In 2018-2019, ENDS users who reported using menthol/mint and fruity/other flavors were more likely to be young adults and never cigarette smokers. Our study findings can inform policy measures concerning flavored NCTPs. Further studies using longitudinal data are warranted to better understand the role of flavors in NCTP use over time.

FUNDING: Federal

PPS21-2

ASSOCIATIONS BETWEEN E-CIGARETTE USE AND E-CIGARETTE FLAVORS WITH CIGARETTE SMOKING QUIT ATTEMPTS AND QUIT SUCCESS: EVIDENCE FROM A US LARGE, NATIONALLY REPRESENTATIVE 2018-2019 SURVEY

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Objectives: While many studies have examined the association between e-cigarette use and smoking cessation, fewer have considered the impact of e-cigarette flavors on cessation outcomes. This study extends previous studies by examining the effects of e-cigarette use and e-cigarette flavors on smoking quit attempts and quit success. Methods: We used data from the 2018-2019 Tobacco Use Supplement-Current Population Survey (TUS-CPS) survey. Multivariate logistic regression analyses were used to investigate the associations between e-cigarette and flavor use with quit attempts among individuals who smoked 12 months ago and quit success. Two current e-cigarette use definitions were used in the logistic regression analysis of quit attempts and quit success; currently use every day or some days vs. 20+ days in the past 30-days. Results: Compared to those not using e-cigarettes, current everyday or someday e-cigarette use with all non-tobacco flavors had an adjusted odds ratio (AOR) of 2.9 (95% CI: 2.4-3.5) for quit attempts and 1.7 (95% CI: 1.3-2.2) for quit success. 20+ days e-cigarette use with flavors had stronger associations with quit attempts (AOR=4.2, 95% CI: 3.1-5.5) and quit success (AOR=4.0, 95% CI: 2.9-5.4). E-cigarette users with non-tobacco flavors were more likely to succeed in quitting compared to those exclusively using non-flavored or tobacco-flavored e-cigarettes. Menthol/mint flavor users had slightly higher odds of quit attempts and success than users of other non-tobacco flavors. Conclusions: E-cigarette use is positively associated with both making a smoking quit attempt and quit success. Those using flavored e-cigarettes, particularly menthol/mint, are more likely to quit successfully. Implications: E-cigarette use is positively associated with both making a quit attempt and quit success, and those using flavored e-cigarettes are more likely to successfully quit smoking, with no statistically significant differences between use of menthol or mint flavored e-cigarettes versus use of other non-tobacco flavored products. This suggests that the potential for e-cigarettes to help people who currently smoke quit could be maintained with the availability of menthol or mint flavored e-cigarettes, even if other non-tobacco flavored products, which are associated with e-cigarette use among youth, were removed from the market.

FUNDING: Federal

PPS21-3

STAKEHOLDER PERCEPTIONS AROUND UNFORESEEN IMPACTS OF THE 2019 MASSACHUSETTS TOBACCO FLAVOR RESTRICTION LAW

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Significance: In November 2019, Massachusetts passed the nation's first statewide law to restrict retail sales of all flavored tobacco products, including menthol products. Introduction of the law resulted in concerns among different stakeholders regarding implications of implementation on individuals and communities. The objective of this study is to explore stakeholder perceptions of unforeseen impacts since the initial implementation of the law. Methods: We conducted in-depth Zoom, phone, or in-person interviews with 32 stakeholders in Massachusetts, including public health officials, clinicians, school staff and tobacco retailers between March 2021 and April 2022. Interviews were designed to obtain diverse perspectives from those impacted by the new policies and an understanding of perceived barriers and facilitators to implementing the law. Interviews were informed by the Exploration, Preparation, Implementation, Sustainment Framework emphasizing sociopolitical context, advocacy efforts, interorganizational networks, and characteristics of decision-makers. A comprehensive thematic analysis incorporating both deductive coding based on study constructs, and inductive coding was applied across transcripts using NVivo 12. Results: A central consideration identified across stakeholder groups was the impact of the policies on stakeholders themselves, their communities, and the future effectiveness of the law. Since passage of the law, participants described the experiences driving their concern. These included loss of tax revenue and sales to neighboring states, tobacco industry loopholes causing confusion around flavor names for retailers and enforcers, and the unexpected shift in professional roles, such as public health inspectors feeling like a 'punisher' within their communities, or retail clerks becoming 'consumer educators' for their customers. Other unintended impacts from the policy included fear among health providers that policies led to an increase in cannabis use among young people, and that policies could potentially have a disproportionate impact on communities of color through increased surveillance of individuals and retailers. Conclusions: Our findings identified concerns at the community (e.g. equity, tax revenue), individual (e.g. product switching), and changing professional roles (e.g. untrained consumer educators). These provide key insights into challenges to and unintended consequences of implementation of the law.

FUNDING: Federal

PPS21-4

TRACKING THE PROLIFERATION OF E-CIGARETTE FLAVOR BLENDS AND CONCEPT FLAVORS

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Introduction: Flavored e-cigarettes have been a major contributor to the youth vaping epidemic. A 2020 survey of more than 2,000 youth and young adult e-cigarette users found that most were using flavor blends featuring a combination of fruit, sweet and cooling sensory characteristics (e.g., Banana Ice), as well as "concept" flavors featuring ambiguous names lacking any flavor characterization (e.g., OMG, Bahama Mama). Some concept flavors share similar sensory profiles as flavor blends. It is important to monitor

the growth in prevalence and diversity in brands offering these flavors due to their high potential for youth appeal. Methods: Data were drawn from a national cross-sectional continuous tracking survey of youth and young adults (aged 15-24, approximately 350 unique respondents per week). The study period ranged from February 9—August 2, 2022. The analytic sample was restricted to past 30-day users of e-cigarettes (N=1,952). Respondents reported whether they had used any of the 9 flavor blends and/or 15 concept flavors presented on the survey in the past 30 days. To identify flavor blend and concept flavor availability by brand on the e-cigarette market, NielsenIQ retail scanner data was used to calculate total sales, aggregated at the 4- and 52-week according to product name keywords and the number of brands offering each flavor. We present Banana Ice as an exemplar for the purposes of this presentation. Results: Two-thirds of the sample (66.3%) reported current use of at least one of the listed flavor blends, and slightly less than half (45.6%) used at least one of the listed concept flavors. There was no significant change in use of these flavor categories observed by week over the study period. One of the most popular flavors, "Banana Ice," first appeared on the US market in early 2020; until June 2021, it was offered only by one brand (Puff Bar). By the 4-week intervals reported between July 2021 and March 2022, Banana Ice was offered by an average of 23 brands per interval. Discussion: Dozens of competing e-cigarette manufacturers are now offering their own versions of flavor blends that were previously offered by a limited number of brands. Flavor blends and concept flavors remain popular among young people amid fluctuations in brands offering these flavors. When sufficient data are available, additional analyses will monitor changes in use of specific flavors among youth and young adults over a longer time period.

FUNDING: Unfunded; Other

PPS21-5

TRANSITION OF E-CIGARETTE FLAVORS USED BY US YOUTH AND ADULTS: FINDINGS FROM THE PATH STUDY WAVES 3-5

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Background: The increase in e-cigarette use is in part attributed to the availability of a substantial variability of flavors. No study has examined the transition in e-cigarette flavor use. In a cohort of current e-cigarette users from a nationally representative sample of US youth and adults, we assessed the transition of flavor use from 2015/16 to 2018/19. Methods: We analyzed Waves 3-5 data of the Population Assessment of Tobacco and Health (PATH) Study. Our study sample included 2844 current e-cigarette users at W3 who reported the flavors being used in the past 30 days. These included 80 youth (12-14 years), 1790 young adults (18-34 years), and 974 older adults (=35 years). Flavor responses were categorized into 5 mutually exclusive groups, including tobacco only (T), menthol/mint only (M), tobacco and menthol/mint (TM), non-tobacco and non-menthol/mint only (NTM), and NTM combined with tobacco and/or menthol/mint (NTM$^+$). We calculated the proportion of each flavor group by wave. Results: Across all age groups, a significant proportion of current e-cigarette users transitioned to non-users from W3-4 (youth: 58.8%; young adults: 44.3%; older adults: 37.9%) and W3-5 (youth: 37.5%; young adults: 39.3%; older adults: 43.3%). Youth e-cigarette users mostly reported using NTM (W3: 81.3%; W4: 26.3%) followed by NTM$^+$ (W3: 7.5%; W4: 6.3%) at W3-4. A number of NTM users transitioned to NTM$^+$ across W3-5. At W5, NTM$^+$ use (25.0%) was more prevalent than NTM (13.8%). Use of T (6.3%), M (3.8%), or TM (1.3%) was low among youth at W3, and users of those flavors transitioned to using NTM or non-e-cigarette users at W4. No one reported using T or TM at W5. For young adults, NTM use was most prevalent across W3-5 (W3: 68.9%; W4: 21.40%; W5:19.4%) followed by NTM$^+$ use (W3: 15.5%; W4: 5.8%; W5: 7.8%). A greater proportion of young adult users compared to youth reported using T (6.0%) and M (1.9%) at W3, and many continued to use T and M across W3-5. Similar to young adults, NTM (42.1%) remained the most popular flavors in older adults across W3-5, followed by NTM$^+$ (11.8%). Unlike youth or young adults, a large percentage of older adult users reported using T (28.3%) and M (9.8%) at W3, many of whom remained as T and M users across the waves. Conclusions: Youth and adult e-cigarette users exhibited unique patterns of transition in flavor use over time. Regulations of NTM flavors may help reduce e-cigarette use, particularly in youth and young adults.

FUNDING: Academic Institution

PPS21-6

LINKING NEURAL RESPONSE TO FLAVORED VAPE PACKAGING AND SUBSEQUENT CIGARETTE SMOKING SEVERITY: THE MODERATING ROLE OF DEPRESSION

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Significance: Appealing flavors and colorful packaging are marketing tools of the tobacco industry to promote flavored e-cigarettes (e-cig). Conversely, plain packaging has been effective in reducing tobacco use. While most flavored cigarettes have long been outlawed, recent research suggests that flavored e-cigs are an appealing gateway to tobacco addiction for youth. We used functional MRI (fMRI) to examine whether neural response to e-cig packaging with flavor cues vs plain packaging is linked to subsequent cigarette smoking among young adult (YA) vapers. Given that e-cigs are used to cope with negative mood, we also explored whether depression levels would influence this relationship. Methods: Images of flavored and plain e-cig packaging were presented to 64 YA non-smoking vapers (female=46; age=20.1±1.5; mean e-cig use 25 of past 30 days, *SD*=7.4). Depression levels were assessed by the Patient Health Questionnaire at the baseline fMRI visit (*M*=1.09, *SD*=.88), followed by self-reported cigarette smoking over 4 weeks. Four regions of interest (ROIs) were identified using clusters of significant (p80 voxels) neural response to flavor cue vs plain packaging: the right inferior parietal (rIPC), lateral occipital, and fusiform cortices and the left superior parietal cortex. Linear regressions with bootstrapped moderation analysis were conducted to examine whether these ROI responses were linked to subsequent cigarette smoking, with depression as a moderator. Results: Weaker neural response to packaging with flavor cues in the rIPC was associated with higher smoking frequency 1-month later (*Beta*=-.36, p=.008) after controlling the effects of baseline vaping severity. A significant moderation effect was observed for depression (*Beta*=-.34, 95%CI=-.85, -.23). Decomposition of the interaction revealed that those who scored high on depression (*Beta*=-.43, 95%CI=-.70, -.16) drove the inverse rIPC-smoking relationship. Conclusion: Weaker response to flavor packaging cues in a brain region known to mediate visuospatial attention and integration (rIPC) may be a neuromarker indicative of poor prognosis. Individuals with elevated depression appear less likely to engage these cognitive processes during packaging exposure, less influenced by the visually salient flavor cues, and more likely to escalate cigarette smoking 1-month later. Findings highlight the importance of mental health influences on reactions to vaping cues and future tobacco use trajectory.

FUNDING: Federal; Academic Institution

PPS21-7

NEURAL RESPONSE TO FLAVORED E-CIGARETTE PACKAGES PREDICTS VAPING FREQUENCY AMONG NON-SMOKING YOUNG ADULT VAPERS

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Significance: Flavored vape product packages often feature salient visual flavor cues (e.g., fruits and candies) that contribute to the recent rapid uptake and escalation of vaping among youth. We used functional MRI (fMRI) to determine whether neural response to vape packaging predicts 1-month vaping frequency among non-smoking young adult (YA) vapers. Methods: 64 YA (18-24 yrs) who vaped on average 25 of the past 30 days (*SD*=7.38) completed an fMRI paradigm that included images of verbally labeled flavored vape packages with and without visual food cues. Subsequent 1-month vaping frequency was queried via self-report. 10 functionally defined regions of interest (ROIs) were identified using clusters of significant neural response (p80 voxels) contrasting explicit visual flavor cue vs. color cue packaging. The predictive utility of the ROI responses was assessed using ordinary least squares regressions. Results: Stronger activation responses to the more salient visual flavor cues in the left inferior parietal (LIP), lateral occipital (LLO), and superior parietal (LSP) cortices were associated with greater subsequent vaping frequency ($Beta_{LIP}$=.21, p=.03; $Beta_{LLO}$ =.28, p=.003; $Beta_{LSP}$ =.25, p=.01), even after controlling the effects of baseline vaping craving and frequency (ps<.01). Neural responses accounted for 4-7% *additional unique* variance in vaping frequency. Conclusion: Among the neural systems engaged during exposure to flavored vape packaging, responses in areas previously associated with integration and interpretation of complex sensory information, including visual identification, predict subsequent vaping among non-smoking YA vapers. Those who exhibited stronger engagement when exposed to packaging stimuli with explicit flavor cues were more likely to escalate vaping 1 month later. Findings demonstrate the potential of fMRI to

identify complementary neuromarkers of vaping escalation risk and provide preliminary evidence that regulation of flavor cue displays on packages might be an effective approach to attenuate YA vaping.

FUNDING: Federal; Academic Institution

PAPER SESSION 22: TOBACCO CESSATION AND CHALLENGES IN PSYCHIATRIC POPULATIONS

PPS22-1

ASSOCIATION OF PSYCHOLOGICAL DISTRESS WITH SMOKING CESSATION, DURATION OF ABSTINENCE FROM SMOKING, AND USE OF NON-COMBUSTIBLE NICOTINE-CONTAINING PRODUCTS: A CROSS-SECTIONAL POPULATION SURVEY IN GREAT BRITAIN

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Significance: Tobacco smoking cessation is associated with improvements in mental health symptoms. This study assessed psychological distress by smoking status, time since quit, and use of a non-combustible nicotine product. Methods: Monthly repeat cross-sectional household survey of adults (18+) from October 2020-February 2022 in Great Britain (N = 32,727). Using unadjusted and adjusted logistic regression models, we assessed: associations between any/serious past-month psychological distress and smoking status and time since quit, and whether these relationships were moderated by ever diagnosis with a mental health condition; and associations between distress and use of a nicotine product by ex-smokers. Results: In the unadjusted model >1y ex-smokers and never smokers had lower odds of any distress (OR=0.42, 95% CI 0.39-0.45; OR=0.44, 0.41-0.47) compared with current smokers. Moreover, the association of lower distress in >1y ex-smokers and never smokers compared with current smokers was more pronounced among those who had ever been diagnosed with a mental health condition (AOR=0.58, 0.51-0.66; AOR=0.60, 0.53-0.67) than among those who had not (AOR=0.86, 0.76-0.98; AOR=0.72, 0.65-0.81). In adjusted models, ex-smokers using any nicotine product had higher odds of distress compared with ex-smokers not using any nicotine product (AOR 1.23, 1.06-1.42). Conclusion: Never smokers and >1year ex-smokers had lower levels of distress than current smokers. The lower odds of distress among >1y ex-smokers was more pronounced among those with an ever (vs never) diagnosis of a mental health condition. Nicotine product use among ex-smokers was associated with higher levels of distress, but due to potential residual confounding and selection bias more research is needed to determine causality.

FUNDING: Nonprofit grant funding entity

PPS22-2

INEQUITY IN SMOKING CESSATION CLINICAL TRIALS TESTING PHARMACOTHERAPIES: EXCLUSION OF SMOKERS WITH MENTAL HEALTH DISORDERS

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Objectives: People suffering from mental health disorders (MHDs) are often under-represented in clinical research though the reasons for their exclusion are rarely recorded. As they have higher rates of smoking and nicotine dependence, it is crucial that they are adequately represented in clinical trials of established pharmacotherapy interventions for smoking cessation. This review aims to examine the practice of excluding smokers with MHDs and the reasons for such exclusion in clinical trials evaluating pharmacotherapy treatments for smoking cessation. Methodology: The Cochrane database of systematic reviews was searched until September 2020 for reviews on smoking cessation using pharmacotherapies. Study selection Randomised controlled trials (RCTs) within the selected Cochrane reviews were included. Data extraction was conducted by one author and independently verified by three authors. We included 279 RCTs from 13 Cochrane reviews. Of all studies, 51 (18.3%) explicitly excluded participants with any MHDs, 152 (54.5%) were conditionally excluded based on certain MHD criteria and 76 (27.2%) provided insufficient information to ascertain either inclusion or exclusion. Studies of antidepressant medications used for smoking cessation were found to be 3.33 times more likely (95% CI 1.38 to 8.01, p=0.007) to conditionally exclude smokers with MHDs than explicitly exclude compared with studies of nicotine replacement therapy. Conclusion: Smokers with MHDs are not sufficiently represented in RCTs examining the safety

and effectiveness of smoking cessation medications. Greater access to clinical trial participation needs to be facilitated for this group to better address access to appropriate pharmacotherapeutic interventions in this vulnerable population.

FUNDING: Academic Institution

PPS22-3

NALTREXONE PLUS BUPROPION REDUCES CIGARETTE SMOKING AMONG INDIVIDUALS WITH METHAMPHETAMINE USE DISORDER: A SECONDARY ANALYSIS FROM THE CTN ADAPT-2 TRIAL

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AIM: The negative impact of methamphetamine (MA) use is compounded by extremely high rates of comorbid tobacco smoking. Comorbid use increases the risk of premature death, MA use severity, and treatment resistance compared to MA-only use. Among cigarette smokers, the combination of naltrexone plus oral bupropion (NTX-BUP) has been shown to improve smoking cessation. We examined the effects of NTX-BUP for reducing smoking among MA-using participants in CTN-0068 (ADAPT-2). Methods: The multi-site ADAPT-2 study used a randomized, double blind, sequential parallel comparison design (SPCD) to evaluate extended-release injectable NTX (380 mg every 3 weeks) combined with once-daily oral extended-release BUP (450 mg/d) vs placebo in outpatients with moderate-severe MA use disorder. Smoking outcomes were assessed with self-reported timeline follow back methodology. A repeated measures linear model for analysis of continuous outcomes was used, covariate-adjusted for baseline MA use days, tobacco use days, age and sex. Results: Of the 403 participants in the ADAPT-2 trial, 290 reported being current cigarette smokers (71.9%). Significant differences were found (p's < 0.0001) for each smoking outcome, favoring the group receiving NTX-BUP versus placebo: proportion of non-smoking days (.24 vs .09); longest mean duration of consecutive non-smoking days (6.36 vs 2.81); and mean number of cigarettes per week (36.7 vs 51.9). Conclusions: NTX-BUP was effective in reducing cigarette smoking in the context of concurrent treatment for MA use disorder. These off-target medication effects warrant prospective investigation using biochemically-confirmed measures of smoking abstinence. The development of NTX-BUP as a co-addiction treatment strategy has a potential for high public health impact.

FUNDING: Federal

PPS22-4

SMOKING ABSTINENCE FOLLOWING PSYCHIATRIC HOSPITALIZATION RESULTS IN IMPROVED DEPRESSIVE AND ANXIETY SYMPTOMS AT 6 MONTHS POST-DISCHARGE

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Significance: Individuals with serious mental illness (SMI) who smoke cigarettes are often reluctant to quit smoking due to concerns that quitting will result in a worsening of their psychiatric symptoms. Psychiatrists and other mental health treatment providers are similarly reluctant to promote smoking cessation in their patients. However, emerging evidence suggests that quitting smoking may not result in longer term worsening of psychiatric symptoms. There is also limited evidence showing symptom improvement following successful cessation, however more research is needed in response to this important question. Methods: We examined the impact of continuous smoking abstinence on psychiatric symptoms over 6 months post-hospital discharge among those who were enrolled in the Helping HAND 3 clinical trial (N=353) to examine the efficacy of a Sustained Care tobacco cessation intervention. We assessed depressive symptoms using the PROMIS Adult Depression Short Form 8a and assessed anxiety symptoms using the PROMIS Adult Anxiety Short Form 8a. We selected those participants who had at least slightly elevated depressive or anxiety symptoms at baseline (i.e., 0.5 SD above the US general population average; N = 318). Results: Results from linear mixed models including all assessment time points (e.g., 1-, 3-, and 6-month follow-ups) showed that continuous abstinence since discharge (vs. continuous smoking) significantly predicted reductions in depressive (p = 0.027) and anxiety symptoms (p = 0.001), controlling for time and the corresponding baseline depression or anxiety scores. Furthermore, significant time X smoking status interaction effects were found in both depression (p = 0.043) and anxiety (p = 0.005) models, such that longer continuous abstinence predicted greater reductions in depressive and anxiety symptoms. Separate follow-up linear regression models showed that continuous abstinence significantly predicted reductions in depressive and anxiety symptoms at 6 months with large effect sizes (Depression: Cohen's d =1.1; p = 0.003; Anxiety: Cohen's d = 1.21; p = 0.001). Conclusion: Study findings show a strong association between quitting smoking and reductions in depressive and anxiety symptoms among smokers with SMI following psychiatric hospitalization. Among those who reported continuous abstinence at 6-month follow-up, the mean depression and anxiety scores at baseline were almost 2 standard deviations greater than the US average at baseline and declined to slightly above the average of the US general population at 6-month follow-up. This work was supported by a grant from NIMH: 1R01 MH104562

FUNDING: Federal

PPS22-5

RCT ASSESSING THE EFFECT OF E-CIGARETTES VERSUS USUAL SMOKING ON NNAL AMONG CHRONIC SMOKERS WITH SERIOUS MENTAL ILLNESS.

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Significance: The majority of people with serious mental illness (SMI), including disabling schizophrenia and bipolar disorder, smoke, and quit rates are very low compared to the general population. Smokers with SMI also smoke with much greater frequency, resulting in higher levels of tobacco-related carcinogens in their bodies, and contributing to substantially higher prevalence of chronic diseases and a dramatic 10-30 year reduced life expectancy. People with SMI have great difficulty quitting and sustaining abstinence, warranting novel harm reduction strategies, including switching to potentially reduced-harm nicotine products, such as e-cigarettes. We conducted the first-ever trial of e-cigarette provision with instructions on their safe use versus usual care in chronic smokers with SMI to test whether substitution of e-cigarettes could reduce harm as measured by the cigarette metabolite, NNAL (4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol. *Methods:* 240 cigarette smokers with SMI (52% male; 47% schizophrenia, 53% BPD; 55% non-White; mean breath carbon monoxide=26.9 parts-per-million, standard deviation=19.9) who had previously tried but were currently unwilling to quit were randomly assigned to receive disposable "cigalike" e-cigarettes for 8 weeks or not. Urine NNAL, a metabolite of a tobacco-specific nitrosamine from smoke, was collected at baseline, 4- and 8-weeks. Generalized linear mixed models examined the effects of e-cigarette provision on NNAL. *Results:* Mean NNAL did not differ by study group at baseline (estimate =0.22; se=0.22; t=0.98; p=0.328). In the primary model, we observed a significant group-by-time interaction (F=3.68, p< 0.026) indicating that NNAL decreased more over time in the e-cigarette group. Closer examination of the longitudinal differences in NNAL revealed that the e-cigarette group had significantly lower NNAL at 4 weeks (estimate=0.54; se=0.23; t=2.37;p<.02), but the group difference was attenuated at 8 weeks (estimate=0.42; se=0.23; t=1.83; p<.07). *Conclusions:* This study demonstrated rapid short-term harm reduction among chronic smokers with SMI assigned to receive e-cigarettes. Attenuation of this effect at 8 weeks suggests that smokers with SMI require more than e-cigarette provision alone to maintain reduced smoking. Development of a behavioral intervention in addition to e-cigarette provision seems warranted to prevent morbidity and early mortality in this high-risk group of smokers.

FUNDING: Federal

PPS22-6

DIFFICULTIES OF REMOTE CO MONITORING IN AN OTHERWISE ACCEPTABLE AND FEASIBLE TOBACCO USE DISORDER INTERVENTION DELIVERED VIA TELEHEALTH TO INDIVIDUALS WITH SERIOUS MENTAL ILLNESS

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Significance: Individuals with serious mental illness are more likely to smoke and less likely to quit smoking as compared to the general population. The current study examined the acceptability and feasibility of a counseling intervention focused on task persistence

for tobacco use disorder delivered via telehealth to people with serious mental illness who were interested in quitting smoking. Methods: Participants (N=34) were provided 8 weekly counseling sessions delivered via telehealth and 10 weeks of nicotine patch. Counseling was consistent with the PHS Guidelines while also using CBT to increase task persistence related to smoking. Participants responded to several 1-7 Likert scale items with higher ratings reflecting greater agreement with statements relevant to acceptability of the counseling sessions. Feasibility measures included treatment attendance, missing data, and follow-up rates. We also assessed rates of cigarette abstinence and changes in cigarettes smoked per day and in task persistence scores on the Thoughts About Smoking Questionnaire (TASQ). Results: Participants indicated high agreement that each session was "easy to understand" and "helpful" (both mean ratings > 6.5 out of 7). Almost half (42.9%) of participants rated the target quit date as occurring at "just about the right time." More than half (64.7%) of all participants attended all eight counseling sessions and we were able to follow 82.4% of the participants at the 3-month follow-up. More than half (54.1%; n=184) of the carbon monoxide (CO) data were missing or unable to be collected. Seven-day point prevalence abstinence (CO < 8ppm; missing = not abstinent) was 8.8% at 3-month follow-up. As compared to baseline, participants showed significant decreases in cigarettes smoked per day, $t(27) = 4.65$, $p < 0.001$, Cohen's $d = 0.88$, and significant increases in task persistence, $t(27) = 3.26$, $p = 0.002$, Cohen's $d = 0.62$, at 3-month follow-up. Conclusions: A telehealth intervention for tobacco use disorder is acceptable to individuals with serious mental illness and may have benefits for attendance as 64% of participants attended all scheduled sessions. Difficulties with remote biochemical verification via carbon monoxide limited the feasibility of this study as designed, though using newer technologies and providing additional equipment to research participants is likely to increase the feasibility of remote CO monitoring with this population in the future.

FUNDING: Federal

PPS22-7

INVESTIGATING POTENTIAL BARRIERS TO SMOKING CESSATION AND HARM REDUCTION AMONG ADULTS WITH MENTAL HEALTH CONDITIONS

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Significance: Adults with mental health conditions (MHCs) who smoke cigarettes have traditionally reported greater nicotine dependence and more difficulty reducing or quitting smoking than adults without MHCs. This analysis relied upon the Theory of Planned Behavior to identify barriers to achieving equity in smoking cessation and harm reduction, by identifying specific challenges for adults with MHCs along the pathway from nicotine knowledge to use intentions and behavior, including use of a lower harm alternative nicotine product (e-cigarettes). Methods: Data from 7982 adults with and without lifetime MHC who had participated in all 5 publicly-available waves of the PATH Study and smoked within the past 30 days at baseline were used in analyses. Longitudinal logistic and linear models estimated associations between MHC status and nicotine absolute and relative risk knowledge, motivation to quit smoking, smoking behavior (cigarettes per day, quit attempts, cessation), and dual cigarette/e-cigarette use transitions. Models were adjusted for selected sociodemographic characteristics, cigarettes per day, nicotine dependence, and a time trend. Results: Adults with MHC were more likely to be female, younger, report lower levels of annual household income, and report greater cigarette- and e-cigarette-based nicotine dependence than adults without MHC. They also exhibited more accurate relative and absolute nicotine risk knowledge (AOR: 1.15-1.30, p<0.001), reported greater motivation to quit smoking (AOR: 1.25-1.50, p<0.001), greater odds of making a quit attempt (AOR: 1.19, p<0.001), greater odds of reporting concurrent e-cigarette use (AOR: 1.30, p<0.001) and citing e-cigarette use to support smoking cessation attempts (AOR: 1.39, p<0.001), and lower odds of reverting from dual to cigarette-only use than adults without MHC (AOR: 0.77, p<0.01). They were not, however, more likely to report successful cessation, to transition to exclusive e-cigarette use, or to quit using both products. Conclusion: Despite having more accurate nicotine knowledge, greater motivation to quit, making more quit attempts, and using e-cigarettes to quit, adults with MHCs who smoke were not more likely to quit smoking or to transition to exclusive e-cigarette use. These individuals may require targeted support to make the final step to either successful cessation or complete transition to lower harm products.

FUNDING: Federal

PAPER SESSION 23: MECHANISMS OF HEALTH WARNING DELIVERY AND ALTERNATIVE USE BY INDUSTRY

PPS23-1

COMPARISONS BETWEEN WATERPIPE SMOKERS' AND NONSMOKERS' REACTIONS TO PICTORIAL HEALTH WARNING LABELS: A RANDOMIZED CROSS-OVER EXPERIMENTAL STUDY

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The prevalence of waterpipe tobacco smoking (WTS) marked the highest in Lebanon among young adults. Implementing health warning labels (HWLs) on tobacco packages is required for WTS control but has not yet been implemented. This study compared the effect of pictorial HWLs and their placements on waterpipe's three parts (device, tobacco, and charcoal packages) on several health communication outcomes between waterpipe smokers and nonsmokers in Lebanon. An online randomized crossover experimental study was conducted among 403 young adults in August 2021. Participants were randomly assigned to view 3 conditions of HWLs: pictorial HWLs only on the tobacco package, pictorial HWLs on three parts of the waterpipe (device, tobacco, and charcoal packages), and text-only HWL on the tobacco package displayed one at a time and in random order. After each image, participants completed a set of post-exposure assessments of health communication outcomes. We examined the differences in the effect of HWLs conditions on several outcomes (e.g., attention, perceived message effectiveness) between waterpipe smokers and nonsmokers, controlling for confounders (e.g., age, sex). Of the 403 participants, 68.5% were waterpipe smokers, more than half were females (59%), and the mean age was 25.5± 4.4 years. Nonsmokers reported greater attention (ßeta (ß)=0.54 [95% Confidence Interval (CI):0.25,0.82]), warning reactions (i.e., cognitive elaboration; (ß=0.31 [95% CI:0.05,0.58]), and social interaction (ß=0.41 [95% CI:0.18,0.65]) for pictorial HWLs on the tobacco packages vs. text-only compared to waterpipe smokers. Furthermore, nonsmokers cited that pictorial HWLs vs. text-only on tobacco packages were more effective in making WTS seem unpleasant (ß=0.40 [95% CI:0.13,0.68]) and in making people more concerned about the health risks of WTS (ß=0.38 [95% CI:0.12,0.63]) compared to waterpipe smokers. The pictorial HWLs on three parts vs. one part elicited slightly greater cognitive reactions, anticipated avoidance, perceived harm, and perceived effectiveness (all p>.05) in nonsmokers compared to smokers. This study shows that pictorial HWLs on the tobacco packages elicited greater attention, warning reactions, and perceived effectiveness than text-only among nonsmokers. These findings provide valuable information for researchers and policymakers about the potential of implementing HWLs specific to waterpipes to prevent their use among young adults and limit tobacco-related morbidity and mortality in Lebanon and other countries.

FUNDING: Federal; State

PPS23-2

EXAMINING THE EFFECT OF STANDARDISED PACKAGING OF E-CIGARETTES AMONG YOUTH AND ADULTS IN GREAT BRITAIN: AN ONLINE EXPERIMENT

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Significance: E-cigarette use among youth and adults has increased in Great Brattain. There is little regulation on the packaging of e-cigarettes, with many featuring bright colours and designs which may appeal to youth. Any effort to regulate the appeal of e-cigarettes to youth may, however, also deter adult smokers from trying e-cigarettes to help quit smoking. This study examined the impact of branded and standardised e-cigarette packaging on e-cigarette product appeal among samples of youth and adults in Great Britain (GB). Methods: An online experiment in the ASH Smokefree GB Youth (n=2463) and Adult (n=12,079) 2021 surveys. Participants were randomised to view one of three e-cigarette pack conditions: (1) branded packs (Control), (2) white, or (3) green standardised packs. Participants were asked to report interest in trying the e-cigarettes displayed. Logistic regression models were used to examine whether reporting 'no

interest' in trying e-cigarette products differed between the two standardised packs conditions versus the branded packs condition. Results: Youth reported higher odds of 'no interest 'in trying e-cigarette products in green standardised packaging (35.8%, AOR= 1.49 [95% CI 1.18-1.88], p.005). Conclusion: Standardised packaging measures may reduce the appeal of e-cigarettes among youth, without reducing their appeal among adult. The findings lend support for the efficacy of standardised packaging of e-cigarettes in Great Britain.

FUNDING: Nonprofit grant funding entity

PPS23-3

PREMIUM CIGAR WARNINGS AT THE POINT OF SALE

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Significance: For premium cigars sold in stores, the Food and Drug Administration (FDA) proposed that retailers in the United States (US) display six warning statements on a sign posted at the point of sale to warn consumers about harms of cigar use. No published research has examined the potential effectiveness of such cigar warnings at the point of sale. Methods: Participants were 809 US cigar smokers (78% ever premium cigar users, 49% past 30-day premium cigar users) recruited from a probability-based national panel. In a between-subjects experiment, participants viewed an image of a premium cigar store countertop at the point of sale with randomization to one of four conditions: 1) no warning sign, 2) a warning sign with six FDA text-only warnings, 3) a warning sign with six novel text-only warnings developed and tested by our study team, or 4) a warning sign with six novel text warnings plus images developed and tested by our study team. We used ANOVAs and post hoc Tukey tests to examine the effects of experimental conditions on outcomes (e.g., smoking satisfaction, discouragement). Results: The novel text warnings plus images decreased the perceived satisfaction of smoking cigars compared with no warning sign (p=0.04) and increased discouragement from smoking cigars compared with FDA text-only warnings (p=0.02). Conclusions: This experiment provides the first evidence that adding images to warning signs at the point of sale for premium cigars decreased the perceived satisfaction of smoking cigars and discouraged cigar use.

FUNDING: Federal

PPS23-4

EFFECTS OF A NICOTINE WARNING LABEL AND VAPING CESSATION RESOURCES ON YOUNG ADULTS' PERCEPTIONS OF PRO-VAPING INSTAGRAM INFLUENCER POSTS

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Background: Instagram "influencers" advertise nicotine/tobacco products on Instagram. Warning labels and cessation resources may help mitigate effects of influencer posts on young adults. Methods: Young adults (N=2,179, 53.0% women, 45.1% Hispanic, 14.9% with regular past-month vaping) participating in a prospective cohort study in Southern California completed an experiment (Nov. 2021-April 2022). Participants viewed three purported Instagram influencer posts related to vaping, designed for this study. Participants were randomized to view posts with a nicotine warning label ("label"), vaping cessation resources ("link"), both ("L&L") or neither ("control"). Participants then reported perceptions of the influencers; product use intentions, susceptibility, and expectancies, harm perceptions; and vaping perceptions and intentions. Results: L&L increased perceptions of influencers as more honest (M=47.9, SD=23.7), trustworthy (M=39.7, SD=21.7), and informed (M=42.6, SD=23.3) than link or control. Labels produced perceptions of the influencers as more honest (M=47.0, SD=23.7) and informed (M=39.9, SD=22.2) and less popular (M=41.5, SD=22.8) compared to link and control conditions. More control condition participants (53.3%) were susceptible to product use, compared to the link (45.5%) and L&L (46.6%) conditions. Post features did not affect brand use intentions, expectancies, harm perceptions, desire to quit vaping, quit-vaping self-efficacy, or having a goal to quit vaping (p-values>.056). Conclusions: Young adults perceived Instagram influencers promoting vaping products as more honest, trustworthy, and informed when the influencers provided a nicotine warning label and a link to vaping cessation resources on their posts. The warning label and link decreased susceptibility to product use. Nicotine warning labels and vaping cessation resources are necessary tools in counteracting effects of influencer advertising; however, they may have the unintended side effects of increasing trust in the influencer and effectiveness of future vaping advertisements. Research is needed to identify messages that promote vaping cessation, which could then be made mandatory.

FUNDING: Federal

PPS23-5

ROLLING TOBACCO SMOKERS' PERCEPTIONS OF HEALTH-PROMOTING PACK INSERTS AND WARNINGS ON CIGARETTE PAPERS

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Introduction: While some countries, including the United Kingdom (UK), are considering requiring tobacco companies to include health-promoting inserts inside packs and/or warnings on cigarette sticks, Canada remains the only country to have implemented either of these policies (pack inserts). No study has considered rolling tobacco smokers' views of pack inserts and warnings on cigarette papers, even though roll-your-own (RYO) tobacco use is common among smokers in many European countries (over 40% in the UK) and increasing in most regions. Methods: Eight focus groups were conducted with 18-35 year-old RYO smokers (n=50) in Greater Glasgow (Scotland) in February-March 2020. Participants were shown four inserts adapted from those required in cigarette packs in Canada, with all encouraging quitting, and two RYO-specific inserts explaining that RYO is not less harmful than cigarettes. They were also shown cigarette papers, which are papers used to roll a cigarette, displaying the warning 'Smoking kills'. Results: There were mixed perceptions of the extent to which inserts would capture attention if included in RYO packs. The positive messaging used on the Canadian inserts was considered motivational and inspirational, and contrasted with the on-pack warnings. In comparison, the messaging on the RYO inserts was viewed unfavourably and generally dismissed. Participants did not feel that inserts would lead them to change their own smoking behaviour, although some felt that the Canadian inserts could be helpful for those thinking about quitting and young people contemplating smoking. The warnings on cigarette papers were generally not supported, with some male smokers angered by them, suggesting they shamed smokers. Many females did not find the papers visually unappealing. Many participants indicated that they were desensitised to the 'Smoking kills' message and felt dissuasive RYO papers would have limited impact on current smokers. However, several said that they would feel and look stupid using them, and that they could have a role in dissuading young people from smoking initiation. Conclusions: Inserts with positive messaging about quitting, rather than messaging describing the harms of RYO, were preferred by RYO smokers. What, if any, RYO specific messaging resonates with RYO smokers warrants attention. When considering dissuasive cigarettes, particularly in countries where RYO use is high, research on the design of dissuasive papers is imperative.

FUNDING: Other

PPS23-6

TOBACCO COMPANIES' CREATION OF ADDITIONAL COMMUNICATION SPACE: A CONTENT ANALYSIS OF INSERTS AND ONSERTS ON CIGARETTE PACKS

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Significance: Pack inserts and onserts—removable items placed inside or on the outside of packs—are a communicative strategy used by tobacco companies that provide them with additional marketing space. We conducted a content analysis of these items across several years, countries, and brands to assess how tobacco companies use inserts and onserts to communicate with consumers. Methods: Between 2013-2020, we systematically collected cigarette packs using the Tobacco Pack Surveillance System (TPackSS) protocol. We identified packs with inserts or onserts (n=178) from 11 low and middle income countries. A codebook was developed to investigate tobacco company strategies, physical pack characteristics, and imagery and lexical marketing appeals. Two coders independently coded the sample. Frequencies were calculated overall and by country, year, language used on the inserts/onserts and pack, and whether the pack was compliant with contemporary health warning label policy. Inter-rater reliability (IRR) between the coders was acceptable (70.8-100.0). Results: Of the 5424 packs, 3% (n=178) had an insert or onsert. 171 of these (96%) were inserts. Japan Tobacco International, British American Tobacco, Richmond Tobacco Trading Ltd and Philip

Morris International represented about 67% of the packs with inserts/onserts. While 78% of pack exteriors were entirely in English, 51% of insert/onserts were entirely in the local language from where the pack was collected. The most common appeals on the inserts/onserts were product quality/dependability (64%), luxury/aspirational (55%), and machinery/technology (37%). Cigarette pack (39%) and stick (23%) imagery was prevalent, as well as images or words mentioning filters (22%). The most common usage appeals involved highlighting or featuring aspects of the product (66%), engaging or addressing customers directly (52%), and informing customers about new/changed aspects of the product (31%). Highlighting the product as part of a collection or series or promotional contests to win money, items or trips were each seen in about a quarter of packs with inserts/onserts. Conclusion: Cigarette pack inserts/onserts are virtually unregulated across the globe, making them an ideal medium for tobacco companies to extend and innovate their advertising. Tobacco control advertising and packaging policies should expand to address inserts/onserts to more fully protect consumers from industry promotion of deadly products via these items.

FUNDING: Nonprofit grant funding entity

PAPER SESSION 24: TAX POLICY AND PRICING: INTERACTION WITH POLICY AND EFFECT ON CIGARETTE, HEATED TOBACCO, AND E-CIGARETTE USE

PPS24-1

THE EFFECT OF E-CIGARETTE TAXES ON E-CIGARETTE AND CIGARETTE RETAIL SALE PRICES AND SALES, UNITED STATES, 2014 - 2019

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Introduction: Over the last decade, several US jurisdictions have begun applying taxes to e-cigarettes. E-cigarette taxes vary greatly not only in magnitude, but also in structure; some jurisdictions tax based off e-liquid volume, while others tax based off wholesale price. Several studies indicate that e-cigarette taxes are associated with increased e-cigarette prices and decreased e-cigarette sales, however, much of this research has been limited in its ability to examine the effects of various e-cigarette tax structures and magnitudes. This study uses a standardized e-cigarette tax measure to examine the impact of e-cigarette taxes on the price and sales of e-cigarettes and cigarettes in the US. Methods: We developed two-way fixed effects and instrumental variables models using State Line versions of NielsenIQ Retail Scanner data for e-cigarettes and cigarettes to estimate the association between standardized state-level e-cigarette taxes on the price and sales of e-cigarettes and cigarettes. This analysis controlled for tobacco control and other state-level characteristics, state fixed effects, and time fixed effects. Results: Results indicate that both e-cigarette taxes and combustible cigarette taxes are passed through to consumers in the form of higher prices; a real one dollar increase in the e-cigarette standardized tax increases the price of one milliliter of e-liquid between 49 to 59 cents, whereas a real one dollar increase in the per-pack cigarette tax increases the price of a pack by between $0.90 and $1.18. For both e-cigarettes and cigarettes, own-tax elasticities are negative (-0.21 for e-cigarette taxes and -0.36 for cigarette taxes from instrumental variable model results) and cross-tax elasticities are positive (0.02 for e-cigarette taxes and 1.12 for cigarette taxes). Conclusion: E-cigarette and cigarette taxes increase retail prices and reduce sales of e-cigarettes and cigarettes, respectively. Although some sales models were estimated with imprecision, positive cross-tax elasticities suggest that e-cigarettes and cigarettes are substitute goods. As the e-cigarette market continues to evolve, future research is needed to fully understand the impact of e-cigarette taxes, their responsiveness, their relationship to cigarette prices and sales, and their pass-through rate.

FUNDING: Other

PPS24-2

WHAT ECONOMIC FACTORS DETERMINE QUITTING BEHAVIORS OF E-CIGARETTES AND CIGARETTES? FINDINGS FROM THE US ARM OF THE 2016-2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEYS

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Background: Tax is the most widely used tobacco control measure in the world. So far it has been considered the most effective tool in reducing smoking and encouraging quitting. Since 1964, many US states have raised cigarette excise tax multiple times. However, taxing electronic cigarettes (ECs) has a much shorter history in the US. Some smokers may switch to EC use and quit smoking, while others may become dual users. Exclusive vapers may also use ECs as a gateway to cigarette smoking. What factors influence smokers' or vapers' decision to quit smoking or EC use, respectively? Methods: We drew data from the US arm of the 2016-2020 International Tobacco Control (ITC) Four Country Smoking and Vaping Survey (N=8,303) and linked it to state cigarette tax and state EC tax implementation data. We employed Generalized Estimating Equation (GEE) method to investigate the association between quitting behavior and

EC tax, cigarette tax, cost perception, and EC device. State and year fixed effects were controlled. Results: Whether a state has imposed an EC excise tax did not have a significant effect on the decision of quitting ECs and cigarettes. As the state cigarette tax increased by 10%, the likelihood of quitting smoking increased by 2.3%. Respondents who thought ECs were cheaper were 57% less likely to quit ECs and 23% more likely to quit cigarettes. Respondents who thought ECs were more expensive were 18% less likely to quit cigarettes. Compared to disposable users, pre-filled cartridge users were 13% less likely to quit ECs. Tank users were 23% less likely to quit ECs and 54% more likely to quit cigarettes. Compared to low-income people, high-income people were less likely to quit ECs. Middle- and high-income people were more likely to quit cigarettes. Older people were more likely to quit both. Conclusions: Our results indicate that cost perception played a significant role in choosing which product to quit. This may imply that smokers/vapers may switch between ECs and cigarettes based on what product was perceived as cheaper. Though 25 states have imposed EC excise tax as of 2021, the magnitude of taxes has not reached a level that will reduce the use of ECs, implying that there is ample room for EC tax increase.

FUNDING: Academic Institution

PPS24-3

CIGARETTE PRICING STRATEGIES POST PLAIN PACKAGING AND DURING A PERIOD OF SUSTAINED ANNUAL EXCISE TAX INCREASES IN NEW ZEALAND

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Significance: Tobacco companies have undermined tobacco excise tax increases designed to prompt quitting and discourage smoking uptake by disproportionately increasing the price of more expensive brands (over-shifting) while minimising the price increases applied to cheaper brands (under-shifting). Little is known about how these strategies evolve during a period of sustained excise tax increases or in response to plain packaging. We reviewed market structure changes in New Zealand (NZ) from 2010 to 2020, when the NZ Government increased tobacco excise tax by inflation plus 10% each year and, in 2018, introduced plain packaging. Specifically, we examined whether NZ tobacco companies shifted excise tax increases to maintain the affordability of lower priced cigarette brands. Methods: We cluster-analysed market data that tobacco companies supply to the NZ Ministry of Health, created four price partitions, and examined the size and share of these over time. For each partition, we analysed cigarette brand numbers and market share, calculated the Volume Weighted Real Stick Price for each year, and compared this price across the different price partitions. We calculated the net real retail price (price before tax) for each price partition and compared these prices before and after plain packaging took effect. Results: Between 2010 and 2020, NZ-based tobacco companies used differential price shifting to reduce the impact of annual tobacco excise tax increases on lower-priced brands compared to higher-priced brands. The number and market share of Super Value and Budget brands increased, while those of Everyday and Premium brands decreased. Differences between the price of Premium and Super Value brands increased, as did the net retail price difference for these partitions. Following plain packaging's implementation, Super Value brand numbers more than doubled; contrary to industry predictions, the price difference between these and higher-priced brands did not narrow. Conclusions: Between 2010 and 2020, NZ tobacco companies introduced more Super Value cigarette brands and shifted excise tax increases to reduce the impact these had on low-priced brands. Setting a minimum retail price for cigarettes could curtail tobacco companies' ability to undermine tobacco taxation policies designed to reduce smoking.

FUNDING: Academic Institution

PPS24-4

THE PRICE ELASTICITY OF HEATED TOBACCO AND CIGARETTE DEMAND

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{Background and Objective: The market for heated tobacco products (HTPs) has grown exponentially in recent years and many governments have started to tax HTPs to regulate their use. Currently, the evidence on how prices and taxes of HTPs impact tobacco use behaviors (e.g., the own price elasticity of HTP demand and cross-price elasticity that reflect how HTP and cigarette costs would influence the consumption of each form) is lacking. In order to fill in this evidence gap, this study uses novel HTP price and tax data to assess own price elasticity for HTP demand, as well as cross-price elasticity between HTP and cigarette consumption. Data and Methods: We use a unique database on quarterly retail prices of Marlboro-branded heated tobacco units and cigarettes from 2014 to 2022, developed by the Campaign for Tobacco Free Kids, in all countries where both HTPs cigarettes are sold. We link them to quarterly sales data obtained from PMI's investors' reports for cigarette and heated tobacco and estimate own- and cross- price elasticity of cigarette and HTP demand using a seemingly unrelated regressions model. Findings and Policy Implications: We find that HTP demand is very elastic to HTP prices, with own-price elasticity ranging between -1.6 and -1.8 in preferred specifications. This is two to three times larger than the own-price elasticity of cigarettes, which ranges between -0.4 and -0.6. We also find strong evidence of s non-symmetric substitution between cigarettes are HTPs. While changes in the price of HTPs affect cigarette demand, cigarette price changes have no significant impact on HTP demand. We also find that a combined increase of the prices of both products reduces the demand for cigarettes, but has no impact on HTP demand.

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS24-5

HOW IS COST PERCEPTION ASSOCIATED WITH TAXES AND INDIVIDUAL FACTORS? FINDINGS FROM THE US ARM OF THE 2016-2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEYS

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Background: Since electronic cigarettes (ECs) entered the United States (US) around 2007, the prevalence of vaping has been increasing rapidly over the years. After Minnesota became the first US state to tax ECs, many states followed suit. As of 2020, 25 US states have imposed taxes on ECs. At the same time, states continuously increased state cigarette excise tax. As smokers may switch to ECs and vapers may switch to cigarettes, it is important to find out how adult tobacco users compare costs between ECs and cigarettes and how cost perception is associated with taxes and individual factors. Methods: We drew data from the US arm of the 2016-2020 International Tobacco Control (ITC) Four Country Smoking and Vaping Survey and linked it to state cigarette tax and state EC tax implementation data. We employed multinomial logit regression to investigate the association between cost perception and EC tax, cigarette tax, vaping frequency, smoking frequency, and the EC device type. State and year fixed effects were used. Results: Adult tobacco users (N=7,736) from states that have EC tax in place did not show a significant difference in cost perception compared to users from states that do not have EC tax. Adult tobacco users from states that have higher state cigarette tax (2 times) were 32% less likely to say that ECs were more expensive and 27% more likely to say that ECs were about the same as cigarettes. As the vaping frequency decreased, vapers were less likely to say that ECs were cheaper, more likely to say that ECs were about the same, or more expensive, or do not know the comparison. Compared to daily smokers, non-smokers were 48% less likely to say that ECs were cheaper, 73% more likely to say that ECs were about the same, and 82% more likely to say that they did not know the comparison. Compared to disposable EC users, pre-filled cartridge users were 33% less likely to say that ECs were cheaper and 20% more likely to say that ECs were about the same. Tank users were 72% more likely to say that ECs were cheaper, 35% less likely to say that ECs were about the same, 29% less likely to say that ECs were more expensive, and 21% less likely to say that they did not know the comparison. Conclusion: Though 25 states have imposed EC taxes on ECs, it did not have a significant effect on smokers' or vapers' cost perception, indicating that there is ample room to increase EC taxes. If the strategy is to increase the price of ECs and make them less affordable, policymakers may consider banning ECs with tank systems first.

FUNDING: Academic Institution

PPS24-6

YOUTH SENSITIVITY TO CHANGES IN STANDARDIZED E-CIGARETTE PRICE AND TAX MEASURES USING NATIONAL ESTIMATES, 2015-2019

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Significance: While the relationship between tax and price and youth cigarette use is well established, little is known about these associations and youth e-cigarette use. This research is the first to examine the association between e-cigarette taxes and prices and e-cigarette use among high school students using standardized measures

of e-cigarette taxes and prices. Results from this research will be critical in guiding policy makers as they continue to pursue the most effective strategies to curb youth e-cigarette use. Methods: This analysis uses past 30-day e-cigarette use data among high school students in the United States - extracted from the 2015-2019 national YRBS - in combination with standardized e-cigarette prices and taxes. Regression analyses quantified the association between changes in e-cigarette price and tax and changes in e-cigarette use and intensity of use, while controlling for age, race/ethnicity, gender, year in school, minimum legal purchasing age restrictions for e-cigarettes, and private workplace e-cigarette restriction policies. Simulations were run to further understand the impact of changes in tax and price. Results: E-cigarette taxes and prices were associated with significant reductions in past 30-day use. Prices were significantly associated with decreases in intensity of use. All simulations modeling increases in e-cigarette taxes and prices predicted decreases in 30-day use and e-cigarette use intensity. A $0.50 and $1.00 increase in taxes leads to a 6.3% and 12.2% decrease in past 30-day use and a 4.7% and 9.3% decrease in the number of days using e-cigarettes, respectively. Similarly, a $0.50 and $1.00 increase in prices leads to 4.1% and 8.2% decrease in past 30-day e-cigarette use and 4.2% and 8.3% decrease in number of days using e-cigarettes, respectively. Conclusion: This is the first study to use standardized measures of tax and price to demonstrate that youth are sensitive to increases in e-cigarette prices and taxes. Raising and maintaining sufficient price points for these products is important for addressing youth use of e-cigarettes. Policies that increase the price of e-cigarettes, such as excise taxes, limiting rebates, discounts, and coupons, and establishing minimum price laws, have the potential to reduce youth current e-cigarette use and days using e-cigarettes. Future research is needed to understand the impact of prices and tax on the use of other tobacco products, dual and poly use.

FUNDING: Other

PAPER SESSION 25: PROFILING TOXIC PRODUCT EMISSIONS AND IMPACT ON HEALTH OUTCOMES

PPS25-1

CHEMICAL PROFILES AND TOXICITY OF ELECTRONIC CIGARETTES: AN UMBRELLA REVIEW

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Significance: Electronic cigarettes (ECs) are nicotine delivery systems that simulate tobacco smoking and are often marketed as a safer alternative to combustible tobacco products. The global market for ECs has rapidly expanded since their introduction, creating a need for research describing the chemical constituents of ECs and their potential health effects so that evidence-based regulations can limit the potential harm from EC use. We conducted an umbrella review to better understand the evidence on the chemical profiles and toxicity of ECs from existing systematic reviews (SRs). Methods: The search for SRs examining chemical constituents of ECs and their toxicity was conducted across four electronic databases through January 25th, 2022. Methodological quality was assessed using the AMSTAR-2 quality appraisal tool. Limitations and recommendations of SRs were summarized to identify needs for future research. Results: Twenty-five reviews were eligible for inclusions, with twenty reviewing chemical profiles and fourteen reviewing their toxicity. The chemical profiles of ECs varied widely across studies included in the reviews, which was mainly attributed to a lack of standardized protocols. Metals were found to be more abundant in EC vapors than conventional cigarettes (CCs), and carbonyls were typically found at lower levels. Evidence of toxicity from preclinical studies was considered weak; however, reviews generally agreed that ECs are less harmful than CCs. The quality appraisal tool revealed important limitations across reviews, in particular a lack of adherence to pre-registered protocols indicating a need for a standardized methodology for conducting a review. Establishing standardized and validated protocols to investigate chemical profiles and additional research on long-term outcomes are recommended. Conclusions: While most reviews concluded that ECs are likely less harmful than CCs, authors were hesitant to draw major conclusions because of variable analytical procedures and inconsistent findings within and between their included studies. Future systematic reviews with improved methodology and reporting are needed to ensure clear and reliable evidence on the chemical profile and toxicity of ECs to inform tobacco regulatory actions.

FUNDING: Federal

PPS25-2

EXPOSURE TO VOLATILE ORGANIC COMPOUNDS (VOCS) AMONG TOBACCO, MENTHOL, AND FRUIT FLAVORED ENDS USERS

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Significance: Current ENDS users have been shown to favor fruit, menthol, and tobacco-flavored ENDS products. There is limited evidence on levels of exposure to potentially harmful compounds in users of flavored ENDS products. In this study, we aimed to quantify the urinary metabolites of three potentially toxic volatile organic compounds (VOCs) previously reported in emissions from ENDS: acrolein, acrylamide, and acrylonitrile, and compare detected levels among users of different flavored ENDS. Methods: Liquid chromatography-mass spectrometry (LC-QQQ) was used to quantify three VOC metabolites 2CAHEMA (acrylamide), 3HPMA (acrolein), and 2CYEMA (acrylonitrile). Study participants attended an observed session and had their urine collected the same day. The urine samples were prepared by diluting 50 µL of urine with 50 µL of internal standard solution and 400 µL of 15 mM ammonium acetate dissolved in water. The resulting solution was vortexed and centrifuged before transferred to vials for analysis. The data set included n=82 for 2CAHEMA, n=88 for 3HPMA, and n=88 for 2CYEMA. Kruskal-Wallis and Dunn's Multiple Comparisons tests comparing individual VOC metabolites between flavors were performed using GraphPad Prism 9. Results: On average, fruit flavored ENDS user urine samples had higher concentrations of VOC metabolites than menthol and tobacco flavored ENDS users (average±SEM): 2CAHEMA: 22.9±4.5 (Tobacco) vs 28.1±5.6 (Menthol) vs 48.4±7.6 (Fruit); 3HPMA: 286.6±77.9 (Tobacco) vs 635.1±241.6 (Menthol) vs 733.0±97.0 (Fruit); 2CYEMA: 9.2±2.1 (Tobacco) vs

22.0±8.4 (Menthol) vs 64.5±21.8 (Fruit) ng/mL. Statistically significant difference was found in the concentrations of the acrolein metabolite, 3HPMA (p=0.0234), between tobacco and fruit. Conclusions: Fruit-flavored ENDS users showed higher concentrations of biomarkers of exposure to, acrolein than tobacco-flavored ENDS users. Further studies are needed to establish the cause of higher exposure to acrolein among user of fruit-flavored ENDS.

FUNDING: Federal

PPS25-3

TIGHTER MANUFACTURING TOLERANCES IN ENDS MORE IMPORTANT FOR LIMITING TOXICANT EMISSIONS THAN LIQUID COMPOSITION? EFFECTS OF LIQUID COMPOSITION AND MANUFACTURING VARIABILITY ON CARBONYL EMISSIONS FROM ENDS

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Carbonyl compounds (CCs) have drawn significant attention in the electronic nicotine delivery systems (ENDS) scientific literature because several of these compounds are powerful pulmonary toxicants and are produced when propylene glycol and glycerine, the main ingredients in ENDS liquids, are heated. Numerous factors reportedly influence CC emissions from ENDS including device power and design, liquid composition, and puff topography. CC emissions may also be influenced by small variation in construction across nominally identical ENDS products. In a recent study of the impact of various ENDS liquid additives on toxicant emissions, we found no correlation between CC yields and liquid ingredients and wide within-condition variability in CC emissions. We therefore sought to examine whether the variability we observed could have been caused by variations in coil temperature stemming from manufacturing differences across the ninety heating coils used in that study, all of which were the same make and model, procured at the same time, and driven by the same external power source. To test the hypothesis, we determined the temperature of the heating coils during operation from the instantaneous coil resistance records of 90 machine puffing sessions and examined the correlation between temperature and CC emissions. Each of the ninety sessions consisted of 15 4 sec puffs, using a Subox Mini C ENDS device powered at 20W using a DC power supply. Sessions were generated each time using a new atomizer from the same manufacturer (SSOC nichrome, 0.5 Ohm). We found that the peak temperature varied widely across samples obtained from nominally identical ENDS products, spanning a 400°C range, and that CCs varied by up to two-orders of magnitude, with higher temperature resulting in exponentially higher CC values. We found that 5% of the atomizers accounted for more than 80% of the total formaldehyde emissions of the 90 sessions. All cases where total CC emissions were one order of magnitude or more above the median, the temperatures were above the median temperature. These findings suggest that a significant reduction in population level toxicant exposure can be realized by enforcing tighter manufacturing tolerances.

FUNDING: Federal

PPS25-4

SUPERCHARGING JUUL: OFF-BRAND JUUL COMPATIBLE PODS DRAW GREATER ELECTRICAL POWER AND EMIT MORE NICOTINE AND OTHER TOXICANTS THAN ORIGINAL JUUL PODS

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Several off-brand pods are marketed for use with the JUUL device. These products are typically less expensive than JUUL pods and can be filled with flavored liquids to skirt the US sales ban on flavored ENDS. To date, little is known about the design and toxicant emission profiles of these off-brand pods. The purpose of this study was to examine design characteristics, draw resistance, and toxicant emissions, including nicotine, carbonyl compounds (CCs), and reactive oxygen species (ROS), from several off-brand JUUL-compatible pods. Yields of total particulate matter (TPM), nicotine, reactive oxygen species (ROS), and carbonyl compounds (CCs) were measured in 15 4-second puffs. In addition, because JUUL was previously found to emit more nicotine in the first puffs of a use bout, an attribute that may enhance abuse liability, we examined whether off-brand pods exhibited similar behavior. We therefore compared puff-by-puff power and aerosol output from the off-brand and JUUL pods. All measurements were made using the same fully charged JUUL device. In addition to pod manufacturer, puffing flow rate was varied. Though similar in outward appearance to JUUL, most off-brand pods emitted several-fold greater nicotine, ROS, and CCs than JUUL pods when used with the same JUUL device. Except for JUUL and one off-brand pod (JC01), none of the products tested exhibited greater aerosol emissions in the first few puffs. We also found that aerosol emissions and device voltage output were unaffected by flow rate during a puff for all the off-brand pods except JC01; for these pods, the JUUL device provided its maximum voltage output during each puff regardless of flow rate. In contrast, greater flow resulted in greater voltage output and aerosol emissions for the JUUL and JC01 pod. This finding suggests that the heating coils of most off-brand pods were incompatible with the temperature-control circuit of the JUUL device, resulting in the latter defaulting to continuous maximum voltage output, thereby "supercharging" the pods. While JUUL-compatible pods are marketed to operate with the JUUL device, they are a heterogeneous class that may emit several-fold higher nicotine and toxicants than JUUL. These findings illustrate how users may obtain more nicotine and toxicants by selecting different ENDS components and highlight that constraining ENDS nicotine emissions requires closed-system products.

FUNDING: Federal

PPS25-5

SEX MODIFIES E-CIGARETTE-INDUCED CARDIAC AUTONOMIC IMBALANCE DEPENDENT ON NICOTINE AND NON-NICOTINE CONSTITUENTS

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Significance: E-cigarette use remains common among youth in the U.S. despite its association with adverse cardiopulmonary outcomes. Recent studies suggest e-cigarette aerosols acutely alter cardiac autonomic balance dependent on the presence of nicotine and flavors. Likewise, e-cigarette constituents may alter cardiac electrophysiology and increase risk for acute cardiovascular events. Nonetheless, it remains unclear how biological sex influences the acute cardiovascular effects of e-cigarette aerosols. Methods: Electrocardiogram (ECG) signals were acquired by telemetry in C57BL/6J mice (male and female, n=8) during exposure to filtered air (Air) or e-cigarette aerosols (three 9-minute puff sessions in 1 hour) separated by at least three-day intervals in a cross-over design. Exposures involved a third-generation e-cigarette and e-liquids containing a propylene glycol and glycerin mixture (PG:VG, 30/70) ± nicotine (1.2%). Mean differences (±standard error) in heart rate and standard deviation of normal-to-normal R-R Intervals (SDNN), indicator of heart rate variability from Air are reported where significant ($p<0.05$ by repeated measures two-way analysis of variance). Results: During puff sessions, PG:VG aerosols induced bradycardia in male (-24±4 bpm) but not female mice (+11±3 bpm, P=0.14), whereas nicotine salt-containing aerosols evoked bradycardia in both sexes (-21±4 bpm in males, -15±3 bpm in females). Immediately after puff sessions, nicotine salt-containing aerosols also increased heart rate and decreased SDNN in both sexes, indicating sympatho-excitation; however, the effects on heart rate were attenuated in females relative to males (+45±4 vs. +59±5 bpm, $P<0.05$). Additionally, in both sexes, nicotine salt-containing PG:VG aerosols more robustly increased heart rate after puff sessions compared to freebase nicotine-containing PG:VG aerosols (+59±5 vs. +32±7 bpm in males, +45±4 vs. +11±4 bpm in females, $P<0.05$). Conclusion: Biological sex modifies the autonomic impacts of e-cigarette via nicotine and non-nicotine constituents. Further studies are warranted to determine how sex might influence the arrhythmogenic and long-term cardiovascular toxicity of e-cigarettes.

FUNDING: Federal

PPS25-6

SHORT-TERM SMOKING OR E-CIGARETTE USE INCREASES MYOCARDIAL INFARCT SIZE AFTER ISCHEMIA/REPERFUSION INJURY IN MICE

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Significance. The public perceives e-cigarettes (e-cigs) as a less harmful alternative to tobacco, but the cardiovascular effects are incompletely understood. Tobacco smokers are at a higher risk of myocardial infarction (MI), but the effect of smoking or vaping on outcomes from subsequent MI is unclear, particularly in the short term. We studied the effects of two-week exposure to e-cig aerosol or cigarette smoke on cardiac function and infarct size (IS) after a post-exposure MI. Methods. 10-week-old mice were exposed to smoke/aerosol of e-cig (JUUL, Virginia Tobacco flavor with 5.0% nicotine

by weight) or tobacco cigarettes (Marlboro Red) or air. The exposure was pulsatile (5s twice/min for one 30 min session/day, daily for 14 days) through nosecones that minimized dermal absorption. On day 15, with no prior exposure on that day, the LAD was occluded for 30 minutes, followed by 24 hours of reperfusion (ischemia/reperfusion MI model). Echocardiography was performed for measurements of ejection fraction (EF), end-systolic volume (ESV), and end-diastolic volume (EDV) pre-and post-exposure and 24 hours post-MI. Hearts were harvested 24 hours post-MI with subsequent triphenyl tetrazolium chloride staining for measurement of dead tissue to determine IS. Results. IS was significantly larger in the tobacco group (46.28±6.4%; n=8) compared to the air control (36.89±9.68%; n=7), with p=0.0078 on Wilcoxon signed-rank test. IS in the JUUL group (42.89±11.59%; n=8) was also larger but with a borderline p=0.0547. Ejection fraction (EF) significantly decreased post-MI in all groups: tobacco (from 62.3±4.45% before exposure to 47.67±8.31% post-MI, p<0.0001), JUUL (from 62.33±4.45% to 52.15±9.8%, p<0.0001), and air (from 62.33±4.45% to 45.78±11.87%, p<0.0001). There were no significant changes in EF, ESV, or EDV during the two-week exposure to tobacco or e-cig before the MI. Conclusion. Short-term daily exposure of mice to e-cig aerosol or tobacco smoke leaves the heart more susceptible to myocardial tissue death in a subsequent MI, resulting in larger infarct size.

FUNDING: Federal; Other

PPS25-7

PRELIMINARY CHARACTERIZATION OF A BIOMIMETIC AEROSOL EXPOSURE SYSTEM: ORAL CAVITY MODULE

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Significance: Differences between in vivo puffing and inhalation and in vitro machine puffing conditions limit extrapolation of laboratory findings to human exposure and response, limiting translation to policy to improve public health. Machine puffing systems fail to represent aerosol dose delivered to each airway region and neglect anatomical diversity across age, sex, and race and ethnicity, which may stem from and contribute to racism and inequities in tobacco regulatory science. Methods: We address these gaps by modeling human puffing and inhalation behavior through biomimetic geometry to improve fidelity of in vitro exposure systems and account for differences in oral anatomies. An Oral Cavity Module (OCM) was engineered using a model of the oral cavity of a 22-year-old white female in Computer Aided Design software and mimics geometry from lips to larynx. An OCM was fabricated using additive manufacturing. Characterization consisted of a Juul electronic cigarette (EC) assembled to a wPUM™ Juul topography monitor. The monitor was installed into an OCM. A filter pad holder was installed downstream from the OCM and connected to a biomimetic aerosol exposure system (BAES) with tubing. Flowrate through the EC was measured at the monitor and system flow rate was measured downstream from the filter pad. Mass balances were performed on the monitor, pod, OCM sampling insert, tubing, and filter pad. Net mass deposited in the OCM was estimated by the difference between EC mass decrease and the sum the flow path components and filter pad mass increase. Results: The system flow rate was systematically varied from 25-50mL/s in increments of 5mL/s while varying system flow duration from 3.5-4.5s in increments of 0.25s. The corresponding puff flow rate at the exhaust of the EC varied between ~15 and ~32mL/s with puff durations corresponding closely to system flow duration. Across six repeated trials 92.7% (R2=0.9977) of mass emitted from the EC deposited on the filter pads and 3.7% deposited in the OCM. Conclusions: This work demonstrates proof of concept for quantifying where EC emissions deposit within the BAES when modeled with anatomy of a white female. Using the described methods, a library of oral anatomies can be fabricated to study differences in EC yield to the laryngeal region across oral anatomies. Results from this work may increase accuracy of exposure in biological models for studying effects of EC on airway tissue while also accounting for differences in aerosol mechanics across oral anatomies.

FUNDING: Federal; Academic Institution

PAPER SESSION 26: CIGARS: FROM EXPOSURE TO POLICY

PPS26-1

THE EFFECT OF STATE AND LOCAL FLAVORED CIGAR SALES RESTRICTIONS ON LARGE CIGARS, CIGARILLOS, AND LITTLE CIGARS: EVIDENCE FROM RETAIL SALES DATA

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Significance: In 2009, the Family Smoking Prevention and Tobacco Control Act (TCA) prohibited flavored cigarettes, except menthol, but allowed for flavors in cigars. Since the TCA, there has been a 34.4% increase in cigar use among youth and widened racial disparities in cigar use. State and local jurisdictions have increasingly enacted flavored tobacco product sales restrictions to reduce youth tobacco use and tobacco use disparities, and in April 2022, the US Food and Drug Administration (FDA) published proposed rules to prohibit characterizing flavors in cigars and menthol cigarettes. As more jurisdictions consider implementing flavor restrictions, it is important to understand their effect on tobacco markets that have high flavor proliferation, including the cigar market. Methods: This study uses data from Truth Initiative's flavor database and NielsenIQ retailer scanner for California, Illinois, Massachusetts, and New York. We use a three-way fixed effect model to assess the impact of the percentage of the population covered by an effective flavored cigar sales restriction on per capita unit sales of large cigars, cigarillos, little cigars, and cigars overall. We control for real sales weighted average price of a cigar, state level unemployment rate, real median household income, percentage of the population covered by private workplace smoke-free air laws, and include year, quarter, and state fixed effects. Results: We find that for every 25% increase in the effective percentage of the population covered by a flavored cigar sales restriction overall per capita cigar sales decrease by 0.4 cigars (p<0.01) - 18% decrease from the mean. When broken down by cigar type, per capita cigarillo sales decreases by 0.27 cigarillos (p<0.05) - 18% decrease, and per capita little cigar sales decreases by 0.24 little cigars (p<0.05) - 41% decrease. Conclusion: The results demonstrate the potential effects of increasing the proportion of individuals covered by flavored cigar sales restrictions. The FDA's proposed product standards prohibiting characterizing flavors in cigars and menthol cigarettes, when finalized, would increase the proportion of individuals covered by flavored cigar sales restrictions to 100%, leading to potentially significant reductions in cigar sales. In particular, the FDA's proposed rule has potential to especially reduce little cigar and cigarillo sales, which may substantially reduce youth cigar use and racial disparities in cigar use.

FUNDING: Other

PPS26-2

COMMUNICATION MESSAGING TO SUPPORT GRAPHIC HEALTH WARNING LABELS ON LITTLE CIGAR AND CIGARILLOS (LCCS): PERCEPTION OF YOUNG ADULT LCC USERS

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Significance: Little cigars and cigarillos (LCCs) cause multiple adverse health effects, and they are disproportionately smoked at higher rates among young adults and among Blacks. Although graphic health warning labels (HWLs) are an evidence-based strategy to reduce tobacco use, little research has examined HWLs for LCCs in priority populations, and no research has examined communication messaging to support and augment adoption of graphic HWLs for LCCs. Methods: As part of a current national study developing graphic HWLs on LCCs, we developed four types of communication messages to support graphic LCC HWLs: 1) Explanatory (e.g., why graphic HWLs on LCCs exist) 2) Testimonial (e.g., from a LCC user) 3) Inquisitive (e.g., asking if they had heard of LCC health effects), and 4) Recommendation (e.g., from a physician). For each message type, we created three messages. We recruited Black and White young adult (18-25 years old) current LCC users to participate in online focus groups and view three graphic HWLs on LCCs (depicting colon, lung, and esophageal cancer). Participants were randomly shown four messages per graphic LLC HWL (one message from each type), and they selected the most effective for each. Participants discussed persuasive communication features, such as ease of understanding, cognitive and affective reactions.

Audio recordings were transcribed, and after inductive and deductive coding, analysis for thematic content occurred. Results: A total of 30 young adult LCC users participated (37% Black; 63% female, 30%; male, other 7%); mean age= 22). Results showed that explanatory (41%, n=37) and testimonial messages (31%, n=28) were deemed as the most effective communication types, and inquisitive messages were the least effective (10%, n=9). Central themes that emerged included: 1) perceived credibility of message source impacted believability and effectiveness; 2) testimonials were seen as more relatable, emotional and made people think about their health; 3) fact-based messages that presented new information succinctly were attention-getting and believable; 4) messages that used language associated with marketing (e.g., "Did you know?") were deemed insincere and untrustworthy; and 5) messages seen as authoritative were disliked and dismissed. Conclusions: To enhance communication messages to support graphic LCC HWLs, messages should come from a credible source (e.g., FDA, or patient testimonial) or present factual, believable statements. Disclosures: None.

FUNDING: Federal; Academic Institution

PPS26-3

DID TOBACCO 21 LAWS AFFECT SALES OF CIGARS IN THE US? EVIDENCE FROM PATH AND NIELSEN SALES DATA

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INTRODUCTION: Laws raising the minimum age of sale for tobacco products to 21 years of age (Tobacco 21 or T21 laws) proliferated across the US in the past decade, leading to the adoption of a federal T21 law in December 2019. Prior research has confirmed that T21 policies have decreased both the use of tobacco products among young people and the sales of the cigarettes which young people smoke. However, little research has yet examined the effects of T21 passage on cigar sales, the second-most used tobacco product among young people in the US. METHODS: Using data from Waves 1 to 5 of the Population Assessment of Tobacco and Health (PATH), as well as Nielsen Scantrack sales data from 24 states representing 78% of the US population covering March 2017 to November 2021, we analyzed the effects of state T21 laws on cigar sales. We calculated weighted estimates of the share of different cigar brand, format (cigarillo, traditional cigar, or filtered cigar), and flavor combinations that were consumed by persons under 21 years of age in the PATH sample. Then, using data on state T21 policy population coverage and timing, in addition to calculated PATH under 21 consumption shares for each product in the Nielsen data, we performed difference-in-difference analyses using STATA 16.1/MP examining how cigar sales changed after a state-level T21 policy was passed. A control for Federal T21 passage in December 2019 was implicitly included through the use of a two-fixed effects design. RESULTS: Based on PATH estimates, we calculated 10.4% (743 million units) of all cigarillos, 5.7% (7.2 million units) of all traditional cigars, and 1.7% (251 million units) of all filtered cigars in the Nielsen data were consumed by persons under 21 years of age. An event study established there were no pre-trend differences between treatment and control groups. When controlling for PATH-derived under 21 consumption shares of sales, we found that the passage of a state T21 policy decreased all cigar sales by 11.1% (95% CI -18.2%- -4.04%, p=0.002) after policy implementation. In format-segregated analyses, we found that sales of filtered cigars fell the most (-13.2%, 95% CI -22.8%- -3.61%, p=0.007), followed by cigarillos (-10.2%, 95% CI -16.7%- -3.66%, p=0.002) then traditional cigars (-7.88%, 95% CI -15.9%- -0.62%, p=0.033). CONCLUSION: The passage of state-level T21 laws worked as intended decreasing sales of cigars, primarily among cigar brands, formats, and flavors most consumed by young people.

FUNDING: Federal

PPS26-4

A LONGITUDINAL ANALYSIS OF FLAVORED CIGAR USE AND CIGAR SMOKING CESSATION IN U.S. ADULTS

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Significance: Flavored cigars mask the harsh taste of tobacco and may be a key barrier to successful cigar smoking cessation. Moreover, flavored cigars have grown in popularity accounting one-third of cigars consumed. The Food and Drug Administration is currently considering a national ban on flavored cigars; however, to date, there have been few longitudinal studies examining whether cigar flavors are associated with short or long-term cigar cessation. Methods: Using United States-based, nationally-representative, longitudinal data from the Population Assessment of Tobacco and Health Study we examined whether flavored cigar use, defined as a binary indicator, was associated with 30-day (wave 1 to wave 5) and 1-year (wave 1 to wave 4) cigar smoking cessation. Multivariable discrete-time survival models were fit to an unbalanced person-period data set (person n = 774, risk period$_{W1\text{-}W5}$ n = 1,943, risk period$_{W1\text{-}W4}$ n = 1,796) of adult respondents (age 18+) who had currently established cigar smoking at baseline and smoked cigars during 5 or more days in the last 30 days. Models adjusted for age, sex, race/ethnicity, annual household income, tobacco dependency, cigarette and cigar smoking intensity, and blunt use. Results: At baseline, 51.3% of sample respondents smoked flavored cigars. In fully adjusted models, flavored cigar use was not associated with either 30-day (HR=0.85, 95% CI= 0.67, 1.07) or 1-year cessation (HR=0.97, 95%=0.76, 1.24). Of the 221 respondents who quit smoking cigars by wave 2, 35.9% had relapsed between waves 3 and 5. Conclusion: We found no evidence that flavored cigar use was associated with 30-day or 1-year cigar smoking cessation. More work is needed to better understand the dynamics of cigar smoking transitions, including cessation and relapse, and the role flavorings may play in larger cohorts - particularly in those who exclusively use cigars and those who use both cigars and cigarettes.

FUNDING: Federal

PPS26-5

PERCEIVED DISCRIMINATION EXPERIENCES, TARGETED PRODUCT MARKETING, AND LITTLE FILTERED CIGAR AND CIGARILLO USE AMONG THE NATIONALLY REPRESENTATIVE OF U. S. YOUNG ADULTS

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Introduction: The tobacco industry has disproportionately marketed little filtered cigars or cigarillos (LCCs) to communities of color, groups which often report higher perceived experiences of discrimination. We address an evidence gap by examining the effects of perceived experiences of discrimination and LCC product marketing on LCC use modality on U. S. young adults (YA). Methods: We analyzed data from Wave 4 of the C'RILLOS study, a U.S. nationally representative sample that follows YA aged 18-36 years (n=1,178) collected in May 2022. Respondents participated in an online survey that asked about their perceived experiences of racial discrimination, exposure and receptivity to LCC-specific marketing, and their use of LCCs within the past 6 months, both with tobacco only or with marijuana as a 'blunt.' Results: Non-Hispanic Black (NHB, *M*=2.16, 95% CI: 2.04-2.28), non-Hispanic Asian (NHA, M=1.86, 95% CI: 1.72-2.01), non-Hispanic multiracial (NHM, *M*=1.98, 95% CI: 1.76-2.21) and Hispanic (HIS, *M*=1.77, 95% CI: 1.6-1.88) reported higher mean levels of perceived discrimination compared to non-Hispanic White (NHW, *M*=1.51, 95% CI: 1.45-1.57) YAs. NHB, NHA, and HIS also reported higher exposures to LCC marketing compared to NHW YAs. Controlling for demographic characteristics, discrimination and exposure to LCC marketing were associated with a 2.23 (95% CI: 1.77-2.81) AOR and 2.73 (95% CI: 2.19-3.40) AOR of using LCCs with tobacco only, respectively, and a 2.01 (95% CI: 1.61-2.50) AOR and 2.03 (95% CI: 1.68-2.46) AOR of using LCCs as blunts. Conclusion: Perceived experience of discrimination and LCC-specific marketing contribute to LCC use behavior in young adults.

FUNDING: Federal

PPS26-6

SHORT-TERM DAILY SMOKING INCREASES MYOCARDIAL INFARCT SIZE AFTER ISCHEMIA/REPERFUSION INJURY IN MICE

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Significance. The public perceives e-cigarettes (e-cigs) as a less harmful alternative to tobacco, but the cardiovascular effects are incompletely understood. Tobacco smokers are at a higher risk of myocardial infarction (MI), but the effect of smoking or vaping on outcomes from subsequent MI is unclear, particularly in the short term. We studied the effects of two-week exposure to e-cig aerosol or cigarette smoke on cardiac function and infarct size (IS) after a post-exposure MI. Methods. 10-week-old mice were exposed to smoke/aerosol of e-cig (JUUL, Virginia Tobacco flavor with 5.0% nicotine by weight; n=8) or tobacco cigarettes (Marlboro Red; n=8) or air (n=7). The exposure was pulsatile (5s twice/min for one 30 min session/day, daily for 14 days) through nosecones that minimized dermal absorption. On day 15, with no prior exposure on that day, the LAD was

occluded for 30 minutes, followed by 24 hours of reperfusion (ischemia/reperfusion MI model). Echocardiography was performed for measurements of ejection fraction (EF), end-systolic volume (ESV), and end-diastolic volume (EDV) pre-and post-exposure and 24 hours post-MI. Hearts were harvested 24 hours post-MI with subsequent triphenyl tetrazolium chloride staining for measurement of dead tissue to determine IS. Results. While there was no overall significant difference in IS values among the three groups (p=0.18 by ANOVA, potentially due to the high variability in the e-cig group), IS was significantly larger in the tobacco group (46.28±6.4%) than in the air control (36.89±9.68%) when the two conditions were compared by t test in exploratory analysis (p=0.04). The mean IS in the e-cig group (42.89±11.59%) was also larger but significance was not reached by t test (p=0.3). Ejection fraction (EF) significantly decreased post-MI in all groups: tobacco (from 61.58±3.01% before exposure to 47.67±8.31% post MI, p<0.05), e-cig (from 64.77±3.48% to 52.15±9.8%, p<0.0001), and air (from 61.2±5.38% to 45.78±11.87%, p<0.05). There were no significant changes in EF, ESV, or EDV during the two-week exposure to tobacco or e-cig before the MI. Conclusion. The results of our exploratory analysis suggest that short-term daily exposure of mice to tobacco smoke leaves the heart more susceptible to myocardial tissue death in a subsequent MI, resulting in larger infarct size. Larger studies will be necessary to confirm this interpretation and to determine if e-cig use causes a similar effect.

FUNDING: Federal; Other

PPS26-7

BIOMARKERS OF TOXIC EXPOSURE AND OXIDATIVE STRESS AMONG U.S. ADULT USERS OF PREMIUM CIGAR VERSUS OTHER CIGAR SUBTYPES: 2013-2019

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Background: Cigars are currently the second-highest used combustible tobacco product among U.S. adults, but knowledge about health effects of premium cigars vs. other cigar subtype use is limited. Methods: This study analyzed the biospecimen data (n=44,191) from Waves 1-5 of the Population Assessment of Tobacco and Health (PATH) Study, collected during 2013-2019. Multivariable linear regressions were conducted to examine between-subjects differences in urine biomarkers of exposure (BOE) from five classes of harmful and potentially harmful constituents along with a biomarker of oxidative stress (urine 8-isoprostane) among exclusive users of premium cigars versus other exclusive cigar subtypes (i.e., non-premium large cigars, cigarillos, filtered cigars), cigarettes, and non-tobacco users. Results: In comparison to non-tobacco users, exclusive premium cigar users had higher geometric mean concentrations of the nicotine metabolite cotinine (5.8 vs. 0.5ng/mg, p<.0001), tobacco specific nitrosamine (TSNA) (4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL): 7.8 vs. 1.5pg/mg,p<.0001), heavy metal (lead: 0.4 vs. 0.3ng/mg,p<.0001), and volatile organic compound (VOC) (N-Acetyl-S-(2-cyanoethyl)-L-cysteine (CYMA,acrylonitrile): 4.7 vs. 1.6ng/mg, p<.0001). Exclusive premium cigar users were less likely to be daily users than other tobacco user groups and had comparable BOEs with exclusive non-premium large cigar users but generally lower BOEs than exclusive cigarillo, filtered cigar, and cigarette smokers. Daily exclusive premium cigar users had similar nicotine and TSNA exposure but lower exposure to PAHs and VOCs than exclusive cigarillo and filtered cigar users. Conclusions: Premium cigar use exhibits different exposure to toxicants from other cigar subtype users. Regulations of premium cigars need to formalize product definition and take the population's health effects into consideration.

FUNDING: Federal; Academic Institution

POSTER SESSION 1

POS1-1

ELECTRONIC CIGARETTE USE AND TOBACCO DEPENDENCE AMONG ADOLESCENTS AND YOUNG ADULTS IN THE PEDIATRIC HOSPITAL

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Background: The pediatric hospital may represent a valuable opportunity to identify and address e-cigarette use and nicotine dependence among adolescents and young adults (AYA) because many hospitalized youth are at high risk for substance use. Due to the lack of data in this population we sought to describe e-cigarette use and nicotine dependence among hospitalized AYAs. Methods: We conducted a cross-sectional survey of AYAs (14-21 years) admitted to two pediatric hospitals between 08/2019-03/2020. Using previously validated questions we assessed the proportion of adolescents reporting ever, monthly, and weekly use of e-cigarettes, conventional cigarettes and symptoms of nicotine dependence. We used chi-squared or Fisher's exact tests to compare between groups. Results: Among 133 respondents, 67% were younger (14-16 years old), 57% were female, and 59% were of non-Hispanic white race/ethnicity. Forty-two participants (32%) reported ever use of e-cigarettes and seventeen (13%) reported monthly use. Thirty-four (26%) reported ever use of conventional cigarette, nine (7%) reported monthly use and six (5%) reported weekly use. Twenty four (18%) reported co-ever use of tobacco and e-cigarettes and seven (5%) reported co-monthly use of tobacco and e-cigarettes. Ever users of 2 or more drugs (n=52) were more likely to report ever use of e-cigarettes (n=38; p<0.001) or tobacco (n= 30; p<0.001). Monthly users of 2 or more drugs (n=15) were more likely to report past month tobacco (n=7; p=<0.001) or e-cigarette use (n=14; p<0.001). Twelve (9%) reported symptoms of tobacco craving. Among the 9 AYAs reporting past month tobacco use, 8 reported tobacco craving (p<0.001). Among the 17 AYAs reporting past monthly e-cigarette use, 7 reported tobacco craving (p<0.001). E-cigarette users and non-users were comparable by race, sex, age and insurance type; there were differences in tobacco use between insurance type (p=0.005) and age group (p=0.035). Conclusions: In this study of hospitalized AYAs a substantial proportion reported regular e-cigarette and tobacco use or nicotine dependence. As e-cigarette use is strongly linked with nicotine dependence, this prevalence signals a high potential for unrecognized and untreated nicotine withdrawal among hospitalized adolescents. Efforts to improve systematic screening for e-cigarette use and tobacco dependence and interventions for prevention and cessation in hospitalized adolescents are critically needed.

FUNDING: Federal

POS1-2

THE RELATIONSHIP BETWEEN PERCEIVED DISCRIMINATION AND CIGARETTE SMOKING IN A SAMPLE OF PEOPLE WITH HIV IN A SMOKING CESSATION CLINICAL TRIAL

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SIGNIFICANCE: People with HIV (PWH) smoke at a very high prevalence, and it is important to identify factors related to smoking behavior in this population. Experiences of perceived discrimination are common among PWH and can result in significant adverse physical and mental health effects. Perceived ethnic discrimination (PED) is common among PWH who belong to minoritized racial and ethnic groups. Despite the high prevalence of cigarette smoking and PED among PWH, little is known about the association between cigarette smoking and PED. The goal of this study was to examine the relationship between PED and cigarette smoking behaviors (i.e., cigarette abstinence, nicotine dependence, motivation to quit smoking, self-efficacy to quit smoking) among adults with HIV who smoke cigarettes. METHODS: This was a secondary analysis of data from a prospective, randomized controlled smoking cessation trial for PWH motivated to quit smoking. Participants (N = 442; Mean age = 50.6; 52.8% Male; 56.3% Black, non-Hispanic; 87.7% unemployed; 81.6% unmarried) were recruited from three HIV clinical care sites in the Bronx, New York and Washington, DC and were randomly assigned to an HIV-tailored intensive group therapy intervention or a control condition. Participants completed the 17-item Perceived Ethnic Discrimination Questionnaire and measures of demographics, smoking behaviors, and depressive symptoms at baseline and were followed up 3- and 6-months following study completion. RESULTS: Linear mixed effect modelling for repeated measures showed that greater PED was related to lower nicotine dependence and lower self-efficacy to quit smoking among PWH. In addition, parallel mediation analyses demonstrated that there was an indirect effect of depressive symptoms such that greater PED at baseline was associated with greater depressive symptoms at 3-month follow-up (ß = 2.34, SE = 0.64, p < .001), and greater depressive symptoms at 3-month follow-up were related to greater nicotine dependence (ß = 0.03, SE = 0.02, p = .05) and lower self-efficacy to quit smoking (ß = 0.02, SE = 0.01, p < .001) at 6-month follow-up. PED was not associated with cigarette abstinence or motivation to quit smoking. CONCLUSIONS: Findings highlight the potential importance of tailoring smoking interventions to PWH with high levels of PED. These interventions may benefit from enhancing self-efficacy to quit smoking and increasing the use of adaptive strategies to cope with PED and depressive symptoms.

FUNDING: Federal; Academic Institution

POS1-3

SEX AND ABSTINENCE IN RELATION TO CESSATION FATIGUE DURING A PRACTICE QUIT ATTEMPT PROCEDURE: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

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Significance: Cessation fatigue, tiredness experienced when trying to stop smoking cigarettes, is associated with a longer time to achieve abstinence and greater lapses to smoking. In addition, several studies have found that women report greater cessation fatigue than men. This study examined the main and interactive effects of sex and abstinence on cessation fatigue using ecological momentary assessment (EMA) data from a practice quit attempt procedure. Methods: This study is a secondary analysis of an EMA study focused on smoking reinstatement in California adults aged 21-70 with current daily cigarette smoking. Participants completed EMA-based assessments including smoking and cessation fatigue for 28 days with the practice quit attempt starting after one week. Multi-level linear models were run investigating sex, abstinence, and sex by abstinence interaction with cessation fatigue. Models controlled for cigarette dependence, morning abstinence plan, baseline cigarettes per day (CPD), and between-person abstinence. Significant interactions were followed up with pairwise comparisons using estimated marginal means. Results: A total of 184 participants (49% female; 50.9% white, age M=43.85±12.75 years), who reported smoking an average of 12.94 (SD=7.94) CPD at baseline, completed measures of cessation fatigue. There was a significant main effect of abstinence on cessation fatigue such that greater cessation fatigue was reported on abstinent days than non-abstinent days (p=0.001). In contrast, there was no main effect of sex on cessation fatigue (p=0.74). There was a significant interactive effect of sex and abstinence on cessation fatigue (F(1,3299)=20.79, p<0.001). Males reported significantly higher cessation fatigue on days they were abstinent (M=3.47, SE=0.15) versus days they were non-abstinent (M=2.87, SE=0.14; p<0.001) while females reported no significant difference in cessation fatigue by abstinence (M=2.88, SE=0.16 versus M=2.99, SE=0.16, p=0.30). When comparing males and females, males reported significantly higher cessation fatigue than females on abstinent days (p=0.007) with no significant sex effect during non-abstinent days (p=0.56). Conclusions: During a practice quit attempt, greater cessation fatigue was reported by men on abstinent days in comparison men on non-abstinent days and compared to women on abstinent or non-abstinent days. Targeting cessation fatigue may be especially useful for men trying to maintain abstinence from cigarettes.

FUNDING: Federal; State

POS1-4

CIGARETTE AND ALTERNATIVE TOBACCO PRODUCT USE AMONG ADULT CANCER PATIENTS ENROLLED IN 10 ECOG-ACRIN THERAPEUTIC TRIALS

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Significance: While cigarette smoking has declined in the US population, sale and consumption of non-cigarette alternative nicotine/tobacco products (ATPs; e.g., e-cigarettes, cigars) is on the rise. Emerging research demonstrates that cancer patients are using e-cigarettes, however little work has quantified the diverse spectrum of ATPs used among cancer patients nor factors associated with use. We investigated prevalence of cigarette and ATP use, and factors associated with use, among cancer patients enrolled in multiple cancer clinical trials. Methods: Data come from patients enrolled into 10 ECOG-ACRIN clinical trials (2017-2021) who completed (N=756) a baseline survey of tobacco use which assessed regular cigarette and ATP use (cigars, clove cigarettes, hookah, bidis, e-cigarettes, smokeless tobacco, snus) since cancer diagnosis and in the past 30 days (30d). Prevalence of use was examined using frequencies and multinomial logistic regression tested factors associated with past 30d tobacco product use (cigarette only, ATP only, both) to determine differences by product category. Results: Patients were on average 59 years of age, 70% male, and the median time from cancer diagnosis to survey was 9 months. 27% of patients reported tobacco use since cancer diagnosis vs. 20% reported use in the past 30d. Cigarettes were the most common product used (77% of tobacco users reported cigarette smoking since cancer diagnosis vs. 60% in the past 30d). 4.8% of the sample used smokeless tobacco since cancer diagnosis vs. 3.6% in past 30d. 2.4% of the sample reported use of e-cigarettes in both time periods. Using the trichotomized variable, 10% used cigarettes only, 8% used ATPs only, and 2% used both in the past 30d. Males vs. females were more likely to use ATPs vs. cigarettes only in the past 30d (OR=4.33; 95% CI, 1.63 to 11.51; p<.005). Patients residing in more economically-disadvantaged neighborhoods (i.e., higher area deprivation index scores) were more likely to use cigarettes only vs. ATPs only in the past 30d (p=0.04) vs. patients with less neighborhood disadvantage. Conclusion: Cigarette smoking is the most prevalent tobacco product used among adults with cancer and ATP use is not uncommon. Past 30d cigarette and ATP use was lower compared to reported use around time of cancer diagnosis suggesting reductions in use. Cancer patients with greater socioeconomic disadvantage were more likely to exclusively use cigarettes vs. ATPs.

FUNDING: Federal

POS1-5

PILOT RANDOMIZED CONTROLLED TRIAL OF AN AVATAR-LED DIGITAL SMOKING CESSATION PROGRAM FOR SOCIOECONOMICALLY DISADVANTAGED VETERANS

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Background: Socioeconomically disadvantaged Veterans receiving care through the Veterans Health Administration have a high prevalence of smoking, and there is a great need for accessible, effective smoking cessation interventions for Veterans at all levels of readiness to quit. Objectives: To address these needs, we developed Vet Flexiquit, a web-based Acceptance and Commitment Therapy (ACT) program for Veterans, and evaluated its acceptability (primary aim), efficacy, and impact on theory-based change processes relative to the National Cancer Institute's SmokefreeVET program in a pilot randomized controlled trial. Methods: Participants (n=49) were Veterans meeting the VHA national threshold for no-cost healthcare based on income or disability status. Participants were randomized 1:1 to receive either Vet Flexiquit or SmokefreeVET. Both groups received text messages as part of the intervention for 6 weeks. Primary outcome data were collected at 3 months post-randomization. Self-reported smoking abstinence was biochemically verified via saliva cotinine. Results: There were no statistically significant differences between arms on any acceptability measure; treatment satisfaction was high and similar across arms (overall satisfaction: 100% for Vet Flexiquit, 95% for SmokefreeVET), with treatment utilization being more modest (M log-ins=3.7 for Vet Flexiquit, M=3.2 for SmokefreeVET). There were no significant differences between arms on the secondary outcomes of smoking cessation or change in ACT theory-based processes. On open-ended responses, Veterans in both treatment arms expressed interest in having support from a professional or peer to enhance their experience as well as an expanded text messaging program. Conclusions: Both programs had high ratings of acceptability, limited utilization, and similar impact on cessation and cessation processes. Taken together with the qualitative data suggesting that support may enhance participants' experience of both programs, these preliminary findings suggest that either program may be beneficial to socioeconomically disadvantaged Veterans who are looking for a broadly accessible cessation treatment option and that integrating provider or peer support and enhancing the text messaging program may boost engagement and outcomes.

FUNDING: Federal

POS1-6

FEASIBILITY AND ACCEPTABILITY OF A TARGETED SELF-HELP INTERVENTION TO INCREASE MOTIVATION TO QUIT SMOKING AMONG ONCOLOGIC PATIENTS

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Smoking after cancer is associated with worse cancer treatment outcomes and prognosis, regardless of cancer type. Our previous research showed that patients with cancers that were not smoking related (e.g., breast) or not commonly known as smoking related (e.g., colorectal), compared to those with thoracic or head and neck cancers, had lower cessation motivation, which predicted lower smoking abstinence. Thus, it is imperative to increase motivation to quit and cessation among patients with malignancies that are not typically linked to smoking. We developed brief booklets, targeted by cancer type, to enhance cessation motivation among patients with such cancers (i.e., breast, skin melanoma, bladder, colorectal, gynecological) by explaining the role of smoking in the cancer's etiology, when applicable, and summarizing the risks of continued smoking and the benefits of quitting. The aim of this study was to assess feasibility for a future efficacy trial and acceptability among the target population. Participants had a diagnosis of skin melanoma (n=10), breast (n=10), bladder (n=10), colorectal (n=8), or gynecological (n=10) cancers within the last 6 months and smoked =1 cigarette in the past month. We approached 109 of 114 potentially eligible individuals (96%), of whom 80 (73%) agreed to be screened. Of those, 53 (66%) met criteria and consented to participate. Of the 53 patients enrolled in the study, 48 completed baseline and received the booklet corresponding to their cancer type. Patients included were 69% women, with a mean age of 58 (SD=9.96), 94% were non-Hispanic White, 38% had a high school education or lower, and 42% were married or cohabitating. Patients had been smoking for 36 years (SD=11.60), about 17 cigarettes per day (SD=7.53), and had low nicotine dependence (FTND M=3.76; SD=1.80). Of those completing baseline, 96% and 92% completed the 1-week and 1-month post-intervention assessment, respectively. Of the 46 who completed a follow-up assessment, 43 (93%) read the booklet and showed high satisfaction (modified Client Satisfaction Questionnaire-8 M=24.83, SD=3.62). Among responders, 33% sought smoking cessation assistance and 25% were smoke-free 1 month post-intervention. Overall, the results indicate feasibility and acceptability of this newly created self-help intervention and support its future efficacy assessment in a fully-powered randomized controlled trial.

FUNDING: Federal

POS1-7

EFFECTS OF LIMITING ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) PUFF DURATION IN ELECTRONIC CIGARETTE USERS AND CIGARETTE SMOKERS

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Significance: Electronic nicotine delivery systems (ENDS) produce an aerosol by heating a liquid that often contains nicotine. Limiting puff duration can limit the nicotine dose delivered to the user, in combination with device power and liquid nicotine concentration. This study's purpose is to determine, in ENDS users and cigarette smokers, the effects of 4 concentrations of protonated nicotine, when puffs are limited to 2 seconds. Methods: Eighteen participants (11 men, 7 women; 13 White, 2 Black/African American, 1 multiracial, 1 Asian, 1 other; 9 cigarette smokers, 9 ENDS users) with a mean age of 31.33 (SD=12.25) years attended four sessions that varied by liquid nicotine concentration (0, 6, 15, 30 mg/ml protonated nicotine). Participants took 10 puffs from each product (limited to 2 s via custom-designed hardware/software) and then used each product for 30 minutes, *ad lib*, (2s puffs). Then, participants could use their own brand cigarette/ENDS. Plasma nicotine concentration, time to use own brand product (latency), and subjective effects were measured. Results: Plasma nicotine increased with liquid nicotine concentration. After 10 puffs, the 6 mg/ml ENDS delivered 4.10 ng/ml (SD=3.06), the 15 mg/ml ENDS delivered 8.97 ng/ml (SD=9.01), and the 30 mg/ml ENDS delivered 13.76 ng/ml (SD=17.88); the 15 mg/ml and 30 mg/ml ENDS delivered significantly more nicotine than the 6 mg/ml ENDS (*ps*<.05; N=15-16). For latency to use own brand product, participants had a shorter latency in the 0 mg/ml condition compared to the 15 mg/ml condition (*p*<.05). After 10 puffs, score on the item "Craving a cigarette/e-cigarette/nicotine" was reduced more in the 15 mg/ml and 30 mg/ml conditions compared to the 0 and 6 mg/ml conditions (*ps*<.05; N=16). Conclusions: Few data exist on the effects of limiting ENDS puff duration. Limiting puff duration is one way to limit the dose of nicotine delivered by an ENDS to the user. Nicotine delivery likely influences craving as

well as use of own brand product. These findings demonstrate that user puff duration can be constrained electronically, and in combination with constraints on nicotine flux (nicotine emitted per unit time), can limit nicotine delivery to users' blood.

FUNDING: Federal

POS1-8

DOSE RESPONSE EFFECTS OF TWO NICOTINE SALT FORMULATIONS ON ELECTRONIC CIGARETTE APPEAL AND SENSORY ATTRIBUTES

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Significance: Various organic acids are used to create nicotine salt formulations, which may improve the appeal and sensory experience of vaping electronic cigarettes (e-cigarettes). This clinical experiment examined the effects of partially and highly protonated forms of two nicotine salt formulations (nicotine lactate and benzoate) vs. free-base (no acid additive) on the appeal and sensory attributes of e-cigarettes. Methods: Current adult tobacco and e-cigarette product users (N=116) participated in an online remote double-blind within-subject randomized experiment involving standardized self-administration of e-cigarette solutions varying in nicotine formulation (free-base, 50% nicotine lactate [1:2 lactic acid to nicotine molar ratio], 100% nicotine lactate [1:1 ratio], 50% nicotine benzoate, and 100% nicotine benzoate). Each formulation was administered in 4 flavors in a pod-style device. Besides the nicotine formulation, the constituents in each flavor's e-cigarette solution were equivalent. After each administration, participants rated appeal (liking, disliking, willingness to use again), harshness, bitterness, smoothness, and sweetness on 0 (Not at all) to 100 (Extremely) scales. Results: Compared to free-base nicotine, 50% and 100% nicotine lactate and benzoate yielded higher appeal, smoothness, and sweetness and lower harshness and bitterness. Dose-response analyses found 100% vs. 50% nicotine salt improved appeal, smoothness, bitterness, and harshness for nicotine lactate and sweetness, smoothness, and harshness for nicotine benzoate. Secondary correlational analyses found that increasing pH was associated with worsening appeal and sensory attributes across nicotine formulations. Conclusion: Limiting benzoic or lactic acid additives or setting minimal pH thresholds in e-cigarettes may reduce e-cigarette product appeal, especially among individuals who are deterred by products with harsh or bitter qualities.

FUNDING: Federal

POS1-9

A CHALLENGING POPULATION: SMOKING CESSATION IN HOME OXYGEN VETERANS AT HIGH RISK FOR ADVERSE EVENTS

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Significance: It is estimated that 1.4 million Americans are on home oxygen. COPD is the most common diagnosis requiring home oxygen and the leading cause of COPD is smoking. There is little information in the literature on home oxygen users who continue to smoke. However, it is known that smoking on home oxygen has led to multiple adverse events including: flash burns, severe injuries, house fires, and even death. To address these issues, the Veterans Health Administration directed all VA facilities to reassess Veterans on home oxygen, offer smoking cessation resources, and to consider discontinuing oxygen therapy if risk outweighs benefits. Method: JAHVA developed a multidisciplinary committee to address home oxygen users who are at high risk for adverse events. This Performance Improvement (PI) project was conducted between 10/1/2020-9/30/21. During delivery of home oxygen all Veterans were assessed for smoking. For those identified as smokers, cessation was recommended, educational materials were provided, and individual telehealth cessation services by the Clinical Pharmacy Specialist (CPS) were offered. The CPS offered tobacco counseling, and a plethora of interventions including pharmacotherapy as well as additional educational materials. Results: 247 Veterans were identified as high risk for adverse events due to smoking while utilizing home oxygen, including 25 who had quit smoking prior to the project timeline but were at high risk for smoking relapse. 88% of the Veterans reported smoking inside their home where their oxygen was stored even if not utilizing. Over half of the Veterans (51%) were interested in quitting and 34% of those agreed to cessation sessions with the CPS. By the end of the project, 60 Veterans (24%) had quit smoking. There was no significant association between a pre-existing mental health diagnosis and smoking cessation success, nor was there a significant relationship between successful quit attempt and number of smoking cessation sessions. The mean age was 68, 91% were men, and 91% were White. Of note 44 (17%) of the Veterans died by the end of the project. Conclusion: This PI project is one of few to look at the effectiveness of smoking cessation interventions in home oxygen users. Cessation rates were higher than expected on this challenging population. This program may be an effective interdisciplinary approach to deliver cessation services to those at high risk for adverse events at other health care systems.

POS1-10

A QUALITATIVE STUDY OF BELIEFS ABOUT SMOKING AND QUITTING CIGARETTES IN A SAMPLE OF ADULTS LIVING WITH HIV/AIDS IN NAIROBI, KENYA

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INTRODUCTION: The cigarette smoking prevalence for people living with HIV/AIDS (PWH) is much higher than people without HIV/AIDS, including in middle/low income countries such as Kenya, and there are significant health-related smoking consequences for PLH. Most research on smoking among PWH has been conducted in high income countries (e.g., United States). More research on smoking among PLH in middle/low income countries is needed due to differences in access to care and cultural beliefs that may be important for smoking interventions. The goal of this qualitative study was to use focus groups to better understand smoking- and smoking cessation-related behavior among PWH in Kenya. METHODS: Participants were 24 PWH with current cigarette use recruited from HIV care clinics and methadone clinics in Nairobi, Kenya as part of a smoking cessation clinical trial study. Qualitative data were collected from three focus groups during which participants were asked about reasons for smoking, barriers to quitting smoking, and facilitators to quitting smoking. Focus groups were conducted in Swahili and translated to English. Two coders examined themes that arose in the focus groups (e.g., HIV, tobacco use). Coded transcripts were inputted into NVivo 12, and queries were run to examine how many times each of the themes were coded in the focus groups. RESULTS: Participants cited many reasons for smoking including social pressure, cravings, boredom, stress/anxiety, environmental triggers, and to prevent cravings or withdrawal. Many participants reported motivation dot quit smoking with reasons for wanting to quit smoking that included health risks, being on medications that interact with tobacco, and the financial burden. Barriers to quitting included stress, addiction and cravings, and social norms related to smoking. Participants expressed an overarching sense of helplessness regarding addiction and the ability to quit smoking. While participants expressed doubts about their abilities to quit smoking individually, they also expressed a great deal of hope and faith that, with the help of the research team and pharmacotherapy, smoking cessation would be possible. CONCLUSION: PWH in Kenya reported high motivation to quit smoking but also felt that quitting was a struggle, citing challenges with addiction and cravings. These results may aid future research developing smoking cessation treatments for PWH in Kenya and, potentially, in other middle/low income countries.

FUNDING: Federal

POS1-11

A MIXED METHODS PRELIMINARY STUDY OF NICOTINE REPLACEMENT THERAPY FOR VAPING CESSATION AMONG MONO AND DUAL USERS

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Background: Many adults express interest in quitting e-cigarettes. However, available interventions for e-cigarette cessation are scarce and are tailored towards young adults. This study seeks to 1) to evaluate reasons for quitting e-cigarettes in treatment-seeking adults, and 2) to assess the feasibility and acceptability of nicotine replacement therapy (NRT) for e-cigarette cessation. Methods: Adult daily e-cigarette users completed qualitative interviews about 1) reasons for quitting e-cigarettes; 2) advice received from healthcare providers; and 3) anticipated challenges in quitting vaping. Interviews were recorded and transcribed for qualitative analysis. Participants were then randomized to either 28-day treatment including combination NRT (21mg patches, 4mg lozenges) + supportive booklet (n=18) or Quitline referral (n=12). Participants responded to daily

surveys to collect data on vaping, smoking, and quit attempts. Primary aims were feasibility (number who enrolled) and acceptability (NRT use, adverse effects). Exploratory aims evaluated abstinence (7-day point-prevalence) at the end of treatment. Results: Of the 30 participants who were enrolled, 50% (n=15) were dual users, and 50% (n=15) were mono-vapers, 53% (n=8) of whom were former smokers. In qualitative interviews, participants reported seeking e-cigarette and smoking cessation treatment due to health concerns, dependence, social stigma, and cost. Mixed messages were reported from healthcare providers. Anticipated challenges of quitting vaping were withdrawal, negative mood, sensorimotor habits, and convenience. Participants generally completed >70% of daily surveys and most completed the end of treatment survey (n=24; 80%). Participants who received NRT reported using the patch M=10.89 days and lozenges M=6.39 days, with few days of adverse effects (M=2.67). At the end of treatment, 6/18 (33.3%; 4 mono and 2 dual users) in the intervention group reported abstinence from vaping, compared to 0 in the control group (*Fisher*=5.00, *p*=.057). However, no dual users reported quitting smoking. Importantly, no former smokers returned to smoking. Conclusions: Adults are interested in quitting e-cigarettes due to negative consequences of use and are willing to use pharmacotherapy. Future research should confirm the effectiveness of NRT for vaping cessation in a larger trial, address cigarette smoking in dual users, and aim to disseminate treatments for vaping to healthcare providers.

FUNDING: Federal

POS1-12

SMOKING CESSATION PHARMACOTHERAPY EFFICACY IN COMORBID MEDICAL POPULATIONS: SECONDARY ANALYSIS OF THE EAGLES RANDOMIZED CLINICAL TRIAL

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Significance: Varenicline, bupropion, and nicotine replacement therapy may have differential effects on cessation in individuals with medical comorbidities. This secondary analysis sought to compare medication efficacy in participants with comorbidities in the EAGLES trial. Methods: EAGLES was a double-blind, triple dummy, placebo- and active-controlled (nicotine patch), randomized trial of varenicline and bupropion for 12 weeks with follow-up through 24 weeks. Medical comorbidity data were derived from the baseline medical screening questionnaire and categorized into 4 subgroups (cardiac, pulmonary, vascular, and diabetes). Generalized linear mixed models were used to assess the association between presence of each comorbidity and biochemically-verified continuous abstinence rates from Weeks 9-12 and 9-24, controlling for age, race, sex, and psychiatric cohort. Similar models were used to test the effect of number of comorbidities on abstinence. Results: Varenicline resulted in the highest Week 12 abstinence rates across all pharmacotherapies and compared to placebo in all comorbidity subgroups: cardiac (40.00% vs 3.57%; OR=23.28 [5.06-107.08]), pulmonary (24.66% vs 12.75%; OR=2.24 [1.34-3.76]), vascular (29.14% vs 10.44%; OR=3.61 [2.29-5.67), and diabetes (30.88% vs. 8.33%; OR=6.54 [2.26-18.95]). This was maintained at Week 24 for those with cardiac (23.33% vs 1.79%; OR=21.74 [2.65-178.23]), vascular (18.87% vs 7.07%; OR=3.08 [1.80 - 5.25]), and diabetes (20.59% vs 4.17%; OR=8.43 [2.11-33.65]) comorbidities. Treatment contrasts within some comorbidity subgroups revealed superior efficacy of varenicline over other pharmacotherapies. Week 24 abstinence was also higher for those with cardiac conditions taking bupropion compared to placebo (13.64% vs 1.79%; OR=10.64 [1.19-90.36]) and for those with vascular conditions taking NRT compared to placebo (12.78% vs 7.07%; OR=1.87 [1.06-3.27]). All pharmacotherapies increased the odds of abstinence regardless of number of comorbidities. Conclusion: These findings show that varenicline is the most efficacious option for cardiac, pulmonary, vascular, and diabetes patients to quit smoking, supporting recent clinical practice guidelines that recommend varenicline as first line pharmacotherapy. Bupropion and NRT demonstrated efficacy for some comorbidity subgroups as well. The differential effects of these medications are relevant for potential tailored treatment approaches, especially if varenicline is not tolerated.

FUNDING: Federal

POS1-13

EFFECTS OF "ICE" FLAVORED E-CIGARETTES WITH SYNTHETIC COOLING AGENT WS-23 OR MENTHOL ON USER-REPORTED APPEAL AND SENSORY ATTRIBUTES

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Significance: "Ice" flavored e-cigarettes combine standard characterizing flavors with coolants, including the synthetic compound, WS-23, or menthol. This study tested the effect of exposure to flavored e-cigarettes with WS-23 or menthol additives on the appeal and sensory experience of vaping. Methods: Adult current tobacco users (vapers, cigarette smokers, and dual users; N=84) completed a single session, double-blind administration of one standardized puff from various custom manufactured e-cigarette solutions using a pod-style device in randomized sequences. Solutions with tobacco, fruit, and mint flavors were varied according to presence of cooling additives (WS-23 vs. menthol vs. none) in both 2% and 4% nicotine salt formulations. Immediately following each administration, participants rated the solution's appeal and sensory attributes (0-100 visual analogue scale). Results: Participants (mean[SD]=38.6[13.5] years, 52.4% male, 70.2% White; 38.1% dual users) rated EC Flavors with WS-23 (vs. no cooling agent) significantly higher in appeal, liking, willingness to use again, smoothness, and coolness and lower disliking, bitterness, harshness (ps<.005). WS-23 (vs. menthol) solutions were rated significantly smoother (mean difference b=5.42; p=.001) and cooler (b=7.38; p<.001) and less harsh (b=-3.36; p=.045). The effects of cooling agent additives did not significantly differ across fruit, tobacco, or mint; 2% vs. 4% nicotine concentration, or smoking status, indicating generalizability of the effects of synthetic cooling agent across potential covariates. Conclusions: Adding WS-23 to e-cigarettes to create "ice" flavors appear to make the vaping user experience more appealing, regardless if tobacco, fruit, or mint "ice" flavors. WS-23 may provide more desirable sensory attributes than menthol in "ice" flavored e-cigarettes. The current findings may inform the review of premarket tobacco applications of e-cigarette products that contain cooling constituents, including menthol and non-menthol agents like WS-23, and future potential product standards.

FUNDING: Federal

POS1-14

THE ROLE OF EMOTION DIFFERENTIATION IN THE ASSOCIATION BETWEEN MOMENTARY AFFECT AND TOBACCO/NICOTINE CRAVING IN YOUNG ADULTS

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Significance: The use of tobacco and nicotine products by young adults is a key public health priority. Tobacco/nicotine use is commonly initiated during young adulthood, which increases the likelihood of continued use in adulthood and related health problems later in life. Despite interest in tobacco cessation, achieving and maintaining abstinence is difficult among this population. Cravings for tobacco/nicotine are often a barrier to abstinence, which have been associated with intensity of affect (i.e., emotions) at the moment-level. Emotion differentiation is important for emotion regulation and involves the ability to distinguish between discrete emotion states (e.g., sad vs. irritated). Emotion differentiation is a protective factor for nicotine dependence that may also moderate the effect of momentary affect on craving. Method: In a sample of young adults (N = 37, observations = 2020, ages 18-25, 51% female, 78% white) interested in quitting smoking or vaping, we used real-time, naturalistic data capture via mobile phones to examine the interaction of momentary affect and trait emotion differentiation on craving. Participants were prompted with four surveys per day for 35 days and asked to make a 48-hour quit attempt on day seven. Results: Multilevel models showed that moments of higher-than-average negative affect (for that individual) (NA; b = .39, p < .001) and positive affect (PA; b = .26, p = .001) were associated with greater levels of craving. Negative emotion differentiation significantly moderated the associations between PA and craving (b = -.63, p = .031) and NA and craving (b = -.67, p = .003). Conclusion: Findings suggest that for young adults interested in tobacco/nicotine cessation and engaging in a quit attempt, greater ability to differentiate experiences of negative affect (e.g., sad, irritated, stressed) weakens the momentary association between intense affect (PA and NA) and craving. Emotion differentiation is a modifiable factor that may protect against craving and facilitate successful tobacco/nicotine cessation.

FUNDING: Federal

POS1-15

THE FEASIBILITY OF OFFERING INCENTIVES TO PROMOTE SMOKING CESSATION AMONG ADULTS WITH TYPE 2 DIABETES

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Significance: Providing small financial incentives for smoking abstinence increases cessation rates. However, the effectiveness of incentivizing smoking cessation in pop-

ulations with chronic diseases, such as type 2 diabetes mellitus (T2DM) is unknown. The feasibility and potential effectiveness of offering escalating abstinence-contingent financial incentives was evaluated among adults with T2DM initiating tobacco cessation treatment. Methods: Adults with T2DM (N=29) were randomized to contingency management (CM) or usual care (UC) treatment for smoking cessation. Participants completed weekly in-person visits and received a smartphone and remote carbon monoxide sensor to complete twice daily mobile health (mHealth) assessments. Both groups received weekly counseling from 1-week pre-quit date through 4-weeks post-quit date, plus nicotine replacement therapy. CM participants earned gift cards starting at $20 that escalated by $5 per week for biochemically verified abstinence. Both groups earned up to $180 for completing other study assessments. Biochemically-verified abstinence was assessed at the final 4-week post-quit visit. Participants completed exit surveys to assess satisfaction with the program. Results: Participants were predominantly female (69.0%, n=20) and White (65.5%, n=19), and the mean age was 53.8 (SD=10.3) years. Retention was slightly higher in the CM group, with 85.7% completing the final 4-week post quit visit compared to only 73.3% of the UC group. On average, CM participants completed 58.3% of the twice-daily assessments compared to 50.6% in the UC group. Cessation rates were lower in the CM group compared to UC in both per protocol (33.0% vs 63.6%) and intention-to-treat (28.6% vs 46.6%) analyses, although the differences were not statistically significant. Average total compensation was $268 for the CM group compared to $213 for UC. Overall, 87.5% of participants reported the smartphone as "very easy" or "easy" to use. Participants also reported ease of use for the study application (87.5%) and remote carbon monoxide sensor (95.8%). Conclusion: Escalating financial incentives did not result in higher quit rates for the CM group; however, total compensation was high in both groups. Participation and quit rates were high overall, suggesting that incentives may not need to be contingent upon abstinence to increase program engagement and smoking cessation among adults with T2DM.

FUNDING: Federal; State; Nonprofit grant funding entity

POS1-16

EFFECTS OF PROACTIVE TOBACCO TREATMENT IN A CERTIFIED COMMUNITY BEHAVIORAL HEALTH CLINIC

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Significance: Tobacco dependence is a chronic disease. This is especially true of people with mental illness who have a high prevalence of tobacco use. Chronic care models recommend health systems implement multidisciplinary teams to assess tobacco use, administer treatment, support patient self-management, and monitor progress. Proactive telephone outreach to people who smoke and brief provider-delivered interventions are two effective chronic disease management practices. Certified Community Behavioral Health Clinics (CCBHCs) are a primary treatment access point for many people with SMI. However, CCBHC providers rarely address smoking. Feasibility and effectiveness of chronic disease management strategies for tobacco use disorder in CCBHCs is not known. Methods: We conducted a pilot, single arm, type 2, hybrid implementation-effectiveness study evaluating a chronic care tobacco cessation intervention delivered in a CCBHC. The intervention combined provider-delivered 5As for tobacco cessation with longitudinal proactive outreach (3 outreach calls over 6 months to offer and connect patients to telephone counseling and cessation medication). We assessed client treatment utilization and smoking abstinence via surveys and administrative records at enrollment, baseline (3 months post enrollment), and at 3, 6, and 12 months (12-month data complete in November 2022) post-baseline. Results: 49 CCBHC clients enrolled (65% Female, 90% White; *M* motivation to quit 5.06/10, *SD*=2.75). 90% of participants received an outreach call. During outreach calls, 43% requested counseling and 27% requested medication. 4% of participants reported abstinence at baseline. 92% of participants completed the 6-month survey. Of those 8.3% of participants self-reported 7-day point prevalence abstinence; participants reported a mean reduction of cigarettes per day of 4.07 (SD=9.45, 26% reduction from baseline); and 63% made a quit attempt. Conclusions: Providing chronic care for tobacco cessation in a CCBHC was feasible and increased tobacco treatment utilization and smoking cessation attempts. Clients were successfully reached via proactive calls and many requested and received tobacco cessation treatment, reduced smoking, and made quit attempts. Smoking abstinence rates were modest but increased compared to baseline. Chronic care interventions have the potential to reduce tobacco use in CCBHCs and should be tested in full-scale clinical trials.

FUNDING: Federal

POS1-17

TOBACCO-CANNABIS CO-USE AMONG CANCER PATIENTS AND SURVIVORS: FINDINGS FROM TWO US CANCER CENTERS

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Introduction: Cannabis use is prevalent among cancer patients and survivors and may provide therapeutic benefits for cancer-related symptoms. However, any therapeutic benefits may be attenuated when co-used with tobacco, as co-use is associated with more severe tobacco and cannabis use patterns and adverse health outcomes in non-cancer populations. There is limited information on the initiation of cannabis use for medical or non-medical purposes in proximity to cancer diagnosis, patterns, or reasons for use among patients that do and do not smoke cigarettes. The current analysis describes cannabis use characteristics among cancer patients and survivors co-using tobacco across two United States (US) cancer centers. Methods: Survey data were collected at 1) Hollings Cancer Center at the Medical University of South Carolina (MUSC, Charleston, SC), and 2) Roswell Park Comprehensive Cancer Center (RP, Buffalo, NY). Sites recruited cancer patients or survivors age 18+ using probability sampling methods from patient lists. Respondents were categorized as: current (daily and non-daily), former, or never cigarette smokers, given that cigarettes are the most prevalent tobacco product among this population. Prevalence of cannabis use was compared across tobacco groups: 1) prior to cancer diagnosis, 2) since diagnosis, 3) during cancer treatment, and 4) after treatment. Primary mode of cannabis use, and medical vs. non-medical (recreational) use, were also compared by group. Chi-square tests were used on weighted data within each site to compare outcomes by tobacco use. Results: At both sites (MUSC=1018, RP=785), participants tended to be female and White; 11.6% of MUSC and 5.2% of RP patients identified as Black/African American, and 2.0% of MUSC and 3.3% of RP patients identified as Latinx/Hispanic. Weighted current cigarette smoking prevalence was similar between sites (MUSC=7.6%, RP=8.9%), with greater differences in rates of former (MUSC=38.3%; RP=47.0%) and never (MUSC=54.1%, RP=44.1%) smoking. At both sites, current tobacco use was associated with greater rates of cannabis use prior to diagnosis, since diagnosis, during treatment, and after cancer treatment (all *ps*<0.001). In addition, smoked cannabis was the most common mode of consumption and there was greater endorsement of cannabis for both medical and non-medical indications (all *ps*<0.001). Conclusions: Across two US cancer centers, results showed that cannabis use is more common among patients and survivors continuing to use tobacco. These data have implications for cancer care delivery, as those using tobacco may be more likely to initiate cannabis use after diagnosis, and based on previous literature, may use more cannabis and have more difficulty quitting tobacco. Co-use of cannabis and tobacco among cancer patients and survivors represents an urgent cancer care priority.

FUNDING: Unfunded; Federal; Academic Institution

POS1-18

PSYCHOMETRIC PROPERTIES OF MEASURES FOR ELECTRONIC CIGARETTE DEPENDENCE

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Background: Measures designed to assess electronic cigarette (ECIG) dependence are largely adapted from those developed for cigarette smoking. Moreover, extant work evaluating their psychometric properties often relies on samples of ECIG users who are concurrent cigarette smokers. The present study evaluated such properties of four dependence measures among former smoking exclusive ECIG users. Methods: Respondents (N=196) were, on average, 34.2 (*SD* = 8.6) years of age, and predominately white (88.3%) and female (57.1%). They also were regular ECIG users [6.95 (0.25) days/week for 4.29 (2.65) years] who had quit smoking cigarettes 3.20 (3.40) years ago. Four dependence measures were completed online, and mean scores on each were indicative of moderate dependence levels: 11.07 (4.41) for the Penn State Electronic Cigarette Dependence Index (PSECDI), 2.22 (0.94) for the E-Cigarette Dependence Scale (EDS-4), 16.41 (8.68) for the Glover Nilsson Behavioral Questionnaire (GNBQ), and 5.56 (8.68) for the Diagnostic and Statistical Manual 5th Edition (DSM-5). Results: Most inter-item correlations [mean *r's* = .25 (DSM-5) to .53 (EDS-4)] and all item-total correlations [mean *r*'s = 0.52 (DSM-5) to 0.81 (EDS-4)] were significant for all four measures. Internal consistency was highest for the EDS-4 (Cronbach's alpha=.89) followed by the GNBQ (.79), PSECDI (.74), and DSM-5 (.71). Age of ECIG initiation was correlated negatively with scores on the EDS-4 (r=-.15, p < .05) and DSM-5 (r=-.22, p < .05), while number of ECIG quit attempts was correlated positively with scores on all measures (*r's* = .31 to .36, *p's* < .05) except the GNBQ. Convergent validity was highest for comparisons between the

GNBQ and DSM-5 (*r*=0.97) though all comparisons were significant (*r*'s= 0.59 to 0.74, *p*'s <.001). Confirmatory factor analysis revealed a single factor structure for all four measures (all items loaded significantly onto one factor), and fit indices were adequate for all models. Conclusions: All four measures demonstrated acceptable reliability and validity, similar to our previous work with never-smoking ECIG users. Still, as different aspects of dependence (e.g. physiological, behavioral, social) were represented across these measures, additional work is needed to develop a single, comprehensive measure of ECIG dependence.

FUNDING: Federal; Academic Institution

POS1-19

IMPACT OF IMPLEMENTING A DECREASE IN THE BEHAVIORAL TREATMENT WINDOW ON REAL-WORLD EFFECTIVENESS OF A MATERNAL SMOKING CESSATION PROGRAM

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Significance: Smoking during pregnancy adversely affects perinatal outcomes for both women and infants. Maternal demographics and baseline smoking influence women's odds of quitting while pregnant and remaining abstinent after the initial quit. However, how these factors and the initial cessation length affect relapse is poorly understood. This retrospective cohort study of the Comprehensive Tobacco Treatment Program (CTTP) at Loma Linda University Health from 2012 to 2019 was designed to determine the real-world program effectiveness, the protective factors for abstinence, and the effects of changing the case definition of having quit. Methods: Women living in San Bernardino County, California, who smoked during pregnancy were enrolled in an intensive multicomponent behavioral smoking cessation program following the five A's: Asking about cigarette use, Advising to quit, Assessing willingness to quit, Assisting with quitting, and Arranging for follow-up (Fiore, 2008; Guerby et al., 2020). Abstinence, initially defined as eight weekly negative urinary cotinine levels, was changed to six in the last two years. Phone follow-up at six months post-intervention was used to determine seven-day point prevalence abstinence. Results: By program end 40.1% of participants achieved abstinence. With intention-to-treat analyses, the reported seven-day point prevalence abstinence rate at six-month follow-up was 36.7%. Older participant age, Hispanic ethnicity, fewer cigarettes smoked at enrollment, and abstinence at program end each increased the odds of seven-day point prevalence abstinence on follow-up. Conclusion: Smoking cessation early in pregnancy improved abstinence. Reducing the measurement of abstinence at program end by two weeks increased initial abstinence but had no effect on abstinence by six-month follow-up. The findings suggest that a programmatic focus on an early quit may have more long-term benefit than a focus on a sustained quit. In addition, the particular success of Hispanic women in quitting smoking during pregnancy warrants further research.

FUNDING: Federal; State; Nonprofit grant funding entity

POS1-20

ASSOCIATIONS BETWEEN LGBQ IDENTITY, E-CIGARETTE USE, AND E-CIGARETTE DEPENDENCE IN YOUNG ADULTS

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Significance: The Lesbian, Gay, Bisexual, and Queer (LGBQ) community has been the target of tobacco industry predatory marketing practices and smoking is integrated into LGBQ culture and identity. LGBQ young adults and adults have high smoking rates but it is unclear to what extent e-cigarette use is associated with LGBQ identity. The objective of this study was to examine the association between LGBQ identity and e-cigarette dependence and use. Methods: An online survey was administered to young adults (18-25 years old) who self-identified as lesbian, gay, bisexual, or queer, who had used an e-cigarette product in the last 30 days, and owned their e-cigarette. The Lesbian, Gay, Bisexual Identity Scale (LGBIS) (subscales: internalized homonegativity, acceptance concerns, concealment motivation, identity uncertainty, difficult process, identity affirmation, identity superiority, and identity centrality) was used to assess LGBQ identity and the Penn State Electronic Cigarette Dependence Index was used to assess e-cigarette dependence. We also assessed the number of days electronic cigarettes and other tobacco products were used. Participants were recruited through electronic distribution lists, social media postings, and PROLIFIC. Logistic and linear regressions examined the association between LGBIS subscales and e-cigarette dependence and past 30 day use, controlling for gender identity, race/ethnicity, age, education, other tobacco use, and number of friends who use e-cigarettes. Results: Participants (n=241; mean age = 22 years old, SD=2.05) were mainly white (84%), female (54%), and non-Hispanic (80%). Participants identified as gay (10%), lesbian (17%), bisexual (60%), and queer (14%). Most (75%) used e-cigarettes 26-30 days in the last 30 days. LGBIS subscales were not significantly associated with e-cigarette use. However, linear regression results showed a statistically significant relationship between the LGBIS and e-cigarette dependence, R^2 = 0.148, F (20, 221) = 1.687, p = .038. The Identity Superiority subscale was significantly and positively associated with dependence (B=.227, p=.017) and the Identity Centrality subscale had a significant negative association with dependence (B=-.320, p=.005). Conclusions: In contrast to previous research with cigarettes, LGBQ identity was not associated with e-cigarette use but was linked to dependence on e-cigarettes. E-cigarettes may play a different role in LGBQ identity than cigarettes.

FUNDING: State; Academic Institution

POS1-21

EXAMINING RACIAL/ETHNIC DIFFERENCES IN TOBACCO DEPENDENCE TREATMENT AMONG MEDICAID BENEFICIARIES USING FIFTY STATE MEDICAID CLAIMS 2009-2014

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Significance: In the US, low-income racial/ethnic minorities experience higher smoking rates and greater burden from smoking-related diseases than their White counterparts. Despite the adverse effects, racial/ethnic minorities are less likely to access Tobacco Dependence Treatment (TDT). Medicaid is one of the largest payers of TDT and covers predominantly low-income populations. It is unknown the extent of TDT use among beneficiaries from distinct racial/ethnic groups. The objective of our study is to estimate racial/ethnic differences in TDT access among adult Medicaid fee-for-service beneficiaries. Methods: Using a retrospective study design and Medicaid Claims data (2009-2014) for all 50 states, including the District of Columbia, we specified multivariable linear probability regression models to estimate rates of TDT use among Medicaid fee-for-service beneficiaries by race/ethnicity. The analytic sample consisted of adults (18-64) who were identified as White (n=6,536,004), Black (n=3,352,983), Latinx (n=2,264,647), Asian (n=451,448), Native American/ Alaskan Native (NA/AN, n= 206,472) who were enrolled in Medicaid =11 months in any given year between January 2009-December 2014. Dichotomous outcomes reflected TDT service use in the past year. The primary outcome, any TDT use, was operationalized as any smoking cessation medication fill, any smoking cessation counseling visit, or any smoking cessation outpatient visit. In secondary analyses, we disaggregated our primary outcome into three separate variables. Any smoking cessation medication fill consisted of FDA-approved medications for smoking cessation: bupropion, varenicline, or nicotine replacement therapy. Any smoking cessation counseling was defined using CPT codes for individual smoking cessation counseling, group smoking cessation counseling, and smoking cessation classes. Any smoking cessation outpatient visit was defined as an outpatient visit with a primary ICD-9 diagnosis of nicotine dependence or nicotine withdrawal. Regression models adjusted for chronic conditions, TDT coverage, age, sex, and state and year fixed effects. Results: In unadjusted and adjusted results, beneficiaries identified as Black, Latinx, Asian, and NA/AN had lower rates (p<0.001) of TDT use compared to White beneficiaries (11%, 10%, 4%, and 14% versus 21%, respectively). This finding was consistent across all study outcomes. Conclusions: Our results are consistent with prior research that has found racial/ethnic disparities in both physical and mental health service use. Racial/ethnic minorities experience numerous barriers to TDT besides health insurance access such as costs, health literacy, and institutional/interpersonal racism. Efforts are needed to better inform racial/ethnic minorities of TDT benefits and provide them with equitable and culturally sensitive smoking cessation care.

FUNDING: Federal

POS1-22

CIGAR SMOKING INTENSITY: ASSOCIATIONS WITH DEMOGRAPHICS, TOBACCO USE, AND BIOMARKERS OF EXPOSURE AMONG PREDOMINANT AFRICAN AMERICAN COMMUNITIES

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Background: Cigar smoking remains common in the US, particularly among Black or African American (AA) individuals, placing them at high risk of tobacco-related disease and death. Tobacco use intensity predicts negative health effects and biomarkers of harm. While previous research has explored cigarette-related associations, limited attention has been paid to cigar smoking intensity (CSI). A better understanding of CSI could inform efforts to address cigar-related health inequities. Methods: In 2018-2019, a sample of past 30-day cigar smoking (n=112) adults residing in Central Virginia completed a survey and provided saliva for cotinine and c-reactive protein (CRP) measurement. The survey included demographics and tobacco use behaviors. CSI was indexed by cigar use days in the past 30 multiplied by average cigars/day and was summed across cigar types (cigarillo/filtered cigars and traditional cigars). Bivariate correlations explored associations among self-report factors, biomarkers, and CSI. Linear regressions predicting CSI controlling for age and significant bivariate factors were performed (IBM SPSS V.27; p<0.05). Results: Most participants were AA (97%), female (63%), middle-aged (mean [SD]=32 [10.8] years), spent $1-$20/week on cigars (66%), and smoked their first cigar <1 hr after waking (67%). Median CRP and cotinine levels were 747 pg/mL and 249 ng/mL, respectively. In the past 30 days, 96% smoked cigarillos/filtered cigars (13.8 [11.1] days; 6.1 [9.8] cigars/day) and 21% smoked traditional cigars (5.7 [6.8] days; 3.1 [4.7] cigars/day). CSI correlated significantly with cotinine (r=0.232), time to first cigar (r=0.313), cigar spending (r=0.386), and past 30-day cigarette use (r=0.231). In regression analyses, CSI was positively associated with shorter time to first cigar (b=0.121), greater cigar spending (b=0.225), and past 30-day cigarette use (b=0.297). Conclusion: Findings from this unique sample suggest that CSI was related to dependence measures and purchasing behavior. Associations with biomarkers were less consistent but deserve further exploration. This work supports use of CSI to understand the impact of tobacco control efforts. Policy makers and those focused in prevention/intervention efforts should acknowledge factors associated with CSI among AA smokers, as such efforts could further assist with lowering tobacco-related disease morbidity and mortality among this group.

FUNDING: Federal

POS1-23

PROSPECTIVE ASSOCIATIONS OF SEXUAL IDENTITY AND TOBACCO USE IN A NATIONALLY REPRESENTATIVE SAMPLE: MEDIATION BY INTERNALIZING AND EXTERNALIZING SYMPTOMS

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Significance: While the overall prevalence of tobacco use has declined considerably in the U.S., tobacco use among gay-, lesbian-, or bisexual-identified individuals has remained disproportionately higher than for heterosexual-identified individuals, with bisexual females bearing the greatest risk. Identifying mechanisms behind these disparities can inform prevention and cessation efforts aimed at advancing health equity. Grounded in minority stress theory, this study examines whether internalizing and externalizing symptoms mediate the risk for tobacco uptake among sexual minority individuals. Methods: Data were from waves 4 and 5 of the Population Assessment of Tobacco and Health (PATH; 2016-19) adolescent and adult surveys. The study population was restricted to individuals aged 14 and older who were not using tobacco at wave 4 (n=21,676). Our primary outcome was tobacco use at wave 5 (approximately 2 years later). Sexual identity was categorized as heterosexual, gay/lesbian, bisexual, or "something else." Multivariable logistic regression assessed whether sexual identity was associated with tobacco use at wave 5, controlling for age, race, ethnicity, region, and transgender identity. Mediation analyses assessed whether internalizing and externalizing symptoms contributed to tobacco use at wave 5 for each sexual identity subgroup. All analyses were stratified by sex and weighted to account for sample design and attrition. Results: Among females who were non-users at wave 4, gay/lesbian (aOR=1.90; 95% CI=1.10,3.28) and bisexual females (aOR=1.66; 95%CI=1.33,2.07) had significantly greater odds of tobacco uptake at wave 5 compared to heterosexual females. For bisexual females, 27% of this association was attributable to high internalizing and externalizing symptoms at wave 4. Among males who were non-users at wave 4, males who reported their sexual identity as "something else" had lower odds of tobacco uptake at wave 5 compared to heterosexual males (aOR=0.19; 95% CI:0.09, 0.41); this association was not mediated by internalizing and externalizing symptoms. Discussion: These findings, from a prospective nationally representative cohort, suggest that internalizing and externalizing symptoms contribute to elevated tobacco use among sexual minority individuals, particularly for bisexual females. Strategies that reduce minority stressors and resulting psychological distress may have an impact on reducing tobacco use disparities and related health consequences.

FUNDING: Federal

POS1-24

CHANGES IN SUBSTANCE USE TREATMENT PROVIDERS' DELIVERY OF THE 5AS FOR NONCIGARETTE TOBACCO USE IN THE CONTEXT OF THE IMPLEMENTATION OF A COMPREHENSIVE TOBACCO-FREE WORKPLACE PROGRAM

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Significance: Tobacco use treatment is not prioritized in substance use treatment centers (SUTCs), contributing to health inequities for tobacco users with non-nicotine addictions. A growing literature shows that the adoption of tobacco-free workplace programs (TFWPs) can affect providers' behavior in addressing patients' conventional cigarette smoking in SUTCs; however, limited research exists on how TFWPs may affect their intervention on patients' use of noncigarette tobacco (e.g., e-cigarette, smokeless tobacco). The current study redresses this gap and assesses how changes in theory-based SUTC provider factors may moderate delivery of the 5As (asking patients about their tobacco use, advising them to quit, assessing their willingness to quit, assisting them in quitting, and arranging for follow-up) for noncigarette tobacco use in the context of a TFWP implementation. Methods: Overall, 15 Texas SUTCs (serving 82,927 patients/year) participated in a TFWP. Their providers answered survey questions before and after TFWP implementation (pre n=259, post n=194) that included tobacco use intervention training. Items assessed were provider factors encompassing their beliefs in concurrently treating tobacco use disorder and non-nicotine substance use disorders, self-efficacy to deliver a tobacco use assessment (TUA), barriers to treating tobacco dependence, receipt of tobacco intervention training, and past-month administration of the 5As for noncigarette tobacco use. Generalized linear or linear mixed models assessed center-level changes in 5A delivery and provider factors. Changes in center-level 5A delivery based on low vs high changes in provider factors were assessed with interaction terms. Results: Providers' delivery of the 5As for noncigarette tobacco use increased with the TFWP, significantly for ask, assist, and arrange, with improvements in each provider factor (*ps*<0.04). SUTCs with greater changes in the expected direction for providers' beliefs had significantly greater odds of advising, assessing, assisting, and arranging; and SUTCs with greater barrier reductions had higher odds of advising and assisting, than SUTCs with fewer changes in those provider factors (*ps*<0.05). Conclusion: TFWPs designed to alter providers' beliefs about concurrently treating tobacco use and non-nicotine substance use, improve self-efficacy for TUA delivery, and reduce barriers to intervention through training can improve the provision of the 5As for patients' noncigarette tobacco use in SUTCs. SUTCs with the greatest room for improvement in provider beliefs and barriers to tobacco use care may benefit the most from TFWPs in terms of brief interventions for patients' noncigarette tobacco use.

FUNDING: Federal; State

POS1-25

DISPARITIES IN E-CIGARETTE HARM AND ADDICTION PERCEPTIONS AMONG ADOLESCENTS IN THE UNITED STATES: A SYSTEMATIC REVIEW

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Significance: The health disparities due to e-cigarette use are now becoming apparent among US adolescents. Perceptions of e-cigarette harm and addiction play an important role in understanding adolescent' e-cigarette use behavior. The objective of this systematic review is to examine the racial/ethnic and socio-economic disparities in e-cigarette harm and addiction perceptions among US adolescents. Methods: We searched five databases to identify cross-sectional or longitudinal studies that focused on adolescents (=18 years of age) who were ever, current, or never users of e-cigarettes, and examined association of race/ethnicity and/or socio-economic status (SES) with e-cigarette harm and/or addiction perceptions. Two co-authors independently identified relevant studies, extracted data, and assessed the risk of bias. Results: Adhering to PRISMA 2020 guidelines, eight of the 226 studies met the inclusion criteria. These eight studies examined either relative perceptions of harm and/or addiction of e-cigarettes compared to traditional cigarettes or absolute perceptions of harm and/or addiction of only e-cigarettes by race/ethnicity. Two of these eight studies also assessed these perceptions by SES. Our results indicate that the relative e-cigarette harm perceptions among US adolescents varies by race/ethnicity, with Non-Hispanic White adolescents being more likely to perceive e-cigarettes as less harmful than traditional cigarettes compared to most other racial/ethnic groups. However, no clear pattern of racial/

ethnic and socio-economic differences in absolute e-cigarette harm and/or addiction perceptions and relative e-cigarette addiction perception was reported. Conclusion: This review highlights the need for more research to explicitly assess perceptions of harm and addiction of e-cigarettes among US adolescents by race/ethnicity and SES. Our findings will be useful to develop sub-group appropriate public health messages that acknowledges the harm and addiction risks of e-cigarettes and ensure that e-cigarettes do not widen existing tobacco-related disparities.

POS1-26

SOURCES OF TOBACCO SMOKE EXPOSURE AND THEIR ASSOCIATIONS WITH SERUM COTININE LEVELS AMONG U.S. CHILDREN AND ADOLESCENTS

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Significance: While tobacco smoke exposure has declined over time in the U.S., racial/ethnic disparities in exposure trends have remained stable among U.S. children and adolescents over time. We assessed tobacco smoke exposure levels based on private and public locations of tobacco smoke exposure according to race/ethnicity among U.S. school-aged children ages 6-11 years and adolescents ages 12-17 years. Methods: Data were from 5,296 children and adolescents who participated in the National Health and Nutrition Examination Survey (NHANES) 2013-2018. Racial/ethnic groups were non-Hispanic White, Black, Other/Multiracial, and Hispanic. NHANES assessed serum cotinine and the following tobacco smoke exposure locations: homes and whether the smoker did not smoke indoors (home thirdhand smoke (THS) exposure proxy) or smoked indoors (secondhand (SHS) and THS exposure proxy), cars, in other homes, restaurants, or any other indoor area. We used stratified weighted linear regression models by racial/ethnic groups and assessed the variance in cotinine levels explained by each location within each age group. Results: Among 6-11-year-olds, exposure to home THS only and home SHS+THS predicted higher cotinine levels among all racial/ethnic groups. Non-Hispanic White children exposed to car tobacco smoke had higher cotinine levels (ß=1.64, 95%CI=0.91-2.37) compared to those unexposed. Non-Hispanic Other children exposed to restaurant tobacco smoke had higher cotinine (ß=1.13, 95%CI=0.23-2.03) compared to those unexposed. Among 12-17-year-olds, home tobacco smoke exposure predicted higher cotinine levels among all racial/ethnic groups, except for non-Hispanic Black adolescents. Car tobacco smoke exposure predicted higher cotinine levels among all racial/ethnic groups. Non-Hispanic Black adolescents with tobacco smoke exposure in another indoor area had higher cotinine (ß=2.84, 95%CI=0.85-4.83). Conclusion: Location of tobacco smoke exposure was uniquely associated with cotinine levels, with home tobacco smoke exposure significantly contributing to cotinine levels among school-aged children 6-11 years old and car tobacco smoke exposure significantly contributing to cotinine levels among adolescents 12-17 years old. Racial/ethnic differences in sources of tobacco smoke exposure were observed among each age group. Smoke-free home and car legislation is needed to reduce tobacco smoke exposure among children and adolescents of all racial/ethnic backgrounds.

FUNDING: Federal

POS1-27

DISPARITIES IN JOINT TRAJECTORIES OF CIGARETTE AND E-CIGARETTE USE ACROSS SEXUAL ORIENTATION GROUPS OF YOUNG ADULT MEN AND WOMEN IN THE US

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Significance. Disparities in tobacco use prevalence continue to impact sexual minority young adults (SMYAs). Cigarettes and e-cigarettes are the most popular tobacco products used by YAs. Research is needed to identify longitudinal trajectories of cigarette and e-cigarette use in subgroups of SMYAs. Methods. We analyzed data from 2,809 men (n=1,235; M_{age}=25.5; 8.0% bisexual, 12.7% gay; 36.4% racial/ethnic minority) and women (n=1,574; M_{age}=24.64; 23.8% bisexual, 5.9% lesbian; 35.3% racial/ethnic minority) in a 2-year, 5-wave longitudinal study (2018-2020), including wave 1 demographics and waves 1-5 past 6-month cigarette and e-cigarette use days. We conducted repeated measures latent profile analysis to identify profiles of cigarette and e-cigarette use trajectories, then multinomial logistic regression analyses controlling for age, race/ethnicity, and city of residence, among men and women, separately. Results. Six profiles were identified: stable low-level (LL) cigarette and e-cigarette use (66.6%), stable LL cigarette use and either high-level (HL; 12.2%) or decreasing (6.2%) e-cigarette use, stable mid-level (ML) cigarette use with LL e-cigarette use (6.2%), stable HL cigarette use with LL e-cigarette use (4.5%), and decreasing HL cigarette use and stable HL e-cigarette use (4.2%). Using stable LL cigarette and e-cigarette use as the referent group, gay (vs. heterosexual) men less likely displayed stable LL cigarette with stable HL e-cigarette use, and bisexual (vs. heterosexual) women more likely displayed: a) stable LL cigarette with stable HL e-cigarette use; b) stable LL cigarette with decreasing HL e-cigarette use; or c) stable HL cigarette with stable LL e-cigarette use. There were no differences between heterosexual and bisexual men or heterosexual women and lesbian women, respectively, on any use trajectories. Conclusions. Bisexual women displayed problematic trajectories (i.e., continued HL cigarette or e-cigarette use, e-cigarette experimentation). Few differences emerged among subgroups of men. Tailored interventions and messaging campaigns could curtail tobacco-related disparities among SMYA men and women, particularly bisexual women.

FUNDING: Federal

POS1-28

UNDERSTANDING THE PERSPECTIVES OF LATINO SMOKERS ON PHYSICAL ACTIVITY: A QUALITATIVE STUDY

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Introduction: Smoking and sedentarism frequently co-occur among Latinos. Evidence suggests that moderate to vigorous physical activity (MVPA) may enhance smoking cessation rates. However, this synergistic phenomenon has not been studied among Latinos, the largest minority group in the U.S. Objective: To understand the perspectives of Latino smokers on physical activity. Methods: Participants were recruited using community-based recruitment strategies. Semi-structured interviews were conducted in English and Spanish with Latino smokers. The Health Belief Model was used as a framework for qualitative theoretical analysis. Results: At baseline, participants' mean age was 54.9 years old (SD 12.1), 50% of the participants were female, and 85% self-identified as heterosexual or straight. Eight participants (40%) indicated their language of preference as "Only Spanish" and 50% were born in Cuba and the Dominican Republic (25% for each country). Most participants (70%) were light smokers (1-10 cigarettes per day), 35% smoked their first cigarettes within five minutes after waking up, and 50% used menthol cigarettes. We identified perceived benefits (e.g., mood management, weight loss, strategy to quit smoking), susceptibility (e.g., risk of cardiovascular diseases and physical impairment, susceptibility to weight gain), and barriers (e.g., lack of social support, health constraints, and low financial resources) of being physically active. Moreover, we identified cues to action to do physical activity (e.g., being a role model: "?I'm going to do it [physical activity] so she [the daughter] can do it too?"; spending time with family and friends: "Well, since I have some little nephews and some little nieces... I go with them to the playground?"; being outdoors: "?go to the parks a lot or go nature walking? being out in the woods? taking all of nature? I?would go down to [local towns in New York] on my bicycle?"). Conclusion: Multiple perceived factors of being physically active were identified among Latino smokers. These factors provide concrete operational strategies to address smoking cessation and physical activity among Latinos. Further research is needed on how best to integrate these perspectives into smoking cessation interventions.

FUNDING: Nonprofit grant funding entity

POS1-29

ASSOCIATION BETWEEN PSYCHOSOCIAL FACTORS AND CO-MORBID HEAVY CIGARETTE SMOKING AND ALCOHOL USE IN A HOMELESS POPULATION

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Significance: The prevalence of combustible cigarette smoking in homeless populations in the United States is about five times that of the general adult population. The psychosocial well-being of cigarette smokers experiencing homelessness is poorer if they also are heavy drinkers. PTQ 2 was a randomized clinical trial among people experiencing homelessness who were also current cigarette smokers and heavy drinkers. Current analysis therefore examined the baseline relationship between psychosocial factors and heavy combustible cigarette and alcohol consumption comorbidity among participants in the PTQ 2 study. Methods: Secondary data analysis of associations among psychosocial variables (anxiety, depression, hopelessness, social network size), heaviness of

cigarette smoking (cigarettes/day; CPD) and alcohol consumption (drinking days/month and number of drinks/drinking day) were estimated using Spearman correlation for continuous variables and t-tests or F-tests for categorical variables. Results: Among the 432 participants, a majority were males (75%), Blacks (71%), non-Hispanics (94%), and had a mean age of 46 years (SD = 12). Heaviness of smoking and alcohol consumption were not significantly correlated. However, heaviness of smoking was positively correlated with social network size (r = 0.15, p = 0.002). Heaviness of drinking was positively correlated with the Mini International Neuropsychiatric Interview (MINI) anxiety score (r = 0.11, p = 0.024), and also associated with frequency of homelessness (mean total number of drinks past 30 days among those experiencing homelessness once vs. > time: 30 vs. 44, p = 0.019). Conclusion: Findings indicate that anxiety and social networks are particularly important psychosocial factors to consider when addressing co-morbid heavy drinking and smoking among adults experiencing homelessness.

FUNDING: Federal

POS1-30

BIVARIATE CHOROPLETH MAP DISPLAYING DENSITY OF TOBACCO RETAILERS BY URBAN-RURAL STATUS IN FLORIDA AND THEIR CORRELATION WITH TOBACCO USE AMONG ADULTS AND YOUTH

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Background: Research shows that people living in rural areas as well as people living in areas with a high density of tobacco retailers are more likely to use tobacco products. We created a bivariate map to look at the correlation between tobacco retailer density and urban-rural status among Florida counties. The map includes layers of graduated symbols displaying various tobacco use rates for adults and youth to look at correlation with density by urban-rural status. Methods: Tobacco retailer data was downloaded from countertools.org. There were 25,138 retailers compiled for Florida. The data includes the county in which each retailer is located. This information was used to find the density (per 1,000 adults) of tobacco retailers in each county. Population data from the Florida Legislature's Office of Economic and Demographic Research's (EDR) midyear population estimates were used for calculating density. Density ranged from 0.53 to 3.3 stores. Density was placed into 3 groups of equal range to show low to high retail store density. The 2013 National Center for Health Statistics (NCHS) Urban-Rural classification scheme was used. The NCHS classification is made up of 6 groups: large central metro, large fringe metro, medium metro, small metro, micropolitan and non-core. For this map six groups were placed into three groups: urban, small metro and rural. County level data from the 2019 Florida Behavioral Risk Factor Surveillance System (BRFSS) and 2020 Florida Youth Tobacco Survey (FYTS) were used to create the map layers showing tobacco use among adults and youth. Esri ArcMap 10.8 was used to create the 9-class bivariate map showing the urban-rural groupings combined with low to high retail store density. Layers with graduated symbols were included to show rates of current cigarette use, current e-cigarette use and smokeless tobacco use. Results: The counties were classified as 23 rural, 28 small metro and 16 urban. For retail density 21% of the counties were high density, 46% were medium density and 33% were low density. Among rural counties 39.2% were high density and 13% were low density. 14.3% of small metro counties were high density, 46.4% were low density. Only 1 urban county was considered high density. 37.5% were low density. High density counties were often more likely to have higher rates of current cigarette smoking and e-cigarette use. Conclusions: Bivariate maps can be useful tools to use in public health decision making.

FUNDING: State

POS1-31

ARE WOMEN MORE DEPENDENT ON SMOKELESS TOBACCO? EVIDENCE FROM BETEL QUID USE IN BANGLADESH

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Background: Betel quid is the fourth most common psychoactive habit globally after tobacco, alcohol, and caffeine beverages. Betel quid dependency has become a global public health concern due to its adverse health consequences. Many studies have been carried out globally and regionally on tobacco and betel quid use. While smoking tobacco is less common among women in Bangladesh, the smokeless tobacco especially betel quid (BQ) use is very common in women of rural areas. However, in Bangladesh, a few studies have been conducted particularly on betel quid dependency among women. Objectives The objective of the proposed study would be to assess the factors associated with the use of non-smoke tobacco, especially the use of betel quid, focusing on the gender aspect and understanding the dependency on betel quid among users. Methodology The study uses the data collected from 4800 respondents in Bangladesh. Tobacco and betel quid (BQ) use rates and dependency scores have been estimated for the sample respondents. This study uses that dataset to measure dependency and factors associated with the use of betel quid dependency. Special emphasis is given to the gender aspect as in Bangladesh, betel quid use is more prevalent among women. While determinants and factors associated with betel quid use are estimated with the logit model, the dependency is measured with the betel quid dependency scale (a well-tested scale specifically used for measuring dependency). Findings Contrary to the well-established belief, the female tends to be more dependent on tobacco when it comes to BQ uses. Knowledge about the negative impacts does not play a positive role here, even though educated people tend to be less dependent on BQ. Moreover, individuals with high incomes tend to be more dependent. In addition, regional variations are observed. Conclusion: Even though generally it is believed that male has more dependency on tobacco, this study finds that women are more dependent on betel quid. Since betel quid consumption is socially acceptable in Bangladesh, women tend to use it more compared to other forms of tobacco use (e.g., smoking). Even though cigarette prevalence is low among Bangladeshi women, betel quid use is posing a greater risk among them which sometimes gets unnoticed.

FUNDING: Federal

POS1-32

CATEGORIZING E-LIQUID FLAVORINGS AND OTHER INGREDIENTS USING A NOVEL INGREDIENT WHEEL

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Significance: Many combinations of flavoring chemicals are added to e-liquids to make them more attractive in taste and smell. Although other studies have categorized e-liquids by labelled flavor, we chemically analyzed e-liquids to develop a novel "Ingredient Wheel." This wheel provides a method for e-liquid product analysis which may contribute to classifying and regulating e-liquid products. Methods: E-liquids (n = 109; nicotine free, free-base, and nicotine salts) purchased from tobacco specialty stores were analyzed for ingredients by gas chromatography-mass spectrometry (GC-MS) and National Institute of Standards and Technology (NIST) library compound matching. Ingredients were defined and categorized by International Union of Pure and Applied Chemistry (IUPAC) name, common name, Chemical Abstracts Services (CAS) number, Flavor Extract Manufacturers Association (FEMA) Flavor Ingredient Library number, the Good Scents System, and other descriptors if available. Because chemical functional groups impart different flavors and smells in the e-liquids, the ingredients were categorized by chemical functional groups. A novel Ingredient Wheel was developed to organize reporting of e-liquid ingredients. A functional test of the Ingredient Wheel was also performed. Results: In the 109 samples, 48 different chemical ingredients were identified and characterized by their functional groups and compared with their flavor profiles. Each ingredient's flavor profile was characterized using the FEMA Library and Good Scents System. The Ingredient Wheel (Version 1) contains 3 levels and categorizes ingredients by flavor profile on the first level. The second level provides the root chemical class of the ingredient by functional group analysis. The third level of the Ingredient Wheel contains the flavor description using general flavor categories retrieved from the FEMA Library and Good Scents System database descriptions. As a validation step, labelled flavor profiles were confirmed and samples with unknown flavor profiles were explored using the Ingredient Wheel. Conclusion: The novel Ingredient Wheel assists to categorize e-liquid ingredients and provides a method for comparing e-liquid constituents to the product label. Evaluating ingredient profiles and the quantity of ingredients present may contribute e-liquid policies and regulations.

FUNDING: State

POS1-33

"IT'S A CARROT-STICK MODEL": A QUALITATIVE STUDY OF CLINICIANS' EXPERIENCES AND KNOWLEDGE OF PRE-SURGERY SMOKING CESSATION REQUIREMENTS

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Significance: To reduce the risk of perioperative complications, some surgeons at VA medical centers require smoking cessation prior to elective surgery. Rural Veterans could be most affected by this requirement as they are more likely to smoke than their urban

counterparts and often experience access challenges to surgical care. We examined the knowledge and opinions of orthopedic surgeons and rural primary care providers (PCPs) on this requirement. Methods: Using semi-structured guides, we conducted one-on-one interviews with 10 orthopedic surgeons and 21 rural PCPs (10 non-VA; 11 VA) from two Veteran Integrated Service Networks recruited via contact lists on the VA intranet. We utilized content analysis. Results: The majority of respondents felt this requirement could increase motivation to quit smoking. One surgeon said, "I think this [requirement] is a way to encourage patients to stop? 'cause there's a carrot at the end of it. It's a surgery that they need." Some PCPs felt a more thorough explanation of smoking-related complications would highlight the importance of quitting prior to surgery and would result in increased quit attempts. Respondents expressed little concern that the requirement might increase rural-urban disparities, although some noted the culture of smoking in rural areas could make quitting more difficult. PCPs and surgeons differed regarding the strictness of the requirement. PCPs felt that there should be exceptions for allowing surgery. For instance, one PCP said, "Sometimes I do want to get on the phone and call the surgeon to ask for an exception? I think if someone has exhausted all the options [for quitting] they would still deserve the procedure." Conversely, most surgeons described the importance of a straight-forward requirement and how it is, "reasonable to have the patient have some skin in the game? to improve their recovery." While PCPs often provide cessation assistance, some reported lacking knowledge of the specific details of the requirement (e.g., duration of abstinence before surgery; biochemical verification). Conclusion: Most respondents thought elective surgery was a good motivator to quit smoking; but PCPs and surgeons differed on whether there should be exceptions to the requirement that patients quit preoperatively. Future efforts to augment perioperative smoking cessation may benefit from improving care coordination across primary care and surgical services, and educating patients more about the benefits of quitting.

FUNDING: Federal

POS1-34

FACTORS ASSOCIATED WITH ACCESS TO TOBACCO AMONG CHILDREN IN THE GAMBIA: EVIDENCE FROM THE 2017 GLOBAL YOUTH TOBACCO SURVEY

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Introduction: The Gambia have enacted various laws that prohibit the sale of tobacco to and by children under 18 years. This study aimed to assess the factors associated with access to cigarettes among children in the Gambia. Methods: We used the 2017 Global Youth Tobacco Survey (GYTS) of 12,585 students, aged 11-17 years from the Gambia. The analysis was restricted to 2951 children 11-17 years old who bought and/or attempted to buy cigarettes within the past 30 days and had valid data on other variables of interest. Current smoking was defined as smoked cigarettes within the past 30 days. Access was defined as successfully purchasing cigarettes within the past 30 days regardless of smoking status. Multivariable logistic regression assessed the factors associated with successful purchase of cigarettes and were adjusted for non-response and the complex survey design. Results: A high proportion of children (59.4%, 95% CI:55.4%-63.3%) who attempted to buy cigarettes were successful. This was higher among children who currently smoke cigarettes (66.1%, 95% CI: 60.4%-71.3%) compared with non-smokers(58.3%, 95% CI:53.5-62.9). Most of the children who bought/attempted to buy cigarettes were boys (61.3%, 95% CI: 57.8%-64.6%). However, there was no significant difference in access to cigarettes between boys (59.3%, 95% CI: 54.2%-64.2%) and girls (59.4%, 95% CI:55.4%-63.3%). On how they accessed cigarettes, 55.6% (95% CI:47.7%-63.2%) of current cigarette smokers bought cigarettes from a store, shop, street vendor, or canteen; 12.2% (95% CI:8.3%-17.5%) got it from someone else, and 6.7% (4.4%-10.0%) used other means. In our fully adjusted models, older age (AOR=3.0, 95% CI: 1.4-6.5), being in eighth grade (AOR=1.5, CI: 1.0-2.1) or ninth grade (AOR=1.6, CI:1.1-2.4) compared with seventh grade, and current smoking (AOR=1.2, 95% CI: 1.0-1.7) were significantly associated with access to cigarettes. Conclusions: Children in The Gambia including non-smokers can purchase/access cigarettes despite the regulations. The government should make more efforts in implementing tobacco control laws that protect children. The legal age to purchase cigarettes should also be increased from 18 to 21 years and all buyers appearing under 21 years should be age verified. Adult smokers should also be discouraged from sending children to purchase cigarettes for them.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS1-35

INTERACTIVE DATA VISUALIZATION: A CASE STUDY FROM ENDS RESEARCH

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Significance: The advancement of interactive data visualization has allowed quicker and more efficient data exploration. Here we present a case study from a longitudinal investigation of ENDS use to support tobacco regulatory science with visualization technologies, such as interactive dashboards, which can be used to support hypothesis generation and can enhance collaboration. Methods: 2338 U.S. adults (21+) regularly (5+ days/week) using an ENDS product participated in waves 1, 2, and/or 3 of the Vaping and Patterns of E-cigarette use Research (VAPER) Study between May 2020-November 2021. Study participants responded to an online survey related to their ENDS use. Through an iterative process, the VAPER team identified which variables would be included in the data visualization. HIPAA-compliant SharePoint storage was used to store the data dynamically and connected to Power BI to be configured and designed to visualize the data. The dashboard was configured to enable users to filter data by one or more variables and generate charts simultaneously and interactively by clicking icons and/or checkboxes. For categorical variables, bar and pie charts were utilized. For numeric variables wattage, voltage, and resistance, violin plots overlayed with boxplots were used to simultaneously describe the distribution densities and quartiles. A dynamic sample counter was installed in each chart/table to allow users to see the total amount of non-missing data points for each variable. Results: Key results from the survey include nicotine formulation, primary liquid flavor, and device type were selected for descriptive analysis and inclusion in an interactive dashboard. A Power BI dashboard was built containing 28 charts and a table organized per page by variable domain, with across and within wave visualizations of comparisons of e-cigarette use behaviors. In total, features utilized allowed viewing over 9000 possible combinations of descriptions of the sample across one or more variables, which, on average, took less than 1 second each to generate after deployment. The dashboard supports simultaneous interactive data viewing for study team members/collaborators/Federal partners across different institutions. Conclusions: Visualization technologies can significantly reduce the time spent generating and distributing descriptions of the fast-evolving e-cigarette market. Interactive visualization provides a wide array of flexibility, enhancing the data exploration experience. Research teams conducting studies in fast-paced fields should consider building and using an interactive data visualization system.

FUNDING: Federal

POS1-36

COMPARATIVE ANALYSIS OF LEVEL OF IMPLEMENTATION OF THE WHO FCTC ARTICLE 5.3 IN INDIA

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Background: Tobacco Industry (TI) portrays itself as socially responsible, while at the same time, uses multiple tactics to shape and influence tobacco control policy. The tobacco industry interference (TII) continues to be the major roadblock to the implementation of WHO Framework Convention on Tobacco Control (FCTC) Article 5.3. However, the extent of the TII in India, the scope of TI interference as well as the challenges experienced by experts in implementing effective tobacco control strategies are sparsely documented. Objective: This paper assessed trends in TII, level of implementation of WHO Article 5.3 and its guidelines, and government's response in implementing these guidelines from 2018 to 2021 in India. Methods: We conducted descriptive comparative analysis of four consecutive India TII Index (January 2018-December 2021) based on the seven key themes and twenty indicators to capture WHO Article 5.3 recommendations: (i) Level of Industry Participation, (ii) Corporate Social Responsibility (CSR) Activities, (iii) Benefits to the TI, (iv) Forms of Unnecessary Interactions, (v) Transparency, (vi) Conflict of Interest, and (vii) Preventive Measures. The Southeast Asia Tobacco Control Alliance's (SEATCA) TII Index was adopted and used to undertake four TII Index in India. Results: The comparative analysis showed that the overall score of India TII Index decreased from 72 (2018) to 57 (2021). Improvements were shown over the years in adherence to Article 5.3 of the WHO FCTC with respect to limiting unnecessary interactions with the TI, avoiding conflicts of interest, and having preventive measures. However, major

gaps were observed in restricting industry participation, regulating CSR activities by the industry, continued benefits to the industry in the form incentives, exemptions, and maintaining transparency. Conclusion: The study reflects upon India's status in implementing WHO Article 5.3 and its guidelines. Given the gaps in the existing measures, there is an urgent need to establish an observatory for periodic compilation of TII index to monitor the TI and report violations at the national and sub-national level.

FUNDING: Academic Institution

POS1-37

EXAMINING THE IMPACT OF A MENTHOL CIGARETTE BAN AMONG AMERICAN INDIAN/ALASKA NATIVE ADULTS WHO SMOKE

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Significance: American Indian and Alaska Native (AI/AN) populations have the highest prevalence of cigarette smoking among any racial/ethnic group in the U.S. 2020 CDC data indicates that of the 27% of AI/AN adults who smoke, more than 38% smoke menthol cigarettes. There is a need to understand how potential tobacco policy changes of banning menthol cigarettes would influence tobacco use among this population who are vulnerable to high rates of tobacco use and tobacco-related health disparities. Methods: Data were collected through an online survey in spring 2022 of 860 AI/AN adults in the U.S. (77.8% males; 21.0% females; mean age=29.0, *SD*=6.2) who smoke menthol (53.0%, n=456) and non-menthol (45.5%, n=391) cigarettes. Survey items assessed the perceived likelihood of switching to non-menthol cigarettes, switching to another tobacco product, and quitting smoking if menthol cigarettes were banned (rated not at all to extremely). Results: Among adults who smoke menthol cigarettes, 32.0% believed they would switch to non-menthol cigarettes (rated very much/extremely likely) and 43.6% would switch to another tobacco product. Most believed they would switch to e-cigarettes (45.0%), followed by cigar/cigarillos (19.5%). While 30.7% believed they would quit smoking if menthol cigarettes were banned. The perceived likelihood of quitting smoking did not differ by menthol vs. non-menthol cigarette status (p=.09). Conclusion: The results suggest most AI/AN adults who smoke menthol cigarettes would plan to reduce their cigarette use if menthol cigarettes were banned, although some would continue to smoke or use other combustible tobacco products. Identifying strategies to maximize reductions in smoking and smoking-related harm will be important if menthol cigarettes are banned.

FUNDING: Federal

POS1-38

FACTORS ASSOCIATED WITH CHANGES IN E-CIGARETTE DEPENDENCE: FINDINGS FROM WAVES 2 AND 3 OF THE VAPER STUDY

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Significance: Little is known about how demographics, device and liquid characteristics, and smoking status impact users' future e-cigarette dependence. We addressed this gap by evaluating the development of dependence in a cohort of regular adult ENDS users. Methods: Our sample includes US adults (21+) who use ENDS 5+ days/week. Participants from waves 2 (12/2020-4/2021) and 3 (9/2021-11/2021) using liquid containing >0 mg of nicotine were included in the analyses (N=628). Changes in E-cigarette Dependence Scale scores (range 0-4, 4 being most dependent) between waves were coded as increasing, decreasing, or stable dependence (from wave 2 to 3). Demographics (waves 1 and 2 - measured in first survey only) and smoking status (wave 2) were self-reported. Device and liquid characteristics were from coded photo data if available; otherwise, self-reports were used (wave 2). Analyses included chi-square tests with Bonferroni correction for pairwise comparisons and multinomial regression. Results: Overall, 80% (n=502) reported a change in dependence from wave 2 to 3, with 55% (n=278) of those participants reporting increased dependence. Smoking status was associated with a change in dependence (p<0.05): 71% of never smokers (n=67), 85% of current smokers (n=136), and 80% of former smokers (n=299) reported a change in dependence, with 60% (n=40), 51% (n=69), and 57% (n=169) of those participants reporting increased dependence, respectively. Group differences between never and current smokers were significant (p=0.011). Demographics (age, gender, race, income, sexual orientation, and region) and device and liquid characteristics (device type, nicotine formulation, paired combination of device type and nicotine formulation, nicotine concentration) were not associated with changes in dependence (p>0.05). Conclusions: A substantial proportion of participants reported a change in dependence regardless of smoking status; however, 29% of never smokers in wave 2 had stable dependence versus 15% of current smokers. A majority of participants with a change in dependence reported an increasing dependence; others had decreasing dependence. These data suggest users could be on different e-cigarette dependence trajectories, dependence is dynamic, and it varies by smoking status. ENDS regulations could differentially impact these groups.

FUNDING: Federal

POS1-39

LONGITUDINAL RELATIONSHIP BETWEEN BELIEF THAT SOME CIGARETTES ARE LESS HARMFUL, SWITCHING TO NATURAL AMERICAN SPIRIT, AND BELIEF THAT ONE'S OWN BRAND IS LESS HARMFUL: RESULTS FROM WAVES 1-5 OF THE PATH STUDY

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SIGNIFICANCE: Natural American Spirit (NAS) smokers are more likely than other smokers to believe that their brand might be less harmful than other cigarette brands, but whether this belief precedes NAS preference and how switching to NAS affects this belief has not been described at the population level. The purpose of this study was to examine whether: 1) holding beliefs that certain types of cigarettes or organic/additive-free cigarettes are less harmful is associated with subsequent switching to NAS; 2) people who switch to NAS are more likely to acquire or maintain belief that their own brand might be less harmful than other brands. METHODS: Data are from 5 waves (2012/13-2018/19) of the Population Assessment of Tobacco and Health (PATH) Study. We used unweighted GEE regressions to report population-averaged aORs. RESULTS: People who believed at a prior wave that some types of cigarettes are less harmful had a 60% increased odds of switching (95% CI 1.2, 2.2) to NAS at a subsequent wave compared to people who believed that cigarettes were equally harmful. Compared to people who believed neither organic nor additive-free cigarettes are less harmful, people who believed that both organic and additive-free cigarettes are less harmful had a 250% higher odds of switching to NAS at a subsequent wave. Switching to NAS was associated with a 16x higher odds (95%CI: 13.1, 20.6) of believing one's own brand might be less harmful than other brands. CONCLUSIONS: People who believe that some types of cigarettes - including organic and additive-free - are less harmful than other types of cigarettes are more likely to seek out NAS; switching to NAS was associated with developing inaccurate harm beliefs about NAS. In combination with significant prior descriptive and experimental work, our results provide additional evidence that NAS marketing inappropriately conveys reduce risk messages to potential and current consumers.

FUNDING: Federal

POS1-40

COMMON PREDICTORS OF QUIT INTENTIONS AMONG NEW ZEALAND SMOKERS: FINDINGS FROM THE 2016 ITC NEW ZEALAND SURVEY

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Significance: Aotearoa New Zealand (NZ) is introducing legislation to implement landmark tobacco control measures, i.e., mandated denicotinisation of smoked tobacco products (STPs), significant reductions in retail availability of STPs, and a smokefree generation policy (i.e., people born after 2009 can never legally be sold tobacco). Modeling studies predict that these measures will greatly contribute to achieving NZ's Smokefree Aotearoa goal of reducing daily smoking prevalence to <5% (from current 9.4%) for all population groups by 2025. Having intentions to quit is a key precursor of future quitting. This study aimed to identify the predictors of quit intentions among adult smokers from New Zealand. Method: Data were from the 2016 ITC New Zealand (NZL1) Survey. Respondents for the ITC NZL1 Survey were recruited from the 2015-2016 NZ Health Survey (n=1,018 smokers; n=137 former smokers). For this study, we included 910 adults who currently smoked at least monthly and answered the question on quit intentions. The 40-minute telephone survey included questions assessing sociodemographic variables, quit intentions, psychosocial beliefs, and risk perceptions. Multivariable logistic regression analyses were used to identify independent predictors

of quit intentions. Results: Nearly 80% of smokers reported having intentions to quit, with 42.2% intending to quit within 6 months. Factors significantly associated with quit intentions included earning more than NZ$70,000 vs. NZ$30,000 or less (AOR=4.92), being female (AOR=2.21), being concerned for one's personal health (AOR=3.64), receiving quitting advice from a health professional in last year (AOR=2.09), perceiving a health benefit to quitting (AOR=1.99), reporting one or more past quit attempts (AOR=1.95), not enjoying smoking (AOR=3.52), having friends and family who disapprove of smoking (AOR=1.91), and being concerned about cigarette prices (AOR=1.99). Conclusions: Over three-quarters of NZ smokers have intentions to quit. Predictors of quit intentions in NZ were consistent with those in other countries (e.g., Canada, US, UK, Australia, China, Malaysia, Mauritius, Kenya, Zambia), and suggest policies (e.g. continuing measures to decrease affordability of tobacco), programs (e.g. health professionals continuing to deliver cessation interventions), and public messaging (e.g. campaigns encouraging multiple and repeated quit attempts even after relapses) that could support the Smokefree Aotearoa 2025 goal.

FUNDING: Federal; State

POS1-41

PREDICTING THE EFFECTS OF PROPOSED TOBACCO PRODUCT STANDARDS AMONG AFRICAN AMERICAN/BLACK MENTHOL CIGARETTE SMOKERS

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Significance. FDA has proposed new product standards pertaining to the availability of flavors for cigarettes and cigars marketed in the US. However, it is unclear whether limiting characterizing flavors in cigarettes (i.e., menthol) and cigars, as proposed, or across all tobacco products, produces differential effects on the tobacco use behaviors of African American/Black (AA/B) menthol cigarette smokers. Moreover, it is unknown whether incorporating historical and social context into FDA communication strategies influences behavioral responses following flavor bans. Methods. We recruited adult AA/B menthol cigarette smokers in the US via Qualtrics blended panels (N=373) and in Richmond, Virginia via local advertising (N=201) for an online experiment from September 2021 to August 2022. Participants were randomized to view one-of-three informational frames: no frame (blank page), a "general" frame (information related to menthol cigarette harms and the consequences of a ban among all US adults), and an "enhanced" frame (information in the general frame adapted to center AA/B smokers). Participants then reported, using visual analog scales (0 [Not at all likely] - 100 [Extremely likely]), how 13 of their tobacco use behaviors would change under three scenarios: maintenance of status quo, limited flavor ban (ban characterizing flavors in cigarettes and cigars), and comprehensive flavor ban (ban characterizing flavors in all tobacco products). Multivariable linear regressions compared adjusted differences in expected responses across policy scenarios and information frames. Results. Across both samples, AA/B menthol smokers (total N=574) reported higher intentions to quit cigarette smoking and lower intentions to switch to electronic cigarettes and smokeless tobacco under the comprehensive ban than the limited ban (ps<0.05) - but were no more likely to buy or import products from new sources. Information frames did not influence tobacco use behaviors directly or by modifying responses to flavor bans. Conclusions. AA/B smokers appear more likely to quit using tobacco products when characterizing flavors in cigarettes and cigars are banned if flavored alternative products are also unavailable, without additional flavor bans significantly increasing activity in unregulated markets. The potential benefits of FDA's proposed menthol cigarette ban among AA/B smokers may be augmented by also limiting access to characterizing flavors in alternative tobacco products.

FUNDING: Federal

POS1-42

CONCEPT FLAVORED E-CIGARETTE SALES IN THE U.S.: 2019-2022

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Significance: Concept flavored e-cigarettes, defined as products with vague or ambiguous flavor descriptions (e.g., rainbow), may create challenges for Food & Drug Administration's regulation of certain unauthorized flavored e-cigarette products (excluding tobacco or menthol), may potentially appeal to the youth, and mislead those interested in switching from flavored to non-flavored tobacco products. We examined trends of recent US e-cigarette concept flavored unit sales by volume, nicotine concentration levels, and flavor type. Methods: Data comprised of weekly NielsenIQ Retail Scanner point-of-sales data from August 10, 2019, through April 30, 2022, for 2182 Local Trade Areas in the contiguous 48 US states and District of Columbia. Unit sales of concept flavored e-cigarette products (devices, e-liquid bottles and pods) were aggregated into four-week time periods, treated as monthly sales data. Average monthly percentage change (AMPC) in unit sales and 95%CIs were calculated using Joinpoint version 4.9.1.0 (National Cancer Institute). Products were categorized by nicotine concertation levels (0 mg, 1-20 mg, 21-40 mg, 40-50 mg, 51 mg and above), and flavor type (cooling flavors producing a cooling/icy sensation vs. others; tobacco, sweet and fruity, mint, menthol, other (e.g., citrus, energy drink), unknown). Results: Overall, sales of e-cigarettes with concept flavors increased from 10.69 million units during August 2019 to 13.91 million units during April 2022 (AMPC:0.3 [95%CI, -0.5, 1.0]). However, during the past 12-month period (April 2021-March 2022), overall sales were on a declining trend (AMPC:-1.5 [95%CI, -2.4, -0.5]). Products with 21-40 mg (87.02%; 39.4 million units) nicotine concentration levels led unit share during the study period. Sales of products with 1-20 mg concentration levels declined more rapidly than other products post January 2020, when the FDA announced guidelines for certain unauthorized flavored e-cigarette products. Cooling flavors, defined as flavors producing cooling sensation, comprised 16.33% of total sales. Tobacco flavors led market share (93.24%; 42.28 million units). However, other flavors increased more rapidly than the others followed by mint and fruity flavored products. Conclusion: Continued monitoring of products with mint and other flavors including citrus and energy drink, and with nicotine concentrations levels greater than 21 mg to address potential use and addiction, especially among susceptible youth.

POS1-43

HOW COMPLETE IS NIELSEN DATA? ASSESSING THE COMPREHENSIVENESS OF NIELSEN TOBACCO PRODUCT RETAIL SALES DATA THROUGH COMPARISONS TO EXCISE TAX COLLECTIONS

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Background: Much tobacco control research is performed with sales data from companies like Nielsen and IRI. Sales data enables rapid tobacco market surveillance and policy evaluation research. Many sales data analyses have focused on the e-cigarette market, but sales data sources do not cover online sales or in specialist e-cigarette retailers. It is essential to know how representative sales data are of the cigarette and e-cigarette market. Methods: We compare monthly excise tax receipt data from US states with specific e-cigarette excise taxes to estimated tax collections from Nielsen sales data between February 2017 and October 2021. Specific excise taxes are calculated based on the quantity rather than the price of a good, enabling market volume coverage comparisons conducted here. We submitted Freedom of information Act Requests to State Treasuries in Georgia, Kentucky, Louisiana, North Carolina, New Jersey, Ohio, and Washington for monthly excise tax collections of all tobacco products, disaggregated by product category. We estimated the excise tax collected from each cigarette and e-cigarette and summed those to the state-month-category level. Then we compared estimated to actual excise tax collections. Results: Nielsen coverage of cigarette sales neared 100% of excise tax collections in Georgia, Ohio, and Washington, and closer to 80% of tax collections in other states. There were no obvious patterns of decline or increase in the share of cigarette tax collections. In states with e-cigarette excise taxes in place during the entire study period, Louisiana and North Carolina, sales coverage of tax collections rose through 2020 before falling in 2021. E-cigarette tax collection shares typically fell below half that of cigarette sales. Conclusions: In the first study to quantitatively assess the comprehensiveness of the coverage of e-cigarette sales data, we find that as expected, e-cigarette market coverage is inferior to cigarette market coverage. The proportion of e-cigarette product taxed in a given state varies from state to state and over time as well. More needs to be learned about how states might be changing tax collection protocols as well as how market forces and consumer behavior might be driving these patterns. When analyzing cigarette sales data from Nielsen company and its peers, researchers should be more confident that their analyses are not influenced by sampling bias to a greater degree than analyses focusing on e-cigarette sales. Determining the effects of interstate variation in Nielsen tobacco sales data coverage as a share of collected taxes must be the subject of future investigations.

FUNDING: Federal

POS1-44

WHEN USING PACKAGING WITH GRAPHIC WARNINGS, INCREASED PACK HIDING ASSOCIATED WITH LOWER SATISFACTION FROM SMOKING CIGARETTES

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Significance: In a recent randomized clinical trial, receiving cigarettes in graphic warning label (GWL) packs was associated with decreased rewarding effects from smoking and increased pack-hiding behavior in social settings. In this secondary analysis of reactions when smoking, we examined if the increased hiding with GWL packs was also associated with perceptions that cigarettes were less rewarding. Methods: Smokers were randomized to purchase usual brand of cigarettes repackaged to GWL, blank packs, or standard US packs and completed twice-daily ecological momentary assessment (EMA) of consumption, pack hiding, and subjective reward (satisfaction, taste, craving relief) of most recent cigarettes. Multilevel vector autoregression (VAR) models estimated networks and directions of associations among hiding and reward over time within individuals temporally (within-day), contemporaneously (at same time), and examined average differences between participants within each treatment arm during 30-day baseline and 90-day intervention periods. Results: Among trial completers (n=357), the mean (SD) age was 39.3 (11.8) years; 54.6% were female, 11.2% were Hispanic, 68.1% were non-Hispanic White, and 20.7% were of other non-Hispanic races. Baseline pack hiding was reported on 41.3% (95% CI, 39.6%-43.0%) of assessments and VAR confirmed reciprocal networks connecting daily ratings of subjective rewards (r_{part} = 0.15 - 0.49, p's <0.05) but not pack hiding. During the intervention, those who reported higher satisfaction from their last cigarette also reported higher craving relief and better taste (p's <0.01). Heightened frequency of pack hiding among GWL smokers was associated with lower ratings of satisfaction (r_{part} = -0.21, $p_{1->2}$=0.02) but not the inverse ($p_{2->1}$=0.09), effects not observed in US (r_{part} = -0.03) or blank (r_{part}=-0.05) pack arms. Conclusion: GWL packs appears to decrease positive perceptions of cigarettes and to significantly increase pack-hiding behavior. Aversive social reactions may increase hiding behavior and decrease satisfaction with smoking. Understanding social impacts of GWL may suggest opportunities for coordinated public health messaging.

FUNDING: Federal

POS1-45

MASSACHUSETTS SALES BAN 2019 INFLUENCE ON RETAIL DENSITY

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Introduction: In 2019, Massachusetts implemented the first statewide restrictions via executive order on ENDS products sales within the state's jurisdiction for both physical and online shops in response to concerns related to the EVALI national outbreak. This resulted in the sudden temporary closure of many retail shops who were required to restrict access to ENDS product for all Massachusetts residents. Other studies have reviewed the impact of Massachusetts' temporary product sales ban on product sales, but few have assessed its overall impact on tobacco retail licensing.Methodology: This observational study used existing tobacco retail licensure data and assessed longitudinal trends both pre and post the enactment of the Massachusetts tobacco retail sales ban. Licensure data was obtained from the Massachusetts Department of Revenue (licenses in MA are renewed every 2 years). Specifically, data on retail tobacco licenses was compared between the pre ban period (October 2018-August 2019) and post ban period (October 2020- August 2021). The objective of the study was to determine if any observational trends with new, unrenewed, or expired licenses was associated with the 2019 Massachusetts sales ban. Additionally, geospatial analysis was used to determine geographical changes in location of licensed shops. Results: Analysis of the Massachusetts post ban period (October 2020-August 2021) found that a total of 7,026 licenses were issued, representing a decrease by 6% (n=432) compared to the pre ban period (October 2018-August 2019) which comprised of 7,458 issued licenses. However, for existing retail tobacco licensure renewals, the post ban period saw an increase of 6,163, representing a small increase of 10% (n=536) when compared to the pre ban period that had a total of 5,627 renewals. For new retail tobacco licenses issued, the post ban period amount was 863, which was a sharp decrease of 53% (n=968) compared to the pre ban period of 1,831. Conclusion/Discussion: Our analysis indicates that following the MA temporary sales ban, the total number of licenses decreased, though decreases were more pronounced with new licenses whereas renewals experienced a slight increase. Understanding the volume of tobacco retail license distribution pre and post tobacco control policy is important in attempting to quantify the impact on the changing tobacco and ENDS product retail landscape, which directly impacts use and uptake. Further research is needed to better understand both the short and long-term impacts of sales bans in order to inform other local, state, and federal tobacco regulatory science efforts.

FUNDING: State

POS1-46

THE INFLUENCE OF NONPROFIT ORGANIZATIONS ON THE POLICYMAKING PROCESS OF A STATE E-CIGARETTE FLAVOR BAN

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Significance. Electronic cigarettes (e-cigarettes) and vaping products are emerging tobacco products that attract the attention of researchers and practitioners. In 2019, an outbreak of severe lung injury among users of vapor products (EVALI - E-cigarette and Vaping Associated Lung Injury) was potentially one of the factors leading the New York State legislature to pass a law banning the selling of flavored e-cigarettes in 2021. The roles that anti-vaping and pro-vaping Non-Profit Organizations (NPOs) played in influencing the policymaking process in New York State remain unclear. Methods. The present study used data from the internet and from social media platforms using Web Crawler software. Data included plain language documents, reports, flyers, and short posts that described various elements of the policymaking process related to induvial and organizational positions, advocacy, study results, persuasion, etc. The Multiple Streams (MS) framework was used to explore NPOs' roles and influence. MS roles analyzed included: Problem Stream, Political Stream, Policy Stream, Policy Window, and Policy Entrepreneurs. Results. The present study observed an increase in policy related messaging on internet and social media platforms beginning when the Policy Window opened shortly after the first incidence of EVALI (September, 2019 to February, 2020). During this same 5-month period, 10 flavor ban bills were introduced in the New York State Legislature. NPOs played an essential role in conceptualizing policy Problems in the Problem Stream, especially the translation of academic research findings into plain language. In the Political Stream, NPOs used social media platforms and websites to interact with governmental officials, legislators, the general public, and other NPOs. The present study identified 26 current and former state legislators as Policy Entrepreneurs. The NPOs compose and provide policy alternatives as policy community members in the Policy Stream. Conclusion. The present study identified the roles and influence of NPOs in the policymaking process of the 2021 NY e-cigarette flavor ban. Further studies on the influences on e-cigarette and vaping legislation using data from the internet and social media platforms is warranted. Funding. Supported by The National Cancer Institute (NCI) and the FDA (TCORS Grant U54CA228110).

FUNDING: Federal

POS1-47

THE IMPACT OF MARIJUANA PRICE ON TOBACCO USE IN DUAL USING ADOLESCENTS: INITIAL DEVELOPMENT OF A MARIJUANA AND TOBACCO CROSS-PRICE PURCHASE TASK

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Significance: Dual tobacco and marijuana use in early adulthood has been linked with greater risk for health and behavioral problems later in life. However, the behavioral mechanisms underlying dual use are not well-understood. This pilot study tested a novel choice task designed to assess how these two substances may interact as either substitutes (purchasing of one increases as the other decreases), complements (purchases increase or decrease together), or independent (purchases are unaffected by the alternative substance price). Methods: Adolescents (N=9, M age=18.8) who smoked cigarettes daily and reported marijuana use at least weekly engaged in an experimental purchasing task. After being provided a hypothetical 'budget' based on their actual purchasing patterns, participants chose how much of both marijuana (in grams) and individual cigarettes they would purchase for the week. For one block of trials, marijuana price increased across trials while cigarette price remained constant; cigarette price increased across trials while marijuana price remained constant in another block. Block order was counterbalanced across participants. Qualitative data was collected after the task. Results: The effect of marijuana price on cigarette purchasing varied across participants: For 2 participants cigarettes acted as an economic complement for marijuana, for 1 participant cigarettes were an economic substitute, and for 6 participants cigarettes were independent of marijuana. When tobacco price increased, marijuana purchases increased for 1 participant (substitution), decreased

for 2 participants (complementarity), and were independent of cigarette price for 6 participants. Patterns were generally asymmetrical within-subject (e.g., marijuana could act as a substitute for cigarettes for a participant but not vice versa). Qualitative data indicated that the task was face valid and easily comprehended by the participants. Conclusions: Even within a small pilot sample, individual variability in behavioral mechanisms underlying dual use points to the existence of risky subgroups whose use of one substance may change in the face of changes in the other; this has implications for both our understanding of the mechanisms underlying dual-use, and implications for cessation interventions when dual use is present.

FUNDING: Federal; Academic Institution

POS1-48

REPEATED INJECTIONS OF CIGARETTE SMOKE EXTRACT, BUT NOT ELECTRONIC CIGARETTE AEROSOL EXTRACT, PRODUCES GREATER ACUTE AVERSIVE / ANHEDONIC EFFECTS THAN NICOTINE ALONE ON INTRACRANIAL SELF-STIMULATION IN RATS

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Significance. Combustible tobacco cigarettes generally have greater abuse liability than non-combusted tobacco products such as electronic cigarettes (ECs) and nicotine replacement therapy. This may be attributable to the higher levels of behaviorally active non-nicotine constituents (e.g., monoamine oxidase (MAO) inhibitors) in cigarette smoke (CS) compared to non-combusted products. Contrary to this hypothesis, we recently reported that a single injection of CS extract containing nicotine and a range of non-nicotine constituents prevalent in smoke (e.g., MAO inhibitors) produced greater acute aversive / anhedonic effects (i.e., *reduced* abuse liability) compared to nicotine alone as measured using intracranial self-stimulation (ICSS) in rats. Effects of an EC extract and nicotine alone on ICSS did not differ. Methods and Results. The goal of this study was to evaluate the generality of our prior findings involving a single injection of each formulation to a repeated injection regimen that more accurately simulated chronic tobacco product use in humans. We also compared formulations in their effects on brain MAO inhibition measured ex vivo to evaluate the potential role of this mechanism in the behavioral data. Nicotine alone (1.0 mg/kg, s.c.) elevated ICSS thresholds following the first daily nicotine injection but not following subsequent injections, reflecting the rapid development of tolerance to nicotine's aversive / anhedonic effects. CS extract elevated ICSS thresholds to a greater degree than nicotine alone following the first injection, and continued to elevate ICSS thresholds following the second and third injections (i.e., tolerance was delayed). Effects of repeated injections of EC extract on ICSS did not differ from those of nicotine alone. None of the formulations inhibited MAO activity measured ex vivo. Conclusions. These data extend our prior findings of greater acute aversive / anhedonic effects of CS extract compared to nicotine alone to a more clinically relevant dosing regimen, and provide further evidence that the centrally-mediated effects of MAO inhibitors and other non-nicotine constituents may not account for the greater abuse liability of cigarettes compared to non-combusted products. Nonetheless, characterizing the constituent(s) mediating the greater aversive effects of CS extracts in this study could provide important insights into the mechanisms underlying tobacco addiction.

FUNDING: Federal; Nonprofit grant funding entity

POS1-49

LONGITUDINAL TRANSITIONS IN ENDS AND CIGARETTES USE AMONG US ADULTS, 2016-2019

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Significance: To support tobacco control efforts, this study sought to estimate the prevalence of transitions in electronic nicotine delivery systems (ENDS) and cigarette use over time. Methods: Participants were 53,729 US adults (age 18+) from Waves 4-5 (W4 to W5, 2016-2019) of the Population Assessment of Tobacco and Health (PATH) Study. We examined behavioral transitions (start, progression, and cessation) in ENDS and cigarette use. Longitudinal survey-weighted multivariable logistic regression models were adjusted for sociodemographic correlates of transitions. Results: Of adults not using ENDS at W4, 4.8% reported starting ENDS use at W5 (representing an extrapolated 10.2 million US adults). Of adults periodically using ENDS at W4, 15.8% progressed to established ENDS use at W5 (~1 million). Of W4 current ENDS users, 43% discontinued ENDS use at W5 (4.3 million). Regarding cigarette smoking transitions between W4 and W5, 3.4% reported starting cigarettes use at W5 (5.6 million), 19.8% progressed to established cigarette use at W5 (2.6 million), and 17% discontinued cigarettes use at W5 (7.5 million). Lesbian, gay or bisexual (LGB) individuals, young adults, and those with poor mental health were more likely to start ENDS or cigarette use at follow-up (all $p<.05$). People with poor mental health were more likely to progress in cigarette use ($p<.05$), but not ENDS use. Conclusions: Discontinuing ENDS use was common, more so than quitting cigarette smoking. However, in absolute terms, ENDS use grew while smoking fell. Tobacco control programs should focus on priority populations, including young adults, LGB, and people with mental health conditions.

POS1-50

THE SITUATIONAL CONTEXTS AND SUBJECTIVE EFFECTS OF CO-USE OF ELECTRONIC CIGARETTES AND ALCOHOL AMONG COLLEGE STUDENTS

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Introduction: Understanding the co-use of e-cigarettes and alcohol, including the situational contexts and subjective effects associated with co-use in real-time is necessary for validating this behavior and informing intervention. Yet, the sparse literature has built upon retrospective data. Methods: This study recruited 686 college students who were currently using e-cigarettes from three campuses in the Midwest and South of U.S in Fall 2019-Fall 2021. An on-line survey was conducted to measure e-cigarette use patterns, GPA, e-cigarette and alcohol dependence symptoms, and respiratory symptoms. A 7-day ecological momentary assessment was used to collect real-time data on e-cigarette and alcohol use, situational contexts and subjective effects. Results: Frequent drinking e-cigarette users reported more high-risk use behavior including consuming 6+ drinks/occasion and simultaneous use, and reported more e-cigarettes and alcohol related dependence symptoms and respiratory symptoms, compared to infrequent/non-drinker e-cigarette users. Alcohol quantity was positively associated with e-cigarette quantity among the high frequency drinking group. This study identified important use contexts that were associated with higher e-cigarette consumption including use of menthol or fruit flavored e-cigarettes, being in a car, and the presence of others. E-cigarette use and alcohol use both increased the levels of positive affect, physiological sensation, and craving for e-cigarettes, whereas only alcohol use significantly decreased negative affect. No interaction effects between e-cigarette use and alcohol use were found. Conclusions: The findings highlight the addiction and health risks associated with frequent co-use of e-cigarettes and alcohol, and also call for regulations on nontobacco flavorings in e-cigarette products.

FUNDING: Federal

POS1-51

ELECTRONIC NICOTINE PRODUCT CHARACTERISTICS: WHICH NICOTINE LEVELS, FLAVORS AND DEVICE TYPES ARE MOST COMMONLY USED TOGETHER?

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Significance: Electronic Nicotine Products (ENP), such as e-cigarettes, are a significant part of the tobacco marketplace and include many products which differ on characteristics like nicotine level, flavor and device type. These characteristics can impact products' appeal, addictive potential, and health risks. Therefore, it is important to understand how adults are using such products, and which characteristics are commonly used together. Methods: We used a nationally representative study of US adults (Population Assessment of Tobacco and Health (PATH) Study Wave 5 (Dec 2018-Nov 2019)) to assess which ENP characteristics were commonly used together. Our sample (N=4,602) included past 30-day users of ENPs who were asked which ENP characteristics (nicotine level, flavor, device type) they used most often. We used a three-way heat map to represent the counts of participants using all possible combinations of ENP characteristics. We used two models to investigate the association between nicotine concentration and flavor/device: a logistic model for the participant knowing the nicotine concentration (yes/no), and a regression for the log-transformed nicotine concentration. Models included as predictors flavor, device, flavor*device interaction, age, sex, education level, and race/ethnicity. Results: The sample consisted of 56% males, 68% Non-Hispanic Whites, and 64% 18-34-year-olds. The most common combination of device-nicotine-flavor was refillable tank-low nicotine (1-6 mg/mL)-fruit (N=413), followed by replaceable cartridges-high nicotine (25+ mg/mL)-menthol (N=327). In the logistic model, device and flavor were both significantly associated with knowing the nicotine concentration

(p<.001). Mod users were most likely to know the nicotine concentration used (93%) and disposable users were least likely to know the nicotine concentration (54%). Those using tobacco flavors were less knowledgeable about the nicotine concentration of the product than those using all other flavor categories (except menthol). In the model for nicotine concentration, there was a significant device*flavor interaction (p<.001), with significant differences between flavors in nicotine concentration for all devices except mods. Within replaceable cartridges, menthol was associated with the highest nicotine concentrations. Conclusions: Identifying more common combinations of electronic nicotine product characteristics will inform tobacco regulatory science by allowing more targeted analyses of addictive potential, appeal, risk, toxicity and harm reduction.

FUNDING: Federal

POS1-52

THE IMPACT OF ELECTRONIC NICOTINE DELIVERY SYSTEMS ON TOBACCO USE TRANSITIONS AMONG US YOUTH AND ADULTS: A LONGITUDINAL ANALYSIS

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Aim: Electronic nicotine delivery systems (ENDS) can benefit combustible tobacco users if they switch completely to ENDS. ENDS can also result in nicotine addiction among tobacco naïve people. To date, there has not been a quantification of these outcomes in a real-world setting. We assessed the impact of ENDS on tobacco use transitions among US youth and adults. Method: We used Population Assessment of Tobacco and Health Study (PATH) wave 4 (2016 - 2017) and 5 (2018 - 2019), adult and youth data, to understand transitions between combustible and electronic tobacco products. Participant tobacco use status in each wave was classified as: 1) Dual use (cigarettes and ENDS), 2) Cigarettes only, 3) ENDS only, 4) Poly (dual use and at least one other combustible), 5) ENDS and at least one non-cigarette combustible product, 6) All other combustible, and 7) Nonusers of any tobacco products (Including former users). We defined the following transitions as 'more harm' (risk): adding or switching to combustible products, nonusers initiating ENDS with or without combustibles. The 'less harm' (benefit) was defined as a) combustible users with or without ENDS completely switching ENDS, b) combustible users quitting combustible products with the help of ENDS. We also assessed whether adults used ENDS with an intention to quit their combustible tobacco products. Weighted numbers are presented. Results: Total sample size (n=31,733) represented 256 million (m) people with 204m nonusers. In terms of the benefits of ENDS, among 3.4 m wave 4 dual users, 470 thousand (K) moved to ENDS only use and 14K moved to nonuse with the help of ENDS in wave 5. These numbers were 776K (2.2%) and 94K (0.27%) for 35m wave 4 cigarette only users, 86K and 7K for 884K poly users, 96K and zero for 497K ENDS and other combustible users, 205K and 11K for all other combustible users. In terms of the risks of the ENDS, among 3.7m ENDS only users in wave 4, 604K started to use a combustible product with or without ENDS in wave 5. Moreover, among 205m nonusers in wave 4, 3.3m started to use ENDS only and 758K started to use ENDS with a combustible product in wave 5. Overall, 1.8m moved from combustible to electronic tobacco use or combustible to nonuse with the help of ENDS (benefit), while 4.6m moved from electronic to combustible or from nonuse to electronic tobacco product with or without combustible tobacco products (risk). Discussion: This study identifies the risk-benefit balance of ENDS in the US between 2016-17 and 2018-19: for every 1 benefit, ENDS creates 2.5 risks (4.6/1.8=2.5) as unintentional consequences. To prevent unnecessary health risks for the population while taking advantage of possible benefits of ENDS, ENDS should be strongly regulated including restricted access of ENDS for tobacco naïve people.

FUNDING: Federal

POS1-53

BRAND ENGAGEMENT APPEALS IN US CIGARETTE AND E-CIGARETTE ADVERTISING, 2019-2020

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Introduction: The tobacco industry has historically used many marketing tactics to promote consumer uptake and use of electronic cigarette and cigarette products. Brand engagement marketing tactics, such as sweepstakes, sponsored events and giveaways, can increase customer attachment to a brand and brand loyalty, including repeat purchasing. This study analyzes and compares brand engagement tactics from cigarette and e-cigarette ads. Methods: 520 cigarette and 4485 e-cigarette ads run during 2019-2020 were coded for eight types of brand engagement tactics. Data were analyzed to report the use of tactics overall, by product type, by brand, and by channel. Results: Among the cigarette ads, 62.9% contained any brand engagement appeals. Among the e-cigarette ads, 47.9% contained any brand engagement appeals. The most common tactics seen in ads were price promotions, links to brand social media accounts and mobile apps, and sweepstakes. Conclusions: Both cigarette and e-cigarette ads rely heavily on brand engagement tactics, many of which allow tobacco companies to collect information about consumers and further market to them.

FUNDING: Nonprofit grant funding entity

POS1-54

LONGITUDINAL ASSOCIATION BETWEEN YOUTH ELECTRONIC CIGARETTE USE AND TOBACCO CIGARETTE SMOKING INITIATION IN THAILAND

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Significance: This study quantifies the longitudinal association between e-cigarette use and subsequent conventional cigarette initiation and vice versa among Thai youths. Methods: Data from a longitudinal survey of 6,045 Thai seventh grade students with baseline in 2019 and the 12-month follow-up in 2020 were analyzed using complex survey multivariate logistic regressions to assess whether e-cigarette use was associated with the subsequent cigarette smoking (ever, current, and dual product users at follow-up) among baseline never smokers. Results: Consistent with prior findings from other countries, among never-smoking baseline ever e-cigarette users were more likely to try cigarette smoking (OR 4.44; 95% CI 2.23-8.86; p<0.001), or become dual users (OR 5.31; 95% CI 2.63-10.74; p<0.001) one year later. Baseline current e-cigarette users were more likely to become ever-smokers (OR 5.37; 95% CI 1.82-15.90; p=0.005), current smokers (OR 3.92; 95% CI 1.69-9.14; p=0.003), and dual product users (OR 6.96; 95% CI 1.54-31.38; p=0.015) at the 12-month follow-up than non-e-cigarette users. Similarly, baseline ever-cigarette smoking was associated with subsequent ever e-cigarette use (OR 3.38; 95%CI 1.66-6.88; p=0.002), current e-cigarette use (OR 2.75; 95%CI 1.47-5.13; p=0.003), and dual use (OR 4.87; 95%CI 2.92-8.13; p<0.001) at the follow-up than never-smokers. Conclusions: This longitudinal study in an Asian LMIC confirms the prospective association of youth e-cigarette use with subsequent smoking initiation in both directions that is similar to that observed in Western high-income countries.

FUNDING: Academic Institution

POS1-55

TRENDS IN HOOKAH USE AMONG COLLEGE STUDENTS IN TEXAS, 2014-2019

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Significance: In 2018, about 1 in 8 (12.3%) young adults aged 19-30 years had used hookah to smoke tobacco during the previous year. Hookah bars and cafes have grown in popularity, particularly in urban areas and around college campuses. Hookah use, like cigarette use, has been linked with several physical health problems. While a typical cigarette requires about 8 to 10 puffs, an hour-long hookah session may involve 100 to 200 puffs, potentially exposing the user to more smoke over a greater period of time. The purpose of the present study was to identify trends in hookah use behaviors among college students in Texas from 2014 to 2019. *Method:* Participants were students recruited from 24 Texas colleges between fall 2014 and spring 2015 to join Project M-PACT, a rapid surveillance system of tobacco use behaviors and marketing exposures. Participants completed an online nine-wave study, with 6 months between each of the first 8 waves and one year between the last two waves. The analytic sample for this study included students who reported smoking hookah at least one day in the past 30 days at all waves, and with complete data on sociodemographic variables (n = 886). At wave 1, participants were 20.15 (SD = 1.77) years old on average; 59.8% female; 34.4% Hispanic, 32.7% non-Hispanic white, 16.6% non-Hispanic Asian, 9.3% non-Hispanic other race/ethnicity, and 7.0% were non-Hispanic Black. Growth curve models were fit to examine trends in hookah use alone, hookah use concurrent with cigarette use, and hookah use concurrent with e-cigarette use, from 2014 to 2019, adjusted for participant sex, age, and race/ethnicity. The dependent variable, hookah use in last 30 days, was assessed by asking "On how many of the past 30 days have you smoked a hookah as intended (i.e. with tobacco)?" *Results*: Current prevalence of hookah use decreased from

17.0% in 2014 to 6.9% in 2019 (p < 0.05). Similarly, the prevalence of concurrent use of hookah with cigarettes and/or e-cigarettes decreased significantly from 2014 to 2019 (p < 0.05 for both). Current hookah use was associated with younger age (OR=0.72; 95% CI: 0.70-0.74), being female 1.50 (1.26-1.79), attending a four-year college 1.65 (1.13-2.41), and not being non-Hispanic white. *Conclusion:* Analyzing hookah use behaviors over time provides insights to inform policy and prevention efforts. Although prevalence rates for hookah use decreased in central Texas from 2014 to 2019, some individuals remain at increased risk. Identifying differences in hookah use behaviors between demographic groups can help target populations who are at greatest risk. Among college students, current hookah users are likely to be a young female minority, attending a four-year college.

FUNDING: Federal

POS1-56

ALTERING E-LIQUID COMPOSITION AND TOXICOLOGY THROUGH THE ADDITION OF WATER

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Electronic cigarette refill liquids (e-liquids) are commonly composed of propylene glycol (PG) and glycerol (GL) as solvents, along with nicotine, an organic acid for pH adjustment, and a host of flavorants for aroma. One popular group of flavorants are flavor aldehydes such as vanillin, benzaldehyde, or cinnamaldehyde. As expected, these flavor aldehydes have been shown to react with the solvents PG and GL to form a variety of acetals in a simple mixture of the three components, without an active water removal step. Furthermore, acetals, such as vanillin PG acetal, have been detected in a wide variety of commercial e-liquids and a recent study has shown that flavor aldehyde PG acetals reach the aerosol and therefore the user's airways during "vaping" of the e-cigarette, and that they are relatively stable in the aqueous environment of the airways. Toxicological studies have shown that vanillin PG is in fact more irritating to human lung cells than vanillin itself and that benzaldehyde PG acetal is more toxic to BEAS-2B lung cells than pure benzaldehyde. Taken together, this raises several questions on e-cigarette safety as well as labeling requirements. In an effort to reduce the buildup of flavor aldehyde PG acetals, this study explored the extent to which the addition of various amounts of water (0 wt-%, 5 wt-%, 10 wt-%, 20 wt-%) to a lab-made e-liquid suppressed the acetal formation therein. Initial results suggest that the equilibrium concentration between initially added flavor aldehyde and the corresponding acetal depends on the aldehyde. While for vanillin, the buildup reaches an equilibrium at an acetal mole fraction of ~0.5 in 3 weeks, benzaldehyde reacts much quicker and to an acetal mole fraction of up to 0.95. Since water is a by-product of the acetalization reaction, its addition is expected to reduce the total amount of acetal formed, and initial results confirm this: the addition of 20 wt-% of water can reduce the extent of flavor aldehyde acetal formation by a factor of up to 20. Regulators as well as e-liquid manufacturers could utilize this strategy to lower flavor aldehyde acetal contents in their products by using one of the most benign materials, water. In addition, water-containing e-liquids would also likely retaining the aroma profile since the free flavor aldehydes tend to have a stronger aroma than their corresponding acetals.

FUNDING: Federal

POS1-57

A BRIEF MINDFULNESS INTERVENTION AS A SUPPLEMENT TO SMOKING CESSATION TREATMENT: FEASIBILITY AND ACCEPTABILITY

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Significance: Initial research has indicated that mindfulness interventions may promote smoking cessation among socioeconomically disadvantaged adults. The current study evaluated the feasibility and acceptability of a brief mindfulness intervention as an adjunct to usual care (counseling and pharmacotherapy) for smoking cessation. Methods: Tobacco Treatment Specialists (TTS) were trained to deliver 5 weekly mindfulness practices to adults enrolling in a smoking cessation treatment program during individual counseling sessions. Mindfulness activities were 3-5 minutes in length and focused on 5 topics: nurturing negative emotions, raising conscious awareness, mindful breathing, intentional self-observation, and decentering. Participants received a brochure describing all activities and were encouraged to practice outside of scheduled appointments. Participants (N=32) and TTS (N=5) completed a feedback survey 4 weeks after the participants' scheduled quit date, which was the end of the counseling intervention period. Smoking cessation was assessed at 4 weeks post-quit-date via self-reported 7-day abstinence. Results: Participants (N=32) were primarily female (71.9%), of non-Hispanic White (65.6%), Black (15.6%), or other races (18.9%), and had an average age of 53.63 (SD=13.40) years. Overall, 56.2% of participants described their overall feelings about practicing mindfulness as a coping strategy for quitting tobacco as positive or very positive. Participants were most likely to prefer the mindful breathing activity (53.1%), and they most frequently practiced the self-observation activity (71.9%). In contrast, participants were least likely practice and enjoy the raising conscious awareness activity (12.5%, 21.9%, respectively). Most participants (62.5%) indicated that the mindfulness activities contributed to their success in quitting tobacco, and that they were likely or extremely likely to continue practicing mindfulness (66%). At 4 weeks post-quit, 40.6% (N=13) of participants reported that they had been abstinent from smoking during the previous 7 days. Most TTS (80%) perceived the intervention to be very or moderately useful to participants, and (60%) indicated that they perceived the breathing activity was the most helpful to those they counseled. Conclusion: Preliminary findings indicated that participants and TTS perceived the mindfulness intervention positively, though more research is needed to determine the effect of the intervention on cessation rates.

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POS1-58

ADOLESCENT ELECTRONIC CIGARETTE AND CANNABIS USE: A BIDIRECTIONAL RELATIONSHIP

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Significance: Adolescent poly-use of substances is a common phenomenon. While many studies have reported that electronic cigarette (e-cigarette) use is associated with higher risk of future cigarette smoking, less is known about the association between e-cigarette and subsequent cannabis use. We examine this prospective relationship in both directions. Methods: The Population Assessment of Tobacco and Health (PATH) Study is a nationally representative cohort study. We include adolescents who participated in both PATH wave 4.5 (2017-2018) and wave 5 (2018-2019). 9,828 cannabis-naïve adolescents are included to investigate the e-cigarette-to-cannabis association and 9,925 e-cigarette-naïve adolescents for the cannabis-to-e-cigarette association. We conduct multivariable logistic regressions, adjusting for sociodemographic characteristics, environmental factors, and other substance use. Results: For the e-cigarette-to-cannabis association, we assessed baseline e-cigarette use using ever, past 12-month, and past 30-day use. Subsequent cannabis use was measured using past 12-month and past 30-day use. We found significant positive associations across the different measures of e-cigarette use with subsequent cannabis use. For example, the adjusted relative risks (aRRs) of baseline ever e-cigarette use were 2.57 (95% CI, 2.04-3.09) with past 12-month cannabis use and 3.20 (95% CI, 2.10-4.31) with past 30-day cannabis use. For the cannabis-to-e-cigarette association, we included baseline ever and past 30-day cannabis use. Subsequent e-cigarette use was assessed via past 12-month use, past 30-day use, and frequent use (>= 20 days in the past 30 days). We also found significant positive associations between baseline cannabis use and subsequent e-cigarette use. For example, the aRRs of ever cannabis use were 1.53 (95% CI, 1.26-1.81) with past 12-month cannabis use and 1.70 (95% CI, 1.25-2.15) with past 30-day e-cigarette use. Conclusion: Our findings suggest a strong association between adolescent e-cigarette use and subsequent cannabis use, and also a positive association between cannabis use and subsequent e-cigarette use. The bidirectional prospective associations imply that both e-cigarette-only and cannabis-only users are more likely to use the other product subsequently than are baseline non-users of either product. It is possible that common factors may explain the onset of multiple substance use, with no specific pathway from one substance to the other.

POS1-59

HISPANIC/LATINX INDIVIDUALS' ATTRIBUTIONS FOR ABSTINENCE AND SMOKING: A CONTENT ANALYSIS OF OPEN-ENDED RESPONSES FROM A RANDOMIZED CESSATION TRIAL

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Significance: Little is known about facilitators and barriers to smoking cessation among Hispanics seeking treatment. This study examined self-reported attributions for abstinence or smoking among participants in a nationwide randomized controlled trial (N=1,417) testing a self-help smoking cessation intervention among Spanish-speaking

Hispanics in the United States (US), *Libre del Cigarrillo por mi familia y por mí: Guía para dejar de fumar* (LDC). Methods: A secondary analysis was conducted using a mixed-methods approach and data from follow-up assessments at 6-, 12-, 18-, and 24-months. Participants responded to open-ended items regarding reasons for either abstinence or smoking: "If you are currently smoking cigarettes, please tell us why you think you have not stopped smoking" and "If you have stopped smoking cigarettes, please tell us what has helped you quit smoking for good". A thematic content analysis of qualitative data was conducted using NVivo on the responses from 1,035 participants who responded to the open-ended items (73% of the original sample). Quantitative subgroup analyses explored differences in the frequency of abstinence and smoking attributions by sex, marital status, and annual household income. Results: *Mood Management* (e.g., stress and anxiety) and *Lack of Self-Efficacy* were the most frequent reasons for smoking across all timepoints. *Personal Health and Wellbeing* and the *LDC Intervention* were the most frequently cited reasons for quitting and maintaining abstinence across all follow-ups. Other less reported barriers (e.g., financial and immigration stressors, environmental disasters, COVID-19) and facilitators (e.g., family, religion/faith, using quit aids/e-cigarettes) were also identified. Subgroup analyses revealed that women, participants who were not married, and lower income participants were more likely to report *Mood Management* reasons for smoking at the 24-month timepoint. The *LDC* intervention was named an important facilitator of abstinence among low-income participants at 24 months, and for married participants at 6 and 12 months who were in that study arm. Higher income participants were more likely to attribute their quitting success to *Willpower* at 6 months. Conclusion: The identified facilitators and barriers to abstinence support and expand findings from previous studies with Hispanics by using a geographically and ethnically diverse sample of treatment seeking, Spanish-preferring smokers. They also provide specific factors, including some culturally-relevant attributions and sociodemographic characteristics, for targeting cessation and relapse prevention interventions designed to improve cessation outcomes and reduce tobacco-related health disparities among Hispanics in the US.

FUNDING: Federal; State

POS1-60

SOCIAL INFLUENCES ON HOOKAH USE AMONG COLLEGE STUDENTS IN TEXAS, 2014-2019

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Significance: Hookah bars and cafes have grown in popularity, particularly in urban areas and around college campuses. Almost 80% of current hookah users say that they use hookah because they like socializing while using the product. And almost half of a sample of college student exclusive hookah users reported having at least five friends who also use hookah. Consequently, peer effects have the potential to be influential, which could result in hookah users holding attitudes and beliefs about the product that facilitate use. Identifying modifiable risk factors that mediate the relationship between friend use and hookah use can help refine interventions for college students. The purpose of the present study was to examine whether willingness to date a hookah user as well as perceptions of risk and addictiveness mediate the relationship between friend use of hookah and past 30 day use among college students in Texas from 2014 to 2019. *Method*: Participants were students recruited from 24 Texas colleges between fall 2014 and spring 2015 to join Project M-PACT, a multi-wave, rapid surveillance system of tobacco use behaviors and marketing exposures. Participants (n=5,482) in the current analysis completed three waves, with one year between each wave. We tested the mediation model using path analyses. Friend use served as the exogenous variable, and was assessed in fall, 2014 by asking "How many of your close friends use hookah?" The three mediators were assessed in fall, 2015 by asking "I would date someone who uses hookah" "How harmful is hookah to health?" and "How addictive is hookah?" The dependent variable, hookah use, was assessed in fall, 2016 by asking "On how many of the past 30 days have you smoked hookah as intended (i.e. with tobacco)?" Analyses controlled for gender, age, race/ethnicity, type of college attended, hookah use and each of the mediators at baseline. *Results*: At baseline 16.7% reported current hookah use, and at the final wave 9.9% reported current hookah use. Friend use assessed at baseline predicted willingness to date a hookah user twelve months later (B=0.10, p<.001), but did not predict perceived addiction and harmfulness of hookah use. Willingness to date a hookah user then predicted hookah use twelve months later (B=0.05, p=.008). The indirect effect for being willing to date someone was = 0.005 (95% CI: 0.003, 0.007). Perceived harmfulness of hookahs predicted less hookah user twelve months later (B=-0.03, p<.001) but perceived addictiveness of hookahs did not. *Conclusion:* While being willing to date someone who uses hookah, did mediate the relationship between friend use and past 30 day use of hookah, neither perceptions of risk nor addictiveness did. Addressing social motivators of hookah use among college students may serve to promote norms that do not support hookah use.

FUNDING: Federal

POS1-61

SIMULATION MODELS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS): A SCOPING REVIEW

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Significance: Electronic nicotine delivery systems (ENDS) use has become increasingly common since their introduction in the mid 2000s, particularly among youth. There is limited information on the health impacts of ENDS use. Additionally, the effects of ENDS use on cigarette smoking initiation and cessation are debated. In response, researchers have deployed mathematical and computational simulation models to understand how ENDS use might affect smoking cessation, initiation, and tobacco-related health outcomes. We conducted a scoping review to explore the depth and breadth of this emerging body of literature, enabling us to provide modelers and users of modelling research with important information on the scope and range of models available. Methods: Pubmed and Embase were searched for papers published from January 1, 2007, which reported ENDS simulation modeling. The final search was conducted on January 10, 2022. PRISMA guidelines were followed. Two authors examined articles for inclusion with a third acting as a tie-breaker. Final data abstraction was conducted by two authors. Details on study location, model type, simulated tobacco products, study goals, simulated populations, data sources, and sensitivity analyses were abstracted. Results: The search identified 254 articles, of which 21 were deemed eligible for inclusion. A majority of papers featured models simulating the US population (N=14). Three papers simulated the UK, two New Zealand, one explored a Pennsylvania specific model, one simulated Singapore, and one simulated Canada. Types of models constructed included Agent based models, Decision Theoretic Models, Population Markov Models, and Life Table models. All models simulated cigarettes and ENDS but did not consider other tobacco products. The purpose of most studies was to project cigarette use (N=13), ENDS use (N=7), smoking and ENDS use attributable deaths (N=13), and health system costs (N=4). Few papers explicitly incorporated cigarette or ENDS policies in their modeling (N=7). Only one paper specifically looked at race/ethnicity and two papers explicitly examined youth ENDS use. Due to great uncertainty underlying ENDS related transitions, all models which explicitly simulated ENDS use had sensitivity analysis surrounding these parameters. All authors noted limitations based on few years of data on ENDS transitions and many called for more studies examining ENDS use in youth and adults. Conclusion: Preliminary results lead us to two main conclusions: First, there is a need for data sources to inform longitudinal transitions between ENDS and cigarette use. Second, there is a need of models that consider special populations, such as youth and people of color, who may be particularly affected by the impact of ENDS on smoking initiation and cessation.

FUNDING: Federal

POS1-62

AN EXAMINATION OF SOURCES OF E-CIGARETTE ACQUISITION BY DEVICE TYPE IN 2022

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Background: Prior to March 2020, social sources were the primary method of e-cigarette acquisition among youth and nicotine naïve users. Stay-at-home orders and social distancing implemented following the start of the COVID-19 pandemic presumably reduced socialization with peers and restricted access to e-cigarettes through social channels. Two years into the pandemic, there is a need to examine more recent data on how e-cigarette users access their products and whether that may differ by sociodemographic characteristics. Methods: Data were obtained from a cross-sectional, continuous tracking survey of participants aged 15-24 years. The analytic sample included current e-cigarette users who completed a survey in 2022 (n=7860). Respondents provided information on source of e-cigarette acquisition (retail or social) and device type (pod-based, tank-based, disposable, and vape pen), as well as sociodemographic characteristics (age, gender, and race/ethnicity). Differences in source of acquisition by age, gender, race/ethnicity, and device type were determined using chi-square tests of differences. Results: Respondents predominantly obtained their products through retail sources (55.2%) and reported using disposable e-cigarettes most recently (40%). E-cigarette source differed significantly across age, gender, race/ethnicity, and device

type. Greater proportions of e-cigarette users who obtained their e-cigarette products through social sources were under 21 years old (15-17 years: 27.0% vs. 8.8%, p<0.001; 18-20 years: 35.2% vs. 28.7%, p<0.001), female (53.7% vs. 49.3%, p=0.042), non-Hispanic White (60.3% vs. 54.1%, p=0.001), and non-Hispanic Black (12.8% vs. 11.1%, p=0.001), relative to those who obtained their e-cigarettes through retail sources. Additionally, most users who obtained products through retail sources were disposable users (44.1%) and tank users (10.5%), while those who obtained e-cigarettes through social sources were primarily vape pen users (33.4%). Conclusions: Although most individuals under 21 years are obtaining e-cigarettes via social sources, more than a third are still obtaining e-cigarettes through retail sources. Results indicate potential gaps in enforcement of the national tobacco 21 (T21) policy. Future research needs to focus on drivers of this trend, such as delivery options and sales through social media, and continue to monitor changes in e-cigarette sources over time.

FUNDING: Unfunded

POS1-63

EVALUATION OF THE UTILITY OF MENTAL HEALTH SCALES IN PREDICTING E-CIGARETTE USE

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Background: Given prior associations between mental health and e-cigarette use, there is a need to identify which mental health scales are correlated with e-cigarette use among youth and young adults. Objective: To evaluate associations between different mental health scales and e-cigarette use. Method: Data were obtained from the spring 2021 National College Health Assessment, a survey administered by the American College Health Association (N=16,074). Multiple logistic regressions including the effects of mental health scales [Kessler 6 Screener for Non-Specific Serious Mental Illness (Kessler 6), University of California-Los Angeles (UCLA) Loneliness Scale, and Connor-Davison Resilience Scale (CDRISC2)], adjusting for sociodemographic characteristics (age, sex, gender identity, sexual orientation, race/ethnicity, and region) and other combustible tobacco use (cigarettes, cigars, hookah), were used to predict past 3-month e-cigarette use. Results: Most respondents were female (60.5%) and White (71.8%). The Kessler 6, UCLA Loneliness Scale, and CDRISC2 independently predicted past 3-month e-cigarette use, even when adjusting for age, sex and gender, sexual orientation, race/ethnicity, geographic region, and use of other combustible tobacco products. Relative to those with no or low psychological distress under the Kessler 6, those with serious psychological distress had higher odds of reporting e-cigarette use in the past 3 months (OR: 1.38; 95% CI: 1.23, 1.56). Those who were positive for loneliness using the UCLA Loneliness scale were also had greater odds of reporting past 3-month e-cigarette use (OR = 1.13; 95% CI: 1.03, 1.22). Those with higher levels of resilience according to the CDRISC2 had lower odds of reported past 3-month use of e-cigarettes (OR=0.97; 95% CI: 0.95, 0.99). When including all mental health scales in the same model predicting past 3-month e-cigarette use, the Kessler 6 remained associated (OR = 1.33; 95% CI: 1.16, for those with serious psychological distress, compared to those with no or low psychological stress). Discussion: Results demonstrate cross-sectional associations between mental health scales measuring psychological distress, loneliness, and resilience and past 3-month e-cigarette use among a nationally representative college sample. Longitudinal research is needed to better understand the direction of the association between mental health and e-cigarette use to guide prevention and intervention strategies.

FUNDING: Unfunded

POS1-64

FREQUENCY OF SOCIAL MEDIA USE AND EXPOSURE TO TOBACCO OR NICOTINE-RELATED CONTENT IN ASSOCIATION WITH E-CIGARETTE USE AMONG YOUTH: A CROSS-SECTIONAL SURVEY ANALYSIS

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Background: Social media use and exposure to content featuring e-cigarette products on social media has been associated with e-cigarette use among adolescents. Considering popularity of video- and image-based platforms (e.g., TikTok, Instagram) and declining interest in traditional text-based and social network platforms (e.g., Twitter, Facebook) among adolescents, there is a need to separately examine and compare the effect of social media platforms widely used by adolescents on adolescent e-cigarette use. In this study, we analyzed use frequency of three social media platforms that were most popular among adolescents in 2021: Instagram, TikTok and YouTube as well as frequency of exposure to and interaction with tobacco or nicotine-related content, including e-cigarettes, on each of these platforms in association with adolescent e-cigarette use. Methods: A cross-sectional analysis was used based on a self-reported survey conducted online in January - May 2022 among socioeconomically- and racially-diverse Los Angeles, California high school students (N=1,993). Pearson's chi-square tests and logistic regression models were used. Results: Adolescents had higher odds of e-cigarette ever-use if they used Instagram (adjusted odds ratio [AOR] = 3.54; 95% CI: 2.41;5.20) or TikTok (AOR = 1.87; CI: 1.18;2.96) several times per day, and lower odds of e-cigarette ever-use if they used YouTube (AOR = 0.23; CI: 0.13;0.42) several times per day, compared to adolescents who did not use these platforms. Adolescents had higher odds of e-cigarette ever-use if they reported seeing tobacco or nicotine posts, including e-cigarettes, on TikTok (AOR = 1.82; CI: 1.29;2.55) at least weekly, compared to adolescents who reported seeing such content on TikTok monthly or less frequently. Conclusions: Frequent use of Instagram and TikTok and frequent exposure to tobacco content on TikTok are associated with increased e-cigarette use, while frequent use of YouTube is associated with decreased e-cigarette use among adolescents (possibly, because of exposure to anti-e-cigarette videos on YouTube). E-cigarette-related content on social media requires stronger regulation and better enforcement by platforms of their own policies restricting tobacco content. At the same time, more anti-e-cigarette youth-appealing content, including educational or advocacy campaigns featuring influencers or even members of general public, should be disseminated on social media platforms popular among youth.

FUNDING: Federal

POS1-65

SOCIODEMOGRAPHIC PATTERNS OF CIGARETTE AND ENDS TRANSITIONS IN THE PATH STUDY: A MULTISTATE TRANSITION MODEL ANALYSIS OF ADULTS AND YOUTH IN 2015-2017 VS 2017-2019

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Significance. The landscape of electronic nicotine delivery systems (ENDS) has changed dramatically, particularly with the rise of pods and disposables, starting in late 2017. It is unknown how these changes have impacted sociodemographic patterns of initiation, cessation, and transitions between cigarettes, ENDS, and dual use. Methods. A multistate transition model was applied to 24,242 adults and 12,067 youth in Waves 2-4 (2015-2017) of the Population Assessment of Tobacco and Health (PATH) Study and 28,061 adults and 12,538 youth in Waves 4-5 (2017-2019). Hazards for initiation, cessation, and product transitions were estimated in multivariable models, accounting for gender, age group, race/ethnicity, and daily vs non-daily cigarette and ENDS use, for adults vs youth and 2015-2017 vs 2017-2019. Results. There were few changes in transitions patterns by gender or race/ethnicity for adults or youth. Among adult non-current users, the age gradient in ENDS initiation from non-current use increased over time (Hazard ratio (HR) 9.5 (95%CI 5.5, 16.4) for ages 18-24 vs 35-54 years in 2015-2017 and HR 22.2 (95%CI 14.0, 35.2) in 2017-2019), as did the age gradient in the transition from dual to ENDS-only use (HR 1.3 (95%CI 0.6, 2.7) for ages 18-24 vs 35-54 years in 2015-2017 and HR 5.5 (95%CI 2.4, 12.5) in 2017-2019). These changes correspond to 1-year probabilities of non-current users transitioning to ENDS-only use of 1.9% (95%CI 0.4, 3.4) and 0.2% (95%CI 0.1, 0.4) among ages 18-24 and 35-54 years, respectively, in 2015-2017 and 4.8% (95%CI 0.0, 9.8) and 0.3% (95%CI 0.0, 0.5), respectively, in 2017-2019; and to 1-year probabilities of dual users transitioning to ENDS-only use of 9.3% (95%CI 0.4, 3.4) and 6.3% (95%CI 0.1, 0.4) among ages 18-24 and 35-54 years, respectively, in 2015-2017 and 29.9% (95%CI 0.0, 9.8) and 5.6% (95%CI 0.0, 0.5), respectively, in 2017-2019. Youth ages 12-14 had a lower initiation rate of cigarettes (HR 0.26 (95%CI 0.07, 0.99) in 2017-2019) and ENDS (HR 0.026 (95%CI 0.20, 0.33)) than those ages 15-17, as well as a higher rate of ENDS cessation (HR 1.84 (95%CI 1.07, 3.17)) and nearly no cigarette initiation among ENDS-only users (HR 0.00 (95%CI 0.00, 0.01)). The hazard ratios for youth did not change significantly from 2015-2017 to 2017-2019, but the absolute hazard of ENDS initiation increased. Conclusions. Young adult non-current and dual users have become increasing likely to transition to ENDS only use, compared to older adults.

FUNDING: Federal

POS1-66

EXAMINING YOUNG ADULT E-CIGARETTE USERS BY DEVICE TYPE: A LATENT CLASS ANALYSIS

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Purpose. The purpose of this study was to explore if there are heterogeneous groups of young adult e-cigarette users when examining their use by device type. Methods. An online sample of young adult e-cigarette users (n = 595) was collected in October 2021. Participants reported their current and past use of e-cigarettes as well as the type of e-cigarette devices they had used in the past 30-days. Types of e-cigarette devices listed included vape pens, mod and mech mods, box mods, JUUL, other non-JUUL pod-based systems, Puff Bar, and non-Puff Bar disposable devices. A latent class analysis (LCA) was used to group e-cigarette users into classes based on their past 30-day use of different device types. Results. Despite what appeared to be a distinct difference in the basic frequencies of e-cigarette device types by newer generation e-cigarette devices such as JUUL (33.4%), Puff Bar (29.1%), and other non-Puff Bar disposable devices (37.8%) and older generation e-cigarette device users such as mech mods (14.3%) and box mods (17%), the LCA found there to be 5 different classes of e-cigarette users when grouped by use of device type. These classes included JUUL only users (31.2%), Box Mod only users (22.3%), non-JUUL pod-based system only users (21.6%), non-Puff Bar disposable only users (18.9%), and users of all e-cigarette devices (6.1%). Discussion. Although the majority of the sample was found to report younger generation devices, there were distinct classes of e-cigarette users based on the type of device and brand loyalty to highly marketed devices. These findings may suggest that young adult e-cigarette users are not a homogenous group, and should not be classified as such in tobacco research. Understanding these different types of e-cigarette users can help researchers understand how to better examine behaviors and beliefs among these different users. Additionally, findings can help those in prevention target messages to appropriate audiences.

FUNDING: Academic Institution; Other

POS1-67

PREFERENCES FOR LEGALIZED NON-MEDICAL CANNABIS AMONG CURRENT NICOTINE USERS: FINDINGS FROM THE 2020 ITC 4CV SURVEY IN AUSTRALIA, CANADA, ENGLAND, AND THE UNITED STATES

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Significance: While public support for non-medical (recreational) cannabis has increased in many jurisdictions, little is known about the type of cannabis law preferred by adult nicotine consumers, who constitute a significant portion of cannabis consumers. We examined the type of law preferred by current nicotine consumers in four countries with differing cannabis policies and among those who do and do not use cannabis. Methods: Data are from adult (age =18) current (=monthly) smokers and/or vapers from the 2020 ITC Smoking and Vaping Survey in Australia (AU; legal medical-only cannabis), Canada (CA; legal non-medical cannabis), England (EN; legal medical-only cannabis), and US (illegal federally; legal medical-only: 37 states; legal non-medical: 19 states). Cannabis use was defined as 'past 30-day' (n=2473); '1-12 months ago' (n=951); '>1 year ago' (n=2537); 'never used' (n=4044). All respondents were asked: "*What kind of law would you prefer for your state (US)/country (CA, EN, AU)?*" Response options were: 'both recreational and medical'; 'only medical'; 'complete ban'; or 'don't know'. Weighted regression analyses were used to examine preferred cannabis law, and whether respondents preferred a legal non-medical law vs. not (medical-only/complete ban/don't know) by recency of cannabis use and by country, adjusting for sociodemographics and other covariates related to cannabis use (e.g., alcohol use, depression). Results: Overall, 62.5% of respondents reported a preference for non-medical cannabis (legal medical-only=26.7%, complete cannabis ban=5.2%, and don't know=5.6%). A preference for legal medical-only cannabis was significantly higher in AU (34.6%) and EN (33.2%) compared to CA (22.6%) and the US (20.2%). There were no differences in the preference for a complete ban (ranging from 4.2% in AU to 6.5% in EN). When we examined factors associated with a preference for a non-medical cannabis law (vs. other responses), past 30-day cannabis consumers were significantly more likely to prefer legal non-medical cannabis (89.3%) than those who used cannabis 1-12 months ago (73.1%), >1 year ago (61.1%), or never used cannabis (34.1%, all p<0.001). Preference for non-medical cannabis was higher in the US (69.2%), CA (67.2%) and AU (57.6%) than in EN (54.1%), and was significantly higher among males, those who identified as White and who perceived greater public approval of cannabis. Conclusion: Many nicotine consumers prefer non-medical cannabis laws, particularly current cannabis consumers. Given evidence that nicotine consumers may be more likely to initiate and continue cannabis use, and be at higher risk for adverse outcomes relative to single-product consumers, increased access through legalization may disproportionately affect nicotine consumers and should be considered in public health efforts.

FUNDING: Nonprofit grant funding entity

POS1-68

PERCEPTIONS ABOUT EXPOSURE TO CHEMICALS FROM E-CIGARETTES RELATIVE TO CIGARETTES, AND ASSOCIATIONS WITH RELATIVE HARM PERCEPTIONS AND E-CIGARETTE USE AND INTEREST

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Significance: Exposure to chemicals is a major determinant of harm from nicotine products, and e-cigarette communications may address chemical exposure issues. However, while e-cigarette studies commonly measure perceived harm of e-cigarettes relative to cigarettes, few have assessed the perceived level of chemicals in e-cigarettes relative to cigarettes. We examined perceptions of chemical levels in e-cigarettes compared to cigarettes, as well as associations with relative harm perceptions, current e-cigarette use, and future use interest. Methods: In January 2021, we surveyed 1018 adults who smoke and 1051 young adult (YA) non-smokers (ages 18-29) from a nationally representative US research panel. We asked (1) if they thought e-cigarettes are less, about the same, or more harmful to health than smoking cigarettes, and (2) if e-cigarettes contain fewer, about the same, or more harmful chemicals than cigarettes ("don't know" was also a response option for both). We analyzed data using descriptive statistics and multivariable logistic regression models. Results: About 20% of smokers and YA non-smokers believed e-cigarettes contain fewer harmful chemicals than cigarettes (about 36% and 25% said "don't know," respectively). About half (54%) of those who thought e-cigarettes contain fewer harmful chemicals also indicated thinking that e-cigarettes are less harmful to health than cigarettes. Among adults who smoke and YA non-smokers, both perceiving e-cigarettes as containing fewer harmful chemicals (versus same or more chemicals) and perceiving e-cigarettes as being less harmful (versus as or more harmful) were significantly associated with higher odds of past 30-day e-cigarette use, respectively (AOR=9.7, AOR=10.2, smokers; AOR=2.6, AOR=3.1, YA non-smokers). However, among smokers who did not already currently use e-cigarettes, only believing e-cigarettes contain fewer harmful chemicals (relative to the same or higher amount of chemicals) was significantly associated with interest in using e-cigarettes in the next six months (AOR=9.3, 95% CI=2.45-35.4). Neither belief was associated with greater interest among YA non-smokers who were not already current e-cigarette users. Conclusions: Most adults who smoke and young adult non-smokers do not think e-cigarettes have fewer chemicals than cigarettes. Believing e-cigarettes contain fewer chemicals may stimulate product interest for some but may not necessarily align with reduced harm product beliefs.

FUNDING: Federal

POS1-69

IMPACT OF ELECTRONIC CIGARETTE USE ON INDOOR AIR QUALITY INSIDE OF VEHICLES

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Significance: Policies have been implemented that prohibit indoor cigarette smoking including some policies that prohibit smoking in private vehicles when children are present. Electronic cigarette (ECIG) aerosol contains harmful toxicants, however, few policies that limit cigarette smoking also include ECIGs and many ECIG users report ECIG use inside of vehicles. This study's purpose was to examine the impact of ECIG use inside of a vehicle on indoor air quality. Methods: Current ECIG users (n=60; 37.7% women; 83.6% white; mean age=20.5, SD=2.3) who owned a vehicle and reported ECIG use inside of their vehicle were recruited for the study. Participants completed a brief survey examining ECIG/tobacco use behaviors and demographics. Participants then sat in the driver's seat of their vehicle with all windows closed and completed a 30-minute

ECIG use session using their own ECIG device. The session included a 5-minute, 10-puff directed bout (i.e. participants required to take 10 puffs, 1 puff every 30 seconds) followed by a 25-minute *ad-libitum* bout (i.e., participants could take as many puffs as desired). Particulate matter 2.5 µm in diameter and smaller ($PM_{2.5}$) was measured every minute from 1 minute before and throughout the sessions using optical sensors that sampled air from the breathing zone of the passenger seat. $PM_{2.5}$ concentrations were determined by applying correction factors developed through gravimetric analysis in a laboratory exposure chamber to real-time sensor readings from participants' vehicles. Results: Most participants (82.0%) reported ECIG use every day and the majority reported using a pod mod (35.0%) or disposable (61.7%) ECIG device. Participants reported ECIG use almost always (46.7%) or sometimes (43.3%) when they were in their vehicle. During the directed bout, peak $PM_{2.5}$ concentrations (mean=1,665.59 µg/m^3) were significantly greater than baseline concentrations of 5.71 µg/m^3 ($t(59)=2.78$, $p=0.007$). Including the 10 directed bout puffs, participants took 29.4 (SD=42.76) puffs during the session and peak $PM_{2.5}$ concentrations ranged from 2.84 to 123,003.35 µg/m^3. Peak $PM_{2.5}$ concentrations during the *ad libitum* bout were correlated with puff count ($r=0.93$, $p<0.001$). Conclusions: ECIG use inside of vehicles impacts air quality in a dose-response manner and exposes bystanders to toxicants present in ECIG aerosol. Policies that prohibit tobacco use inside of vehicles should include ECIG use restrictions to prevent unwanted exposures.

FUNDING: Federal

POS1-70

ELECTRONIC CIGARETTE DEPENDENCE AMONG FORMER CIGARETTE SMOKERS: ASSOCIATION WITH DEVICE AND USER CHARACTERISTICS

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Significance: The ability of an electronic cigarette (ECIG) to produce dependence likely varies as a function of its ability to deliver nicotine, which is determined by interactions between device/liquid features and user behaviors. This study examined the association of such factors with ECIG dependence level among ECIG users who were former cigarette smokers. Methods: Former-smoking ECIG users (N=196) recruited from Amazon MTurk completed an online survey February-June 2022. Participants uploaded a picture of their ECIG device and liquid, which was coded by two independent raters according to device type (vape pen, mod, pods, modern disposable) and individual characteristics (refillable, adjustable power, flavor, nicotine concentration). Participants reported their duration and frequency of ECIG use and completed the Penn State Electronic Dependence Index. Multivariable linear regressions examined these device and user features as predictors of dependence, controlling for age, gender, and race. Results: Participants had a mean age of 34.2 years (*SD*=8.6), and identified primarily as white (88.3%) and female (57.1%). They reported using a nicotine-containing ECIG, on average, 7.0 (*SD*=0.3) days/week, for 4.3 (*SD*=2.7) years. They had not smoked cigarettes for an average of 3.2 (*SD*=3.4) years, and reported smoking for 10.3 (*SD*=8.1) years before quitting. The most used device types were mods (39.8%), followed by pods (36.7%), modern disposables (19.9%), and vape pens (3.6%). The mean PSECDI score was 11.1 (*SD*=4.4), indicating moderate levels of dependence. Using mods, relative to using pod devices, was associated with lower ECIG dependence scores (*B*=-2.61, *SE*=1.16, $p=0.025$). When individual characteristics were included in the model, longer durations of use were associated with higher dependence scores (*B*=0.25, *SE*=0.12, $p=0.037$). No differences in dependence levels were observed for other device types or use behaviors, or for any individual device/liquid characteristics. Conclusions: Differences in ECIG dependence were largely independent of the various device features and use behaviors evaluated here. Findings corroborate previous work suggesting that many currently available ECIG products are capable of producing dependence.

FUNDING: Federal

POS1-71

ASSOCIATION OF SMOKING AND QUITTING BEHAVIOR WITH PERCEIVED AND EXPERIENCED MENTAL HEALTH STATUS AMONG ADULTS WHO SMOKE CIGARETTES, POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY, 2019

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Objective: The link between poor mental health and smoking prevalence and cessation relapse is well-documented. Self-rated mental health (SRMH; perceived mental health), moderately correlates with the severity of internalizing problems (IP), assessing experienced negative emotions such as, depression and anxiety. However, SRMH may provide a deeper insight into the individual's mental health status beyond that explained by IP. Therefore, we investigated the relationship of cigarette use behavior, namely current smoking or quit, and SRMH as a measure of mental health controlling for IP. Methods: This cross-sectional study analyzed data from Wave 5 (2019) of a national longitudinal study of U.S. adults, Population Assessment of Tobacco and Health (PATH). Adults who smoked 100 cigarettes in their lifetime comprised this study sample (N=10,079). Main behavior outcome (current smoking or quit), labeled as *smoke or quit,* included 3 groups: *smoke,* defined as now smoke 'every day' or 'somedays;' *quit<3m;* and *quit=3m* based on time since last smoked in adults who now did 'not smoke at all.' SRMH ranged from excellent-poor; and IP had 3 levels of symptom severity (mild, moderate, high). Weighted descriptive statistics and multinomial logistic regression were conducted. Two models were evaluated: one with IP alone and the other with both IP and SRMH. Results: Overall, of adults in this sample, 6.3% had *quit<3m*, 14.7% had *quit=3m*, and the rest reported current smoking. Behavior outcome, *smoke or quit,* varied significantly by SRMH, even after controlling for IP. Those who rate their mental health 'excellent,' rather than 'poor,' were more likely to report having *quit<3m* than to report current smoking (AOR 2.2, 95% CI 1.1, 4.7). Adults with mild and moderate IP were more likely to have *quit=3m, than to currently smoke* (mild AOR 1.3, 95% CI 1.1, 1.7; moderate AOR 1.5, 95% CI 1.1, 1.9). Compared to adults aged 18-24 years, older adults (55+) had lower odds of being quit than smoke (*quit<3m* AOR 0.2, 95% CI 0.1, 0.9; *quit=3m* AOR 0.7, 95% CI 0.5, 0.9). Discussion: Findings suggest that while sustained abstinence (=3m) is associated with enjoying mental health (suffering none-to-mild symptoms), early smoking abstinence (<3m) is associated with higher self-rated mental health. Results confirm the bidirectional relationship between mental health and maintenance of smoking habit. Improving self-rated mental health could promote early smoking abstinence.

FUNDING: Federal

POS1-72

"TOBACCO-FREE NICOTINE" E-CIGARETTE USE AND MINT/MENTHOL FLAVORED E-CIGARETTE USE AMONG YOUNG ADULTS

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Background: Mint/menthol flavors have been shown to reduce nicotine-associated harshness and enhance the appeal of e-cigarettes among young people. Although the US FDA banned menthol flavor in cigarettes and cigars, this rule does not extend to menthol e-cigarettes. Recently, "Tobacco-Free Nicotine" (TFN) e-cigarette products were introduced to the market in a variety of flavors including mint/menthol flavors, which may attract TFN e-cigarette use. However, there is a dearth of research exploring the role of mint/menthol flavors in TFN e-cigarette use. This study aims to examine how mint/menthol-flavored e-cigarette use influences susceptibility and use of TFN e-cigarettes. Methods: In Fall 2021, 1,239 young adults aged 18-25 years participated in an online Qualtrics™ panel survey. The analytic sample was limited to those who had heard of TFN e-cigarettes (n=579). Outcomes were lifetime use of and susceptibility to TFN e-cigarettes. Binary logistic regression analyses examined associations between mint/menthol-flavored e-cigarette use and TFN lifetime use and susceptibility respectively, adjusting for demographics and other substance use. Further, we examined the number of flavors used and e-cigarette device types used on the two outcomes. Results: Of those who had heard of TFN, 78.9% were lifetime e-cigarette users and 52.0% used mint/menthol flavors. Among the lifetime e-cigarette users, 65.9% reported TFN lifetime use and 12.9% reported susceptibility. Regarding use, adjusted models showed that lifetime e-cigarette users who used mint/menthol flavors (vs. other flavors) were more likely to report TFN lifetime use (OR=2.10, 95%CI [1.19,3.68]; $p<0.05$). Additionally, using more flavors and using disposable pod vapes were associated with higher odds of TFN use (p-values<0.05). TFN susceptibility was not associated with mint/menthol-flavored e-cigarette use ($p>0.05$) but was related to disposable pod vape use ($p<0.001$). Conclusions: Mint/menthol-flavored e-cigarette use was associated with TFN lifetime e-cigarette use among US young adults. Given a variety of flavors are available in TFN e-cigarette products including many flavors with menthol or minty components, mint/menthol flavor use may be a unique factor associated with the appeal of TFN e-cigarette products. Further research is warranted to understand the mechanism of the association between mint/menthol-flavored e-cigarette use and TFN product use as well as how the mint/menthol flavors interact TFN products to contribute to reinforcement and addictiveness in e-cigarette use among young people.

FUNDING: Federal

POS1-73

EVALUATION OF A STATEWIDE SOCIAL MEDIA TOBACCO PREVENTION CAMPAIGN

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Significance: Each year, more than 14,000 preventable deaths are attributed to tobacco use in North Carolina. Although communication campaigns are an evidence-based strategy to prevent and reduce tobacco use and social media is an increasingly important source of information for users, few evaluations have examined the reach and engagement of a statewide, social media tobacco prevention campaign. Methods: We created a social media campaign called "North Carolinians for a Tobacco-Free Generation" (NCTFG). We designed NCTFG to target the engaged public and decision makers (e.g., legislators, community leaders in North Carolina) to 1) increase knowledge of the hazards of tobacco use and 2) increase understanding of and support for evidence-based tobacco prevention and control policies. Between November 5, 2021 and May 5, 2022, we measured the reach and engagement of NCTFG's social media campaign on Twitter and Facebook using several metrics such as the number of followers and post interactions (the summation of likes, comments, and shares.) Results: Over a six-month period, we created 312 posts for Twitter (73%, n=229) and Facebook (27%, n=83). The posts focused on: harms of tobacco use, effective tobacco control policies, statistics about tobacco use, tobacco-related news stories, upcoming events, and local stakeholders and organizations. To engage local stakeholders and organizations, we: 1) conducted spotlight interviews, 2) organized three Twitter chats, and 3) shared posts from other tobacco control organizations. Across both platforms, we amassed 221 followers with slightly more followers on Twitter (n=124, 56%) than Facebook (n=97, 44%). Twitter received slightly more engagement (as measured by post interactions) than Facebook. Posts that mentioned local stakeholders, effective tobacco control policies relevant to North Carolinians, or contained photos, videos, or GIFs performed well on both platforms. Conclusions: To optimize reach and engagement, statewide social media tobacco prevention campaigns could consider curating and tailoring content for different social media platforms and connecting with local stakeholders and organizations via interviews and Twitter chats.

FUNDING: Federal

POS1-74

THE LANDSCAPE OF CIGAR MARKETING IN PRINT MAGAZINES FROM 2018-2021: CONTENT, EXPENDITURES, VOLUME, PLACEMENT AND REACH

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Introduction. Cigar consumption has increased in the U.S. over the past decade, yet there are gaps in the research on how cigars are promoted. This includes the promotion of cigars in print magazines, which are one of the few channels available to the general public. This study aims to examine print magazine ad placement, volume, ad characteristics and associated expenditures for cigars from 2018-2021, as well as readership data for print magazines containing cigar ads. Methods. We merged content analysis data with Kantar Media data on magazine placement and expenditures. Magazine readership data were obtained from MRI-Simmons. Results. The only brand featured in print magazines was Black & Mild, a top cigar brand in the U.S. There were 30 unique Black & Mild print magazine ads and 284 occurrences (i.e., appearances in magazines), translating to $46,504,578 in expenditures. All ads featured the word "enjoy/enjoyment" and a warning label. Filtered cigars were the most featured cigar type (75%) and sweets was the most featured flavor (78%). Black & Mild ads were identified in 26 different publications, with readership figures ranging from approximately 2 to 11.9 million (see Table 2). Almost all publications have disproportionate Black/African American readership. Conclusions. This study identified advertising tactics used in print advertising for a top cigar brand. Future research should examine how these tactics impact consumer perceptions and behavioral intentions. Findings regarding cigar print ads reaching vulnerable populations may inform FDA's regulatory efforts to reduce tobacco-related health disparities through regulations and public education campaigns.

FUNDING: Federal

POS1-75

TESTING POLYTOBACCO PUBLIC EDUCATION MESSAGES ADAPTED FROM EFFECTIVE TOBACCO PREVENTION MASS MEDIA CAMPAIGNS: RESULTS FROM AN ONLINE MESSAGE TESTING TRIAL

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SIGNIFICANCE: Polytobacco use is increasingly popular among young people. Unfortunately, no current mass media prevention campaigns include polytobacco themes and little is known about how to effectively target polytobacco use through communication efforts. The current study tested novel messages targeting young adult polytobacco use. METHODS: A message trial was conducted in U.S. Amazon Mechanical Turk workers (n=952) aged 18-24 using a 3 (campaign: Truth, FinishIT, and The Real Cost) × 3 (theme: original campaign message, message adapted to address polytobacco use, message adapted to address polysubstance use) design with sixteen tobacco-focused prevention messages in each of the six categories (n=108 messages total). Participants were randomly assigned to view three messages in a web-based survey: one original, one polytobacco, and one polysubstance message. For each message, they responded to items on likeability, FDA's 5-item message perceptions (MP) scale, and a validated 3-item scale of perceived message effectiveness (PME) that related to polytobacco use. Linear mixed effects models assessed the effect of campaign, theme, and their interaction on message response. RESULTS: Messages derived from FinishIt (PME M=3.54[0.96]; MP M=3.37[1.00]) and The Real Cost (PME M=3.46[0.99]; MP M=3.41[1.02]) had lower MP and PME compared with Truth (PME M=3.61 [0.90]; MP M=3.59[0.92]) messages. PME did not significantly differ by message theme; however, polysubstance use messages had lower MP ratings than original messages (M=3.48[0.99]). Interactions between campaign and theme demonstrated lower PME ratings for The Real Cost + Polytobacco messages compared with Truth's original messages. We found no fixed or interaction effects of campaign and theme on MP. CONCLUSION: Polytobacco messages modeled from previous mass media campaigns produced similar message responses to original messages and did not appear to discourage polytobacco use more than original or polysubstance use messages. Overall results may underestimate the effectiveness of individual messages tested in this study.

FUNDING: Federal

POS1-76

EFFECTIVENESS OF THE OFFER OF THE SMOKE FREE SMARTPHONE APPLICATION COMPARED WITH NO INTERVENTION FOR SMOKING CESSATION: A PRAGMATIC RANDOMISED CONTROLLED TRIAL

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Significance: This study aimed to evaluate the effectiveness of the offer of *Smoke Free*, an evidence-informed, widely used app for smoking cessation compared with no support. Methods: This was a randomised controlled trial conducted online with no restrictions on location. 3143 adult smokers motivated to make a quit attempt in the next month, recruited between August 2020 and April 2021, were randomised to receive offer of the *Smoke Free* app plus follow-up (intervention) versus follow-up only (comparator). Both groups were shown a brief message at the end of the baseline questionnaire encouraging them to make a quit attempt. The primary outcome was self-reported 6-month continuous abstinence assessed 7 months after randomisation. Secondary outcomes included quit attempts in the first month post-randomisation, 3-month continuous abstinence assessed at 4 months, and 6-month continuous abstinence at 7 months among those who made a quit attempt. The primary analysis was performed on an intention-to-treat basis, with missing-equals-smoking imputation. Sensitivity analyses were performed restricting the intervention group to those who took up the offer of the app, on complete cases, and using multiple imputation. Results: The follow-up rate for 7 months was 41.9%. 22.7% of those offered the Smoke Free app registered for the app. In the intention-to-treat analysis, the rate of 6-month continuous abstinence was similar in the intervention and comparator arms (6.8% vs. 7.0%; RR=0.97, 95%CI=0.75-1.13). Six-month continuous abstinence rates were higher in those who registered for the app than those in the comparator group (10.4% vs. 7.0%; RR=1.48, 95%CI=1.03-2.09), although this difference was attenuated after adjustment for key baseline characteristics (RR=1.32, 95%CI=0.92-1.85). Participants in the intervention group were 25% less

likely to report a quit attempt compared with those in the comparator group (11.5% vs. 15.3%; RR=0.75, 95%CI=0.63-0.90), but this was attributable to the lower response rate to the 1-month follow-up in the intervention versus comparator group (16.3% vs. 22.5%) with no difference observed in any of the sensitivity analyses. There was no significant difference between groups in 3-month continuous abstinence rates (RR=0.84, 95%CI=0.57-1.24) or 6-month continuous abstinence among those who tried to quit (RR=1.20, 95%CI=0.83-1.73); results consistently observed across sensitivity analyses. Conclusions: Less than a quarter of smokers offered the Smoke Free app registered for it. Those who were offered the app did not achieve a higher 6-month continuous abstinence rate than those not offered the app, but there was some evidence that those who took up the offer did achieve a higher abstinence rate.

POS1-77

SEX DIFFERENCES IN THE ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND TOBACCO USE PATTERNS AMONG ADULTS IN THE UNITED STATES

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Significance: Adverse childhood experiences (ACEs), which refer to traumatic events that occur in childhood, have been identified as risk factors for tobacco use in adulthood. Data is limited on the sex differences in the association between ACEs and tobacco use. This study explored sex differences in the association between ACEs and tobacco use patterns among adults in the United States. Methods: This was a cross-sectional analysis of data from adults aged =18 years in the 2020 Behavioral Risk Factor Surveillance System (N=62,768). ACEs, the independent variable, was assessed from 11 questions related to childhood emotional abuse, physical abuse, sexual abuse, and household dysfunction. Response options were coded no = 0 or yes = 1. An ACE composite score was calculated by summing affirmative responses ranging from 0 to 11 and categorized as 0 (reference), 1, 2, 3 or =4. The dependent variable, tobacco use patterns, included non-use (reference), e-cigarette only, cigarette only, and dual use of e-cigarettes and cigarettes. Multinomial logistic regression was applied testing the interaction between sex and ACEs while controlling for sociodemographic factors, depression, smokeless tobacco, marijuana, and heavy alcohol consumption. Subsequent models were stratified by sex. Results: Of the sample population, 57% were female. Among females, 17.5% reported =4 ACEs, while 12.7% of males reported =4 ACEs. Although we found no statistically significant interaction by sex, a greater number of ACEs were associated with higher odds of tobacco use patterns among females and males, with varying strengths of associations. Specifically, females who reported =4 ACEs compared to none, had higher odds of e-cigarette (adjusted odds ratio [95% confidence interval]: 3.83 [1.64-8.94]), cigarette (2.78 [1.90-4.06]) and dual use (3.50 [1.96-6.22]) relative to non-use. Males with =4 ACEs had higher odds of cigarette (1.75 [1.16-2.63]) and dual use (7.77 [4.06-14.88]). Conclusion: Our findings underscore the importance of developing sex-appropriate trauma-informed intervention strategies. It is also important to consider ACEs when designing tobacco-specific preventive programs to curb initiation and promote cessation among US adults.

POS1-78

EVALUATION OF THE IMPLEMENTATION OF AN E-REFERRAL SYSTEM FOR SMOKING CESSATION AT MOFFITT CANCER CENTER: A QUALITATIVE STUDY

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Background: Promoting smoking cessation is recognized as an essential part of cancer care. However, many cancer patients are not referred to smoking cessation services. Moffitt Cancer Center is one of the NCI-designated cancer centers that was supported by the NCI Cancer Moonshot Cancer Center Cessation Initiative (C3I) to build the smoking cessation infrastructure for their patients. To improve access to smoking cessation treatment, an opt-out based automatic e-referral system for Tobacco Quitline services was developed and implemented in March 2021, along with options for local group support and an in-house tobacco treatment specialist. This study evaluated implementation outcomes, barriers, and facilitators of the e-referral system one year after its launch to inform program improvements and long-term sustainability. Method: Using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework, we conducted semi-structured interviews with 12 steering committee members responsible for developing and implementing the new clinical workflow representing diverse disciplines, and 12 nurses who were expected to use the new e-referral system. Interviews were audio-recorded, transcribed, and coded. Qualitative thematic content analyses were conducted. Results: The results revealed that interviewees perceived the e-referral system as an effective strategy for identifying and referring smokers to cessation services. However, challenges regarding adoption and implementation included nurses' perceptions that smoking cessation was a lower priority compared to other clinical care concerns, competing demands, and perceptions that some patients were likely to have low motivation to quit smoking. Suggestions to improve future implementation and sustainability included: (1) sending providers regular reminders to refer smokers using the system, (2) giving providers and patients additional information about the differences between various referral options, and (3) providing both groups with better descriptions on what to expect next after a referral is made. Conclusion: Overall, key stakeholders felt that initial implementation of the e-referral system was successful; however, additional implementation strategies are needed to ensure sustainability including regular reminders on the e-referral system and further trainings on various referral services and their processes.

FUNDING: Federal

POS1-79

DOES INHALING OTHER SUBSTANCES INTERFERE WITH QUITTING SMOKING? A TEST OF THE COMMON ROUTE OF ADMINISTRATION THEORY WITH E-CIGARETTES AND SMOKING CANNABIS

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Significance: Reducing combustible cigarette use is a major public health concern. The current study is a test of the common route of administration theory - the idea that using substances in similar ways (e.g., by inhaling them) increases their co-use. Analyses examine how the use of e-cigarettes and smoking cannabis, both separately and together, impact combustible cigarette trajectories among a sample of young adult smokers. In addition to examining how each inhaled substance may affect quitting combustible cigarettes independently, the study tested for a potential synergistic effect of using both substances. Methods: The current study used three waves of data from the Community Youth Development Study (CYDS), a longitudinal study established in 2003 that has followed 4407 youth from 24 communities across seven states (Colorado, Illinois, Kansas, Maine, Oregon, Utah, and Washington). A subsample of 907 participants who reported daily cigarette smoking at age 23, 26, or 28 were included in analyses. Self-reports of cigarette and e-cigarette use, and smoking cannabis were obtained at each age. Latent growth modeling was used to model cigarette smoking over time, with past month e-cigarette use, smoking cannabis, and their interaction included as time-varying covariates. Sex, race, ethnicity, education, and intervention status were included as time-invariant controls. Results: There was an overall downward trajectory in daily combustible cigarette smoking from age 23 to 28. Smoking cannabis significantly impeded this trajectory, while using e-cigarettes had a marginal effect in increasing quitting. The interaction between smoking cannabis and using e-cigarettes was not significant. Conclusions: Among young adult daily cigarette smokers, smoking cannabis, on its own, poses a risk to quitting combustible cigarettes, while using e-cigarettes may promote cigarette cessation, possibly through substitution. Given the serious negative health consequences related to cigarette smoking, better understanding factors that impact cigarette uptake, use, or quitting represents an important public health priority.

FUNDING: Federal

POS1-80

USE OF TOBACCO SALES DATA TO INFORM TOBACCO CONTROL SYSTEMATIC REVIEW

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Background: Strong tobacco control relies on accurate, readily available data on consumer use and trends and policy impacts. Studies have used tobacco retail scanner sales data to inform tobacco control efforts. The aims of this review were to examine different providers of retail sales market data and the ways in which researchers around the world used these data to inform tobacco control efforts. Methods: A systematic review was conducted by searching PubMed, CINHAL, PsyINFO, Scopus, and Google Scholar. Articles that used tobacco sales data collected by market research companies and published in English language from inception to May 12, 2022 were included. The following information was extracted from each article: sales data provider, type of retail channel, data time period, tobacco products assessed, frequency of reporting, and study

aims. Results: Ninety-nine articles were included in the systematic review. The majority of articles used Nielsen sales data (k=93). Other sales data used were Information Resources, Inc. (k=4), Intage Inc. (k=1), and Symphony Information Resources (k=1). The primary aim of included articles was categorized into either (i) monitoring and surveillance (k=59) or (ii) evaluation of tobacco control policies, impact of taxes, and events (k=40). Monitoring and surveillance commonly included primarily reporting sales of one or more tobacco products over a period of time (k=38), substitution between tobacco products (k=38), and elasticities in demand and prices of a tobacco products (k=21). Policies most commonly evaluated were related to restriction in sales of flavored tobacco products (k=11), standardization of packaging (k=6), misleading descriptors (k=3), and ban on promotions and discounts (k=3). To supplement information, articles (k=58) used other data sources such as population estimates from U.S. Census Bureau (k=12), Office of National Statistics (k=3), and American Community Survey (k=3). Conclusion: With the widely changing marketplace, access to readily available sales data has been employed in a number of different ways to inform future policies. There are variety of retail data sources available. Tobacco control efforts might consider expanding the use sales data by linking with other datasets to provide more holistic picture in monitoring, surveillance and policy evaluation.

FUNDING: Federal; Nonprofit grant funding entity

POS1-81

TRANSITION BETWEEN SMOKING AND VAPING STATES IN THE 20S IN THE GENERAL POPULATION AND AMONG FORMER SMOKERS

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Significance: The rising rates of electronic nicotine delivery system (ENDS) is a major public health concern because the new products are likely to introduce nicotine to individuals who might not have otherwise smoked combustible cigarettes, as well as present a risk for former smokers to relapse to nicotine use. The current study examines the transitions between four nicotine use states (non-users of nicotine, exclusive ENDS users, exclusive cigarette users, or dual users) among a populations of young adults in a longitudinal study as well as in a subsample of former smokers. Methods: Data are drawn from the Community Youth Development Study (CYDS), a longitudinal study that has followed 4,407 youth from 24 small communities in seven states since 2003. Participants were surveyed 13 times between the ages of 10 and 28 (in 2021). The sample is gender balanced (50% female) and ethnically diverse (20% Hispanic, 64%white, 3% black, and 12% other race/ethnicity). Data from ages 21, 23, and 26 are used in the current analyses. Simple Markov Models in Mplus were used to examine transitions between the four nicotine use states. Results: From ages 21 to 26, most nonusers remained such, with 8% transitioning to combustible use (either as smoking alone or as dual use with ENDS). Around a third of smokers and a quarter of dual users quit, but 58% of smokers and 59% of dual users continued combustible use. Exclusive ENDS use was the least stable state, with only 30% of users remaining in that state over 5 years. Half of all ENDS users were most likely to quit all nicotine use; however, 14% transitioned to combustible cigarette use. Among former smokers at age 21 who continued to abstain till age 23, 82% remained nicotine-free till age 26. Almost half of those who relapsed to smoking cigarettes by age 23 quit by age 26 (45%), and half continued to use combustible cigarettes. Those who switched to ENDS use were most likely to quit (64%) or continue to use ENDS (25%). Relapsing to dual use was most associated with later combustible use (57%). Conclusions: Findings demonstrate the complexity in the longitudinal interplay between the two modes of nicotine use. Exclusive ENDS use was the least stable state, but the majority of ENDS users reported no nicotine use at a later date, both in the general sample and among former smokers (though some did transition to combustible use). Dual use was most associated with continued combustible use.

FUNDING: Federal

POS1-82

MODERATING ROLES OF SEX AND DEPRESSIVE STATUS ON THE RELATIONSHIPS BETWEEN SOCIAL MEDIA EXPOSURE/ENGAGEMENT AND YOUNG ADULTS' USE OF ENDS PRODUCTS TWO YEARS LATER

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Significance: The use of ENDS products by young adults has substantially increased in recent years, which is related to routine/passive exposure to and active engagement with ENDS information on social media. However, it is unclear if the role of ENDS-related social media on young adults' ENDS use and dependence varies for males and females and for those with mental health issues, which was examined by the current study. Methods: Participants were students recruited from 24 Texas colleges in fall 2014 for a multi-wave project M-PACT. Data were from the spring 2017 (baseline; M_{age}= 23.28, SD_{age}= 2.30; 64.8% females) and spring 2019 (two years follow-up) waves. Only participants completing both waves were included (n=4225). The study question was assessed with lagged two-way interactions between the social media variables (i.e., exposure to and engagement with pro- and anti-ENDS information on social media) and each potential moderator (i.e., sex, depressive symptoms) at baseline predicting past 30-day ENDS use and dependence (assessed by craving and need for ENDS) at two-year follow-up. All models were adjusted for potential confounders (age, sex, race/ethnicity, use of other tobacco products, sensation seeking, close friends and household use of tobacco or ENDS products, past 30-day ENDS use, and dependence) assessed at baseline. Results: Significant two-way interactions were identified. Specifically, exposure and anti-ENDS engagement were positively associated with ENDS dependence two years later only among females (standardized regression coefficient $Beta_{exposure}$= .07, p<.01; $Beta_{engagement}$=.05, p<.05), but not males ($Beta_{exposure}$= -.04, p=.15; $Beta_{engagement}$= -.06, p =.06). The association between pro-ENDS engagement and past 30-day ENDS use was significant only among males (*AOR* =.50, p<.05), but not females (*AOR*=1.24, p=.33). The association between ENDS exposure and past 30-day ENDS use was only significant among those without clinically significant depressive symptoms (*AOR*=1.13, p<.05) but not those with depressive symptoms (*AOR*=1.01, p=.92). Conclusion: Although females and those without depressive symptoms report lower past 30-day ENDS use and dependence than their counterparts in our sample, they may be more susceptible to the effects of exposure to and engagement with ENDS information on social media. Findings underscore the detrimental impact of ENDS-related social media and highlight the need for universal prevention programs that target even young adults traditionally at lower risk for ENDS use and dependence.

FUNDING: Federal

POS1-83

INFORMING THE DEVELOPMENT OF E-CIGARETTE CESSATION INTERVENTIONS FOR YOUNG ADULTS: A QUALITATIVE STUDY

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Significance: Prevalence of e-cigarette use among young adults (YAs; ages 18-24) has sharply risen in recent years. Studies indicate that a large proportion of YAs who use e-cigarettes report symptoms of nicotine dependence (79.4%) and have made attempts to quit in the past year (33.3%). In 2021, over 100,000 youth sought e-cigarette cessation services, demonstrating strong demand for cessation support. Yet, few evidence-based and efficacious e-cigarette cessation interventions designed for YAs exist, and the few that do exist are not based on feedback from YAs who the interventions are designed to help. This exploratory study aimed to inform future interventions by gathering feedback about e-cigarette users' preferences and thoughts about what they believe should be included in an e-cigarette cessation intervention that would garner acceptability and engage young adults in cessation efforts. We also sought to identify barriers and facilitators of quitting e-cigarettes. Methods: We conducted open-ended surveys and eight focus groups with 40 young adults between the ages of 18 and 24 who currently used e-cigarettes, formerly used e-cigarettes (no use in the past 30 days at least), or initiated with e-cigarettes but then transitioned to combustible cigarettes. Results: Participants reported that an e-cigarette use intervention should (a) address common misperceptions that e-cigarettes pose little to no health risks; (b) offer ideas on healthy alternatives to use (e.g., oral substitution, other activities); (c) teach alternative coping skills to manage stress, cravings, and withdrawal; (d) offer incentives for quitting (e.g., badges); (e) provide information on how to access affordable nicotine replacement therapies (NRT); and (f) include social support, such as through peers who are also quitting e-cigarettes. Barriers to quitting included an inability to tolerate withdrawal symptoms, strong and frequent cravings, peer social influences, and ability to easily access e-cigarettes. Facilitators to quitting included being knowledgeable of the harms of e-cigarettes, having access to NRT, being aware of and avoiding situations that trigger use (e.g., avoiding people who use e-cigarettes), and having support from loved ones/partners. Conclusion: Future studies should develop interventions that focus on education about the harms of e-cigarettes; ways to manage stress, withdrawal, and cravings; resources for obtaining affordable NRT; and social support.

FUNDING: Academic Institution

POS1-84

CHARACTERIZING ELECTRONIC CIGARETTE-RELATED VIDEOS ON TIKTOK

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Significance: As a popular social networking platform for sharing short videos, TikTok has been widely used for sharing electronic cigarettes (e-cigarettes) or vaping-related videos, especially among the youth. We aimed to characterize the e-cigarette/vaping-related videos and their user engagement on TikTok through descriptive analysis. Methods: From TikTok, 500 short videos, posted between October 4, 2018 and February 27, 2021, were collected using e-cigarette/vaping-related hashtags. Two human coders independently hand-coded the video category and the attitude towards vaping (pro-vaping or anti-vaping) for 417 vaping-related videos. The user engagement measures (such as the comment count, like count, and the share count) for each video category were compared within pro-vaping and anti-vaping groups. The user accounts that posted these videos were also characterized. Results: Among the 417 vaping-related TikTok videos, 387 (92.8%) were pro-vaping and 30 (7.2%) were anti-vaping videos. Among pro-vaping TikTok videos, the most popular category is Vaping trick (107 videos, 27.65%), followed by Advertisement (85 videos, 21.95%), Customization (75 videos, 19.38%), TikTok trend (70 videos, 18.09%), Others (44 videos, 11.37%), and Education (6 videos, 1.55%). By comparison, videos with the TikTok trend had significantly higher user engagement (like count/video) than other pro-vaping videos. Anti-vaping videos included 15 videos (50.00%) about the TikTok trend, 10 videos on Education (33.33%), and 5 (16.67%) videos about Others. Videos with Education have a significant lower number of likes than other anti-vaping videos. The most TikTok users posting vaping-related videos are personal accounts (119/203, 58.62%). Conclusion: Vaping-related TikTok videos are dominated by pro-vaping videos with popular categories focus on vaping trick, advertisement, customization, and TikTok trend. TikTok trend has higher user engagement than other categories. Our findings provide important information on vaping-related videos shared on TikTok and their user engagement levels, which might provide a valuable guidance on future policy-making such as restrictions of pro-vaping video posting on TikTok.

FUNDING: Federal

POS1-85

THE PATTERN OF SMOKELESS TOBACCO USE AMONG SCHOOL-GOING ADOLESCENTS IN DELHI, INDIA: A MIXED METHOD STUDY

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Background: Globally , 1 in each 10 girls and 1 in each boys, aged 13 to 15 years consume tobacco. The South East Asian region accounts for 81 percent of the world's smokeless tobacco users. India comes among the top five tobacco product producers in the world. The study aims to determine the pattern of smokeless tobacco (SLT) use among school students and to know the perception of the Point Of Sale (POS) (vendors) regarding the sale of tobacco to minors.MethodologyA cross-sectional mixed method study was conducted among 714 students from the 9th-12th class. Quantitative data was collected using a pre-tested modified Global Youth Tobacco Survey (GYTS) questionnaire and was followed by a qualitative study, in which the POS were mapped using google maps within a 1 km area around the selected schools and a total of 8 in-depth interviews were conducted and inductive analysis was done. The Chi-square test was used to determine the association of socio-demographic and other various factors with the age of initiation of SLT use. ResultSLT consumption was observed in 79 (11%) of 714 students. It was observed that 22 (27.9%) students consumed SLT at a frequency of 6-9 days in a month and 51 (64.6%) students initiated the use of SLT before the age of 12 years. The majority of the students 56 (70.8%) consumed Pan masala with Zarda and chewing was found as the main mode of consumption of SLT in 55 (69.6%) students. 56 (70.9%) students wanted to quit the habit of SLT use whereas 49 (62%) of them tried to quit the habit and 43 (54.4%) of the students sought help in order to quit the habit. The students who were exposed to tobacco (smoked/ smokeless) on the school premises initiated SLT consumption at an early age (p=0.02). As per the majority of vendors, pan masala and zarda and khaini were the most common smokeless tobacco products sold to minors followed by cigarettes, bidis. All 8 of the vendors were aware of the law against selling tobacco to minors, 5 (62.5%) of them were aware of the correct legal age of 18 years to consume tobacco, and 6(75%) of them were of the opinion that law should be there but lacks implementation in reality. ConclusionFactors like exposure to tobacco at school was found to be associated with the early initiation of SLT use among students highlighting the need to intensify the activities for identification of vulnerable groups in order to counsel them on th e prevention and control of tobacco use. KeywordsAdolescents, mixed method, smokeless tobacco

POS1-86

COMPARISON OF TOBACCO USE PATTERNS & CESSATION OUTCOMES BETWEEN PRE-COVID & COVID PERIOD. LESSONS FROM LIFEFIRST, A TOBACCO DEPENDENCE TREATMENT PROGRAM IN INDIA

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Background: COVID-19 pandemic has impacted many aspects of day-to-day life, including lifestyle behaviors like tobacco use. Tobacco use has been shown to increase chances of coronavirus infection, severity of COVID disease and death due to COVID and its complications. However, comparison of tobacco use patterns and cessation outcomes before and during COVID have not been studied. This study aimed to assess the changes in tobacco use behavior and cessation outcomes of an evidence-based tobacco dependence treatment program called LifeFirst before and during the COVID-19 pandemic. Methods: LifeFirst provides counselling-based tobacco cessation services to adult tobacco users in workplaces and healthcare facilities since 2012. In the pre-COVID period (April 2019 to March 2020), 658 tobacco users registered with the LifeFirst program and during the COVID period (April 2020 to March 2022), the number of registered users was 1166. All registered users were offered one detailed counselling session and six follow-up sessions over a duration of six months. Of these, 1491 users (658 from pre-COVID and 833 from COVID period) have now completed the six-month intervention period and their cessation outcomes were analyzed. Results: There was a change in use of tobacco products from pre-COVID period to COVID period. The use of smoking tobacco products decreased from 21% to 16% while smokeless use increased from 69% to 80%. Dual tobacco use (smoking as well as smokeless) reduced from 10% to 5%. The average money spent daily on tobacco in pre-COVID period was Rs. 42 and increased to Rs. 62 during covid time. In the pre-COVID period, the 7-day point prevalence abstinence (7-day PPA) at six months was 63% and rose to 80% in the COVID period. More than half of the registered users with high nicotine dependency were able to quit tobacco use during COVID time whereas, this was seen among 33% users before COVID. Conclusion: There was a shift in tobacco use patterns among tobacco users registered with LifeFirst from smoking products to smokeless tobacco during COVID probably due to unavailability, higher prices and awareness about the association of smoking and COVID-19. LifeFirst was able to make a positive impact on tobacco use behavior among tobacco users through counselling even in COVID period. The higher quit rate in the COVID period signifies the importance of implementing effective cessation support services along with public awareness and tobacco control policies.

FUNDING: Unfunded; Other

POS1-87

OKLAHOMA HOSPITAL ASSOCIATION'S INVESTIGATION OF UNREACHABLE AND DECLINED QUITLINE OUTCOMES

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Significance: The purpose of this case study is to examine why nicotine users, who are proactively referred to a Quitline have outcomes that are classified as unreachable or declined. Lessons learned from this case study can help those professionals working in clinical tobacco treatment systems change better implement and evaluate their programs. Methods: Oklahoma's Hospitals Helping Patients Quit program collaborated with OU Health and other statewide partners to develop a standardized survey to identify why patients referred to the Oklahoma Tobacco Helpline result in an outcome of unreachable or declined and to see if those patients would accept a subsequent referral to the OTH. OU utilized data from its EMR and support from the OTH to identify the cohort of patients for the case study. The survey was implemented with patients through phone interviews and participants were offered a 5 dollar gift card for participation. Results: Case study participants largely indicated a positive readiness to quit score at the point of initial referral, avg. of 7.3 for unreachable participants and 6.3 for declined participants on a 10-point scale. 106 patients identified as unreachable were called, 39 patients were reached, and 27 agreed to participate. Participants stated that they were unreachable for the following reasons: 33% indicated that their best phone number was not provided, 33% indicated that their outcome was misclassified, or they didn't remember being contacted, 15% indicated that they were busy when the OTH called, 11% indicated that they had a phone related complication, and 8% indicated that they screened their phone calls or had already quit when contacted by the OTH. Seventy percent of participants from this cohort indicated that they were still interested in quitting and 94.7% of them accepted a subsequent proactive referral to the OTH. 36 patients identified as declined were called, 16 were reached, and 11 agreed to participate. Survey outcomes for this cohort were as follows: 36% indicated that that their outcome was misclassified (i.e.,

enrolled or not reached), 27.3% indicated that they wanted to quit on their own, 18% indicated that they were not ready to quit, and 18% couldn't remember. Fifty-four percent of participants from this cohort indicated that they had already quit on their own when contacted by OU for the follow up survey. Of those participants who had not quit on their own, 80% accepted another proactive referral to the OTH. Discussion: Building a CTT protocol to ensure that the patients best phone number is always provided to the QL may help reduce unreachable rates. As seen in this case study, CTT can increase quit rates even without QL support. Implementing follow up support for patients who do not have positive QL outcomes, may greatly help improve QL acceptance rates.

FUNDING: State

POS1-88

HEALTH COMMUNICATION DESCRIBING THE MENTAL HEALTH BENEFITS OF QUITTING SMOKING INCREASES MOTIVATION TO QUIT AMONG THOSE WITH ANXIETY AND DEPRESSION

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Significance: Individuals with anxiety and depression are more likely to smoke cigarettes than the general population. This disparity may be maintained, in part, by beliefs about cigarettes as mood enhancers and fears of psychiatric symptom exacerbation from quitting. In contrast to these beliefs, the literature suggests that there are mental health benefits from quitting and this inconsistency may be a barrier to making a quit attempt among those with a history of mental illness. We therefore sought to examine and compare the effects of gain-framed messages that focused on either the physical or mental health benefits of quitting smoking on those with and without a history of anxiety and depression. Methods: Probability-based sampling methods were used to recruit adults who smoke daily and reported (n=211) or denied (n=208) a lifetime diagnosis related to anxiety or depression. Participants were then randomly assigned to view a message online that was focused on the physical- or mental health benefits of quitting smoking. We hypothesized that participants with anxiety and/or depression (vs. those without) who view messages related to improved mental health would report increased motivation to quit as compared to those viewing messages about the physical benefits of quitting. Results: Consistent with hypotheses, there was a significant interaction of message type and history of mental health diagnosis on motivation to quit (p=.016). Individuals with a history of depression and/or anxiety who saw a mental health message had higher motivation to quit smoking than when they saw a physical health message. The inverse was true for individuals without a history of anxiety and/or depression. There was no significant interaction, however, between having current mental health symptoms and message type on motivation to quit (p>.05). Conclusions: Our data suggest that individuals with anxiety and/or depression diagnoses who smoke experience increased motivation to quit if told about the benefits of quitting smoking on their mental health symptoms. Given the large proportion of individuals who smoke who have diagnoses of anxiety and/or depression, regular communication about the benefits of quitting on these symptoms may have widespread benefits in reducing cigarette use. Additional work will be important to determine if the increases in motivation to quit smoking associated with these messages translate into actual quit attempts and ultimately to cessation.

FUNDING: Federal

POS1-89

IMPROVING PREDICTION OF TOBACCO USE BEHAVIOR OVER TIME: FINDINGS FROM WAVES 1-4 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Significance: First-order Markov models are often used to examine patterns of tobacco use behavior over time. When we use first-order Markov models, we assume the Markov property where the conditional probability distribution of one's tobacco use in the future is dependent only on one's current tobacco use. Given that tobacco use behavior is complex, particularly in some sub-populations (e.g., smokers attempting to quit), higher-order Markov models may better estimate patterns of tobacco use behavior. This study compared 1st, 2nd and 3rd order Markov models to examine whether incorporating information about tobacco use history improves model estimation of tobacco use. Methods: This study used data from four waves of the nationally representative Population Assessment of Tobacco and Health Study. In each wave, a study participant was categorized into one of the following five tobacco use states: never smoker, former smoker, menthol cigarette smoker, non-menthol cigarette smoker, or e-cigarette/dual user. We compared 1st, 2nd and 3rd order Markov models using generalized logistic regression models in the total sample and by age (18-23, 24-31, 32+) and smoking frequency (someday vs. everyday smokers), and transition probabilities between tobacco use states were estimated. Results: Akaike Information Criterion scores indicated the 3rd order Markov model, which incorporated the most information about participants' prior tobacco use, was the best fit to the data in the total sample (1st order: 94419977; 2nd order: 86304400; 3rd order: 83953627) and when models were stratified by age or smoking frequency. Transition probabilities for cigarette smokers and e-cigarette/dual users ranged widely, dependent on an individual's tobacco use history. For example, the estimated percentage of menthol cigarette smokers, non-menthol cigarette smokers, and e-cigarette/dual users in Wave 3 that transitioned to former smokers (i.e., quit) one year later ranged from 4%-58%, 5%-60%, and 5%-64%, respectively, dependent on tobacco use history. Conclusions: Despite their greater complexity higher-order Markov models improve estimation of tobacco use behavior over time, regardless of age or smoking frequency. Research examining tobacco use transitions should incorporate data on even a brief period (e.g., 1 year) of tobacco use history. Overall, e-cigarette/dual users were least likely to remain in their same tobacco use state one year later as compared to other tobacco use states.

FUNDING: Federal

POS1-90

THE BIDIRECTIONAL NATURE OF CAMPAIGN RECEPTIVITY AND CAMPAIGN-RELATED ATTITUDES AND THE IMPACT ON TOBACCO PRODUCT USE

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Population level anti-tobacco education campaigns influence a range of youth and young adult public health behaviors and have been evaluated with a 6-item Perceived Message Effectiveness (PME) scale. Campaign receptivity is a key component of PME and has been measured using items from the PME scale (This ad? is convincing, grabbed my attention). While campaign receptivity has been revealed to impact campaign-related attitudes, the purpose of this study is to examine the bi-directional nature of campaign receptivity and campaign-related attitudes, while extending this work to include tobacco behavior as an outcome. We believe that higher campaign receptivity will be related to higher campaign-related attitudes and tobacco-related beliefs (i.e., anti-industry and social movement beliefs) will be associated with a lower likelihood of current tobacco use. Data were drawn from the Truth Longitudinal Cohort, a nationally representative, probability-based cohort which includes youth and young adults (N=6,295; 15-24 years). Campaign receptivity was calculated from 3 items over 5 waves 2015-2017 (i.e., this ad was convincing; this add grabbed my attention; this ad gave me good reasons not to smoke). Anti-industry beliefs were calculated from 4 items (i.e., I would like to see tobacco companies to go out of business; tobacco companies make me angry; tobacco companies try to get young people to start smoking; tobacco companies lie). Social movement beliefs were calculated from 3 items (i.e., I want my generation to be known as the one that ends smoking; I would be part of a movement to end smoking; taking a stand against smoking is important to me). Any current tobacco use was calculated at a follow up wave in 2018. Findings indicated strong positive associations between campaign receptivity and campaign-related attitudes (anti-industry beliefs=.68, social movement beliefs=.80), even after controlling for the bi-directional relationship over time. There were strong negative associations between campaign-related attitudes and any current tobacco use (anti-industry beliefs=-.092, social movement beliefs=-.098). This study raises awareness to the importance of understanding how campaign receptivity translates to a relationship with intended campaign-related attitudes and how this goes on to impact tobacco use behavior.

FUNDING: Nonprofit grant funding entity

POS1-91

DIFFERENCES IN CESSATION OUTCOMES BETWEEN CIGARETTE SMOKERS WITH SUBSTANCE USE PROBLEMS AND THOSE WITHOUT PROBLEMS: RESULTS FROM WAVE 4 (2017/18) & WAVE 5 (2018/19) OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY.

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SIGNIFICANCE: The burden of cigarette smoking is higher among people with substance use problems (SUPs) than the general population. Therefore, understanding smoking cessation outcomes and the extent of uptake of smoking cessation interventions for this population is of public health importance. We assessed the differences in cessation outcomes among cigarette-only smokers with SUPs compared to those without SUPs. METHODS: We used the nationally representative Population Assessment of Tobacco and Health (PATH) Wave 4 (W4) and 5 (W5) datasets. The study population comprised current established cigarette-only smokers (100+ lifetime sticks and past 30-day use) with SUPs and without SUPs from W4. We assessed two cessation outcomes in W5: 1. Discontinuing tobacco use in W5 (transition from a current established cigarette smoker in W4, and in W5 have not smoked any tobacco product in the past 12 months [P12M]). 2. Difference in P12M use of nicotine replacement therapy (NRT) and non-NRT cessation aids at W5. Chi-square analysis and regression models were used to evaluate differences in cessation outcomes. RESULTS: Between 2017/18, 52% of cigarette-only smokers had SUPs. The following year, a higher proportion of cigarette-only smokers with SUPs (vs No SUPs) had stopped tobacco use for the P12M (59% vs 55.1%, p=0.02). On a multivariable model, after adjusting for past-year mental health conditions and nicotine dependence, there was no significant difference between cigarette-only smokers with SUPs and those without SUPs (OR: 1.05; 95% CI: 0.90, 1.21). However, older adults (>24 vs <25 years) (p=<0.01), non-Hispanic blacks (vs non-Hispanic whites) (OR: 0.65; 95% CI: 0.54, 0.79), Hispanics (vs non-Hispanic whites) (OR: 0.69; 95% CI: 0.54, 0.89), and females (vs males) (OR: 0.49; 95% CI: 0.42, 0.58) had lower odds of quitting. Further, there was no difference in using NRT products to quit in the P12M (10.4% vs 9.8%, p=0.47) between both groups (smokers with SUPs vs No SUPs). Likewise, there was no significant difference in the proportion of cigarette smokers (SUPs vs No SUPs) who used non-NRT prescription drugs in the P12M (6.5% vs 7.7%, p=0.10). CONCLUSION: Over a one-year period, there was no significant difference in success at quitting between cigarette-only smokers with SUPs compared to those without SUPs. These findings have public health implications for estimating cessation outcomes among smokers with SUPs who have a disproportionately higher burden of use.

POS1-92

AGE GENDER DIFFERENCES IN EXPOSURE TO E-CIGARETTE RELATED CONTENT ON YOUTUBE

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Background: YouTube, which is popular among youth, custom tailors its content to user characteristics such as age and gender. Previous studies have shown that e-cigarette content, which may be appealing to youth (e.g., vape tricks) and content that has sales or promotional strategies are prevalent on YouTube. However, whether e-cigarette content is tailored to users by age or gender is under-studied. This study aimed to identify whether exposure to e-cigarette content differs by user characteristics such as age and gender. Methods: We created fictitious viewer profiles separated by gender (male, female), age group (16, 24 years old), and race/ethnicity (white, black, Hispanic) to simulate youth searching for e-cigarettes on YouTube. We searched for e-cigarette content on YouTube using 18 search terms including "e-cigarettes" and "vape." Using supervised machine learning, we classified the searched videos by themes (e.g., product review), channel type (e.g., retailers, vape enthusiasts), and promotional content (e.g., discount). We further conducted chi-square tests to examine the association between each theme, channel type, and promotion by age and gender. Results: We identified N=3,830 unique e-cigarette YouTube videos. Chi-square tests showed significant differences between theme and sales/promotion by age and gender (all ps<0.05). Of the videos that were exposed to youth, 46% were "product reviews" (vs. 50.1% exposed to young adults), 32.7% had an external link to purchase e-cigarettes (vs. 34% exposed to young adults), and 11.5% were "other relevant" videos (e.g., comedy sketches about the culture of vaping) (vs. 8.8% exposed to young adults). Of the videos that were exposed to females, 56.4% were uploaded by "vape enthusiasts" (vs. 52.3% exposed to males), and 7.8% were "cannabis" videos (vs. 5.8% exposed to males). Discussion: Youth and females are exposed to greater e-cigarette content and e-cigarette promotion strategies despite YouTube's self-imposed policies that restrict this content. Concerningly, youth are exposed to content that has external links to purchase e-cigarettes as well as appealing content (e.g., comedy), and females are more exposed to cannabis content. More research is needed to understand gender differences in e-cigarette exposure on YouTube. Comprehensive restrictions to prevent youth exposure to e-cigarette promotional content are warranted.

FUNDING: Federal

POS1-93

VAPING DEPENDENCE PREDICTS INCREASES IN DEPRESSION SCORES AMONG NON-SMOKING YOUTH AND YOUNG ADULTS

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Background: Little is known about the association between vaping dependence level and depression symptoms among youth. The diathesis-stress model suggests that predisposing factors, such as substance use, may contribute to development of stress-related disorders, such as depression. The study aims to determine how vaping dependence and depression are related longitudinally among never smoking youth. Method: Current past month electronic cigarette users who reported not smoking in the past month (i.e., non-smoking vapers; n=1256) between 16 and 25 years old were recruited to the Vaping Dependence Cohort November 2020 to March 2021, and were followed longitudinally every three months. The Vaping dependence level (assessed using an adapted Penn State E-cigarette Dependence Inventory with possible scores between 0 and 20 with higher numbers indicating greater dependence) at time t was used to predict depression symptoms (assessed using the Center for Epidemiologic Studies Depression Scale (CESD)) at time $t+1$. Individuals contributed between 1 and 3 sets of follow-up data (2.4 sets of observations per individual). Generalized Estimating Equations models were used to estimate the change predicted after 3 months, controlling for scores or symptoms at time t, repeated measures and demographics. Vaping dependence and depression symptoms scores were both treated as continuous variables. Average vaping frequency was calculated using number of puffs per session (divided by 10) X number of sessions per day X number of vaped days per month (divided by 30). Results: Most participants were white (72%) and female (79%) with a mean age of 19.1. The average CESD-score was 15.8 (SD=0.16; range 0-32). 32.1% reported vaping in the past month (median 79 puffs per day) with a mean PS-ECDI score of 8.5 (SD=0.1; range 0-19). Higher vaping dependence scores were associated with increased depression symptoms scores at three months follow-up among youth (Beta=0.08, 95%CI=0.01 - 0.15), controlling for baseline depression symptom scores and covariates. While vaping dependence was highly associated with vaping frequency level, no association between the frequency of vaping and depression was found (Beta=-0.33 95% CI:-1.21,0.54). Discussion: Our results are consistent with the diathesis-stress model of the relationship between substance use and depression. Vaping dependence but not vaping frequency predicted increased depressive symptoms among non-smokers. Further research is needed to investigate how vaping and depression interact among those who use both vaping and combustible tobacco products.

FUNDING: Federal

POS1-94

COMPLIANCE WITH FLAVORED TOBACCO PRODUCT SALES PROHIBITIONS IN 4 CALIFORNIA CITIES

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Significance. Flavored tobacco products (FTPs) appeal to youth, resulting in some municipalities prohibiting their sale. The degree of compliance with FTP sales prohibitions among retailers, however, is unclear. The purpose of this study was to assess the availability of FTPs in retail environments with sales prohibitions. Methods. A convenience sample of four cities in Southern California with FTP sales prohibitions were included in the study. Cities 1 and 2 enacted local sales prohibitions 2-3 months prior to data collection, City 3 approximately 18 months prior to data collection, and City 4 approximately two years prior to data collection. Tobacco product retailers in each city were identified from the California Department of Tax and Franchise Administration database, Yelp, and Google Maps. All specialty vape and tobacco retailers in each city were included in the store sample. Remaining stores were categorized as gas stations, mini-marts and liquor stores, or large grocery stores or pharmacies. Fifty percent of remaining licensed retailers in each store category were included in the sample if the

total number of stores in a city was greater than 30 (Cities 1 & 2); all remaining licensed retailers were included in the sample if the total number in a city was 30 or less (Cities 3 & 4). From June to August 2022, trained shoppers of legal tobacco purchasing age attempted to purchase prohibited FTPs from retailers in the store sample. If prohibited items were on display, purchases were attempted and completed, if possible. If items were not on display, shoppers asked salespersons for prohibited products and completed purchases if they were made available. Results. Twelve stores from the initial store sample were permanently closed. Among the remaining 141 stores, purchases of a prohibited FTP were completed in 41% of stores. The highest proportion of complete purchases occurred in vape or smoke shops (97% of 32 stores) followed by mini-marts and liquor stores (39% of 46 stores), gas stations (19% of 32 stores), and large grocery stores or pharmacies (10% of 31 stores). Access to FTPs varied by city, with successful purchases occurring in 52%, 44%, 15%, and 0% of stores in Cities 2, 3, 1, and 4, respectively. Conclusion. Compliance with FTP sales prohibitions is highly variable across municipalities, with access still high in some cities. Improved policy implementation and enforcement are needed to achieve the intent of local ordinances.

FUNDING: Federal; Academic Institution

POS1-95

SMOKING AND VAPING-RELATED LUNG DNA METHYLATION IN HEALTHY INDIVIDUALS: AN EXPLORATORY TARGETED ANALYSIS OF THE COVID-19 METHYLATION

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Introduction: Studies show that smoking can increase the risk of COVID19-related mortality and severity. Smoking impacts DNA methylation and is associated with respiratory diseases. While a recent study reported COVID19-related altered blood DNA methylation, there is no knowledge about how these COVID19-related CpGs (COVID-CpGs) are associated with smoking and vaping and their associations with biomarkers of exposure and lung effects. Methods: Genome-wide DNA methylation was measured in bronchial epithelium collected from electronic cigarette users (EC, n=14), smokers (SM, n=16), and never-smokers (NS, n=39). We performed a targeted analysis of 42 methylation genes (n=1,948 CpGs) that were identified in COVID19-positive patients compared to healthy individuals and non-COVID19 patients with respiratory diseases (by Balnis et. al, 2021). Differentially-methylated (DM) COVID19-CpGs were identified between groups using a multiple regression model by controlling for age and gender at FDR<0.2. Spearman correlations were used to compare between significant COVID-CpGs and exposure (i.e., cotinine and 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanol [NNAL], smoking, and EC history and other effect biomarkers (i.e. bronchoalveolar lavage cytokines, lipid-laden macrophages [LLM], and gene expression) at raw *P*<0.05. Results: Of 1,948 COVID-CpGs, 60 and 109 were significantly associated with age and gender, respectively. Thirteen were DM COVID-CpGs in SM compared to NS, with four having hypermethylation. While none of the smoking-related COVID-CpGs were correlated with urinary biomarkers, cg13163786 (*SORL1*, r= -0.55) was significantly correlated with cigarettes-per-day. In SM, cg17010664 (*VPS13D*), cg14162418 (*SORL1*), and cg14680131 (*SEMA4A*) had moderate positive correlation with IL-4 (r=0.56), IL-6 (r=0.50), and IL-13 (r=0.59), respectively. Also, cg17010664 (*VPS13D*, r= 0.59) was correlated with LLM in SM. Separately, one COVID-CpG, cg02641839 (*ACOT7*), was identified to be different between EC and NS, but this CpG was not correlated with exposure and effect markers. Five smoking-related COVID-CpGs corresponding to *ATP1A1*, *LTBP1*, *SORL1*, and *VOPP1* had a weak to moderate negative correlation with gene expression. Conclusions: This is the first report of smoking and vaping-related COVID-CpGs in healthy individuals, supporting further research on the possible impact of smoking and vaping-related DNA methylation on COVID-19 susceptibility.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS1-96

MOBILE-BASED BEHAVIORAL SUPPORT BY EX-SMOKING PEERS FOR SMOKING CESSATION: A PRAGMATIC RANDOMIZED CONTROLLED TRIAL (RCT)

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Significance: We assessed the effectiveness of mobile-based psychological and behavioral support by ex-smoking peers for community smokers on smoking cessation (SC). Method: This two-arm, pragmatic RCT recruited biochemically validated daily adult smokers under Hong Kong Council on Smoking and Health Quit-to-Win Contest 2021 (ClinicalTrials.gov: NCT04909320). At baseline, all participants received brief SC advice (AWARD: ask, warn, advise, referral, do-it-again). Each participant in the intervention group joined an instant messaging ([IM] i.e., WhatsApp) 3-person chat group, consisting of an experienced SC counselor and a peer ex-smoker who had quit smoking for =1 year and had been trained to provide behavioral support using IM apps. Participants received 12-week tapering scheduled text messaging on SC, positive psychological exercises (i.e., gratitude, savoring), and real-time behavioral support from ex-smoking peers (i.e., experiences on quitting methods, coping with withdrawal symptoms/craving, and encouragement). Participants in the control group received 6 regular messages on SC using SMS. All participants were offered referral to SC services at 1- and 2-month follow-up. The primary outcome was biochemically validated abstinence (exhaled carbon monoxide level of <4 ppm and saliva cotinine level of <30 ng/ml) at 6-month. Secondary outcomes included biochemically validated abstinence at 3-month, self-reported past 7-day point prevalence abstinence (PPA), and smoking reduction by at least half of baseline daily cigarette consumption at 3- and 6-month. We reported 3-month cessation results by intention to treat. Poisson regression was used to estimate risk ratios (RRs) of outcomes. Results: 1105 participants were randomly assigned to the intervention (n=553) and control (n=552) groups from June to October 2021. At baseline, 78.4% of participants were male, 43.0% aged 39 or below, and about half had low nicotine dependence. Compared with controls, the intervention group showed small but non-significant increase in biochemically validated abstinence (8.3% vs. 6.7%; RR 1.24 [95% CI 0.82-1.88], P=0.31), self-reported abstinence (15.7% vs. 13.6%; RR 1.16 [95% CI 0.87-1.54], P=0.31), and smoking reduction (17.2% vs. 13.8%; RR 1.25 [0.95-1.65], P=0.12) at 3 months. Conclusions: At 3-month follow-up, mobile-based psychological and behavioral support by ex-smoking peers showed a small non-significant increase in smoking abstinence than controls with regular messages.

FUNDING: Other

POS1-97

PERSONAL CHARACTERISTICS ASSOCIATED WITH SWITCHING FROM CIGARETTE SMOKING TO NON-COMBUSTIBLE TOBACCO: FINDINGS FROM THE PATH STUDY

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Significance: Tobacco harm reduction (THR) strategies, such as switching to non-combustibles (NCs; e.g., e-cigarettes, smokeless tobacco), may help mitigate tobacco-related adverse health outcomes for those who do not quit tobacco, but should not reduce the likelihood of quitting. This study identifies personal characteristics associated with switching from cigarettes to NCs to understand better who may be engaging in THR. Methods: PATH Study data were analyzed as three sets of wave pairs in which baseline and follow-up were separated by 2 years: Wave 1 (2013/14)-3 (2015/16), Wave 2 (2014/15)-4 (2016/17), and Wave 4 (2016/17)-5 (2018/19). Two weighted Generalized Estimating Equation models assessed the correlates of switching from exclusive cigarette smoking (baseline) to exclusive NC use (follow-up) 1) compared to continued smoking (n=6007), and 2) compared to tobacco cessation (n=2328). Predictor variables included demographics, smoking characteristics, NC harm perceptions, and environmental exposure variables (baseline). Results: Ages 18-44 years (ref=65+, ORs=3.85-6.03), having income ≥$100,000 (ref=<$25,000, OR=1.60, 95% CI [1.22, 2.10]), being non-Hispanic (OR=1.50, 95% CI [1.14, 1.98], white (OR=1.82, 95% CI [1.46, 2.25]) or male (OR=1.20, 95% CI [1.03, 1.41], higher nicotine dependence (OR=1.00, 95% CI [1.00, 1.01]), and perceiving NCs as less harmful than cigarettes (OR=1.35, 95% CI [1.18, 1.55]) were associated with switching from smoking to NCs compared to continued smoking. Ages 18-64 years (ref=65+, ORs=3.12-7.09), being Non-Hispanic (OR=1.61, 95% CI [1.15, 2.25]), higher nicotine dependence (OR=1.01, 95% CI [1.00, 1.02]), more

cigarettes smoked per month (OR=1.00, 95% CI [1.00, 1.002]), noticing warning labels often (ref=never, OR=1.40, 95% CI [1.07, 1.83]), noticing promotions (ref=not, OR=1.40, 95% CI [1.07, 1.82]) and perceiving NCs as less harmful (OR=1.30, 95% CI [1.07, 1.58]) were associated with switching from smoking to NCs compared to tobacco cessation. Conclusion: Younger ages, being non-Hispanic, and higher dependence was consistently associated with switching to NCs. Being white, male, and highest incomes were associated with switching to NC vs continued smoking only, while noticing promotions/warnings and heavier smoking were associated with switching to NC vs cessation only. Education/interventional efforts may be targeted towards those who are likely to continue smoking to increase awareness of relative product harms and THR.

FUNDING: Federal

POS1-98

CHANGES IN NICOTINE INTAKE AMONG EXCLUSIVE DAILY MOD AND POD E-CIGARETTE USERS OVER 12 MONTHS

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Significance: E-cigarette usage patterns between users is highly dependent on liquid and device delivery characteristics as well as a user's nicotine dependence. Currently the most popular devices among daily e-cigarette users are mods and pods. However, few studies have examined long-term exclusive use of one of these products or the effects of switching between device types. This study aims to examine the long term usage patterns of mod and pod users including the nicotine concentrations in their e-liquids and the subsequent effect of this change on urinary nicotine biomarkers. Methods: E-cigarette liquids and urine samples were collected from 63 exclusive daily vapers every month over one year. Participants reported monthly purchasing habits, including total liquid volume, as a surrogate for use intensity. Nicotine concentrations in e-liquid and cotinine concentrations in urine were measured using GC-MS and LC-MS methods, respectively. Relative change in the average values between participants compared to the initial visit were calculated for each subsequent visit. Trends in nicotine and cotinine concentration were evaluated between mod-only, pod-only and vapers who switched between product types throughout the course of the study. Results: Most participants (52%) used exclusively mod-style devices throughout the study, 30% used pod-styles exclusively and 18% switched between device types. Among mod users, nicotine concentration in e-liquid increased by 25% from months 1 to 12, while cotinine levels increased by 50%. Nicotine concentration among pod users remained stable, however, cotinine also increased by 50%. Nearly a 3-fold increase in nicotine was observed among those who switched from mod to pod devices, with a corresponding 75% increase in cotinine levels. Purchasing patterns revealed that both mod users and switchers bought less e-liquid over time, while pod users purchased more. Conclusions: Important preliminary evidence revealed substantial increase in nicotine intake and plausible addiction from use of vaping products over time. Our results indicate users may increase nicotine dependence over time by either switching from pod to mod or increasing mod nicotine concentrations over time. These findings have important regulatory implications, particularly in curbing youth use of highly concentrated pod e-cigarettes.

FUNDING: Federal

POS1-99

DOCUMENTING PHILIP MORRIS INTERNATIONAL'S USE OF SOCIAL MEDIA IN ITS GLOBAL MARKETING OF IQOS

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Significance: Several leading social media platforms prohibit tobacco marketing. While tobacco companies have claimed to stop using social media influencer marketing, the extent to which they currently use social media is unclear. Newer products, like heated tobacco products (HTPs), might be particularly likely to use social media as they emerge in the global market. This study examined Philip Morris International's official marketing of IQOS, the global HTP leader, across social media platforms in the 68 countries where IQOS is sold. Specific topics covered include: what (if any) social media platforms are used, frequency of posting, reach, and functions of posts. Methods: The IQOS website for each country was visited in May, 2022, and any listed IQOS social media accounts were recorded. Each accessible IQOS social media account was coded for number of posts in the past 30 days and past year, number of followers/subscribers, and date of latest post(s). Accounts with at least one past-month post were dual coded to describe the post's function: Instructional/Informational, General Advertising, Price Promotions, or Event Promotions. Posts categorized as General Advertising or Event Promotions were further coded for their main theme as follows: Lifestyle, Fashion, Design/Art, Sport, Health, Innovation/Technology, Science/Research, Nature, or Music. Results: Of the 68 countries, 66 had country-specific websites, and 8 were not accessed because of technical limitations. Of the 58 websites visited, 44 (75.9%) listed at least one social media account. Across websites, a total of 104 official IQOS accounts were listed with 19 on Instagram, 21 on Twitter, 42 on Facebook and 22 on YouTube. Collectively, these accounts had 1,117 posts in the past year and ~138,363 followers/subscribers. Of the 55 accessible past-month posts on YouTube and Instagram, 26 (47.3%) functioned as General Advertising, 15 (27.3%) Event Promotions, 10 (18.1%) Instructional/Informational, and 4 (7.3%) Price Promotions. In order of prevalence, dominant themes in General Advertising and Event Promotions were lifestyle, design/art, innovation/technology, nature, and fashion. Conclusion: Social media is a key component of PMI's global marketing of IQOS despite platform prohibitions against tobacco marketing. Posts were used to engage new and existing consumers with advertising, event promotions, instructions on use of the product and price promotions.

FUNDING: Federal

POS1-100

PARENTS WHO CO-USE TOBACCO AND MARIJUANA AND THE IMPLICATIONS FOR CESSATION

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Significance: Co-use of marijuana and tobacco is increasing as more states legalize marijuana for recreational use. Children are often exposed to tobacco smoke by parents; it's unclear how marijuana smoke impacts children when parents co-use. In addition, there are few data on how marijuana co-use impacts parental cessation, which is critical to child health. This project examined the prevalence and correlates of co-use among parents who use tobacco, and the association with tobacco cessation. Methods: This is a secondary analysis of a randomized, controlled, single-blind clinical trial at Children's Hospital Colorado. Families of hospitalized children with at least one parent who used tobacco were eligible. The intervention included brief motivational interviewing during and after hospitalization, nicotine replacement therapy when appropriate, and follow up recommendations for primary care; the control group received referral to their state's Quitline. Parents completed questionnaires at baseline and 12 months on demographics, and tobacco and marijuana use. Co-use was defined as reporting the use of both marijuana and tobacco; non-marijuana users could be vaping or using electronic cigarettes or tobacco alone. Tobacco cessation was determined by self-reported 7-day abstinence, and confirmed with urine cotinine (<10 ng/mL) when nicotine replacement therapy was not used. Fisher's exact tests were used. Results: A total of 241 parents were enrolled and had baseline data on marijuana use; of these, 115 (48%) completed follow-up at 12 months. One-third reported using both marijuana and tobacco; there were no differences between groups by child gender or ethnicity, household income, parent education, or housing type. Overall, 17% of parents reported having quit tobacco at 12 months; 16% of co-users, and 17% of non-marijuana users (p=ns). When analyzed by treatment condition, 11% of co-users in the intervention group had quit vs. 23% of non-marijuana users, while 20% of co-users in the control group quit vs. 11% of non-marijuana users (p=ns). Conclusions: A third of parents who use tobacco report co-using marijuana; this may increase over time. There were no significant differences between groups by demographics. While we did not find a significant impact on smoking cessation, results are intriguing and suggest that the intervention may be less impactful for parents who co-use marijuana. Further studies with larger sample sizes are needed to determine the best ways to provide smoking cessation to co-users.

FUNDING: Federal; Academic Institution

POS1-101

WHAT E-LIQUID FLAVORS WERE USED IN THE PAST 30-DAYS BY CURRENT E-CIGARETTE USERS IN NATIONALLY REPRESENTATIVE SAMPLES OF YOUTH, YOUNG ADULTS, AND OLDER ADULTS IN THE UNITED STATES?

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Significance: The U.S. Food and Drug Administration (FDA) have introduced policy frameworks to help prevent youth access, appeal, and use of e-cigarettes. One such framework was to address the use of flavors (except mint, menthol, and tobacco) by youth which has been described as the "core" of the epidemic of youth use of e-cigarettes. Methods: An online questionnaire was administered to cross-sectional, nationally representative samples of 1,215 youth aged 13 to 17 years, 3,370 young adults aged 18 to 24 years and 3,038 older adults aged 25 years and older. Participants were recruited through Ipsos' *KnowledgePanel*, and a proportion of the young adult sample was recruited from online opt-in panels. Current use of an e-cigarette for the youth population was defined as use on at least one of the past 30 days and current e-cigarette use in the young and older adult populations was defined as having used an e-cigarette 100 or more times and now uses an e-cigarette every day or some days. Results: An estimated 6.7% of youth, 11.6% of young adults and 3.4% of older adults reported current e-cigarette use. Among youth current e-cigarette users, the most frequently reported flavors used in the past 30 days were Fruit 72.2%, Candy 33.0%, Dessert 30.2% and Menthol/Mint 26.4%, Other Sweets 22.6%, and Tobacco 15.6%. Among young adult current e-cigarette users, the most frequently reported flavors used in the past 30-day were Fruit 75.2%, Menthol/Mint 50.0%, Candy 34.5%, Dessert 24.8%, Other beverages 22.0% and Other Sweets 13.0%. Among older adult current e-cigarette users, the most frequently reported flavors used in the past 30-day were Fruit 55.6%, Menthol/Mint 33.0%, Tobacco 31.4%, Candy 29.1%, Dessert 13.1%, and Other Sweets 11.3%. Conclusions: Fruit was the most frequently reported flavor used by both youth and adult current e-cigarette users in the past 30-days. Mint/Menthol flavors were frequently reported by youth and adult current e-cigarette users. Tobacco flavored products were reported most frequently by older adults and youth but less so by young adults. These findings highlight the need for continued surveillance of the flavors that appeal to and are used by youth and adult e-cigarette users. Such surveillance data can be used in submission to regulators to monitor changes in flavor preferences to strike a balance between public health concerns around youth use of flavored tobacco products and the public health benefits of the availability of flavored products to adult current smokers attempting to quit.

FUNDING: Other

POS1-102

CANNABIS USE IN ADULT MEXICAN SMOKERS AND E-CIGARETTES USERS: ANALYSIS OF AN ONLINE COHORT

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Background: Cannabis and tobacco use are strongly linked, but no study has assessed the characteristics of smokers who use cannabis in low- and middle-income countries. In Mexico, where recreational cannabis use is illegal, 8.6% of adults use it. We aimed to describe the prevalence and correlates of cannabis use among adult Mexican smokers Methods: We analysed data from an open cohort of adult Mexican smokers with an oversample of e-cigarette users (i.e. dual users) surveyed every four months from November 2018 to March 2021. We estimated the prevalence of cannabis use, overall and by country region. Multinomial models regressed frequency of cannabis use (never, once per month, more than once per month) on region, demographics, smoking (non-daily, <= 5="" cigarettes="" per="" day="" (cpd),="">5 CPD), e-cigarette use (exclusive smoker, dual occasional 1-2 days per week, dual frequent >=3 times per week), binge drinking and diagnosed depression. Logistic models regressed last month cannabis use using electronic devices on the same covariates. Results: Of all participants, 11.2% reported using cannabis once per month and 13.3% more than once per month; 25.8% of those who used cannabis, used an electronic device to consume it in the last month. Participants from Mexico City had the highest prevalence of last month cannabis use (26.2%), those in the State of Mexico had the lowest (15.7%). Younger participants were more likely to use cannabis, regardless of frequency. Those who smoked 5 CPD were more likely than non-daily smokers to use cannabis more than once per month (ARRR=1.25; p<0.001). Compared to exclusive smokers, occasional dual users and frequent dual users were more likely to use cannabis once per month (ARRR=1.75 & 5.51, respectively; p< 0.001), and more than once per month (ARRR=1.65 & ARRR=2.63, respectively; p<0.001). Individuals who reported binge-drinking or depression were more likely to use cannabis at least once per month (ARR=1.67 & 1.76, respectively; p< 0.001) and more than once per month (ARR=2.20 & 2.55, respectively; p< 0.001). Conclusion: Cannabis use among smokers in our sample was higher than in the Mexican general population, its use was associated with younger age, dual use, binge drinking, and diagnosis of depression. Future efforts to prevent or reduce cannabis use, should consider aiming specific efforts at smokers and e-cigarette users.

FUNDING: Federal; State

POS1-103

QUANTITY OF CIGARETTES SMOKED WHEN CO-USED WITH ALCOHOL AND CANNABIS: CONSIDERATION OF DIFFERENT DEFINITIONS OF CO-USE BASED ON DAILY DIARY DATA

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Background: Cigarettes are frequently co-used with alcohol and cannabis. However, definitions of co-use vary and do not differentiate between co-use in the same situation and co-use in separate situations. We investigated the number of cigarettes smoked on different types of smoking days with and without alcohol or cannabis co-use. Methods: This study analyzed 2,408 smoking days collected in a 30-day smartphone-based daily diary study among 146 young adults (aged 18-26; 48% female; 41% non-Hispanic White) in the San Francisco Bay Area. Mixed models examined day-level associations between cigarettes smoked and 3 types of smoking days (days with cigarette only use; days with co-use in different situations; days with co-use in the same situation), controlling for sociodemographics. Two separate models were run for co-use of cigarettes and alcohol (alcohol model) and for co-use of cigarettes and cannabis (cannabis model). Results: Days with cigarette only use were most common (62% in alcohol model; 60% in cannabis model), followed by days with co-use in the same situation (alcohol 28%, cannabis 23%), and days with co-use in different situations (alcohol 10%, cannabis 17%). More cigarettes were smoked on days with co-use in the same situation compared to days with co-use in different situations for both co-use of cigarettes and alcohol (b=1.474, SE=0.136, t=10.8, p<.001) and co-use of cigarettes and cannabis (b=0.822, SE=0.209, t=3.9, p<.001). There was no significant difference in cigarettes smoked between days with cigarette only use and days with co-use in different situations. Conclusions: Compared to cigarette use only days, more cigarettes are smoked on days when young adults are co-using cigarettes with alcohol or cannabis in the same situation, while the same is not true for days with alcohol or cannabis co-use in different situations. Conflating different definitions of co-use may impact findings on associations between co-use and smoking behavior.

FUNDING: Federal

POS1-104

A CROSS-SECTIONAL ANALYSIS OF THE NICOTINE METABOLITE RATIO AND ITS ASSOCIATION WITH SOCIODEMOGRAPHIC AND SMOKING CHARACTERISTICS AMONG PEOPLE WITH HIV WHO SMOKE IN SOUTH AFRICA

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Significance: People with HIV (PWH) have a higher prevalence of smoking and lower success in quitting than the general population. In high-resource settings, the nicotine metabolite ratio (NMR) has been found to vary by race/ethnicity and has been used to inform smoking cessation strategies. The NMR has not yet been evaluated in HIV populations in low-resourced countries or among smokers in the African region. Methods: We conducted a cross-sectional analysis of baseline data from a large randomized controlled trial for smoking cessation among PWH in South Africa. At baseline, participants provided a urine sample and self-reported sociodemographic and smoking behavior characteristics. All participants had current smoking status biochemically verified with exhaled breath carbon monoxide (=7 ppm) and a point-of-care urine cotinine test. Information on alcohol use, marijuana use, and mental health status were also collected. Urine samples were analyzed for the NMR, calculated as the ratio of 3'-hydroxycotinine to cotinine. NMR levels were evaluated using a cutoff value of = 0.31 for high metabolizers. Results: 438 of the 561 trial participants consented to provide urine for NMR samples and were included in this analysis. The median age of the participants was 37.5 (IQR: 31, 46) years, and all (100%) were Black South African. The median NMR was 0.31 (IQR: 0.31,0.31; range: 0.29, 0.57) with 362 (83%) participants having a high NMR and 76 (17%) having a low NMR. High nicotine metabolizers had higher odds of being male vs females (OR 1.15; 95% CI: 0.63, 2.03) and of having a 12th grade education (OR 1.83; 95% CI: 0.88, 4.23). A high NMR was associated with a higher level of addiction as measured by the Heaviness of Smoking Index (OR 1.61; 95% CI: 0.49, 7.28), a nearly 40% lower odds of a quit attempt in the past year (OR 0.63;

95% CI: 0.36, 1.07), and baseline withdrawal symptoms including anxiety (OR 0.77; 95% CI: 0.61, 0.99), concentration (OR 1.28; 95% CI: 1.02, 1.64), and sleep (OR 1.28; 95% CI: 1.03, 1.58). Conclusion: In this Black South African population, a large percentage of participants have a high NMR, which varied by sociodemographic and mental health characteristics. Smoking cessation strategies should consider how a higher NMR may make cessation more difficult for those with higher levels of addiction and certain withdrawal symptoms. Given the clustering of values around 0.31, a different cutoff for high versus low metabolizers should be explored.

FUNDING: Academic Institution

POS1-105

CORRELATES OF ECIGARETTE QUIT ATTEMPTS AND DESIRE FOR VAPING CESSATION SERVICES AMONG COLLEGE STUDENTS

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Background: Although research on vaping cessation intentions and behaviors among young adults/college students is growing, less is known about what methods these populations are using to quit and whether there is interest in vaping cessation services. This study examined factors associated with e-cigarette/JUUL quit attempts, in addition to correlates of desire for campus-based cessation services among college students. Descriptive statistics surrounding vaping cessation methods were also assessed. Methods: Data were drawn from an anonymous online survey of US-based college students (N=1,209) administered in April 2022. The analytic sample was limited to current e-cigarette/JUUL users (n=312). Logistic regression was used to assess correlates of 1) e-cigarette/JUUL quit attempts and 2) desire for campus-based vaping cessation services, adjusting for sociodemographic characteristics, cessation-related perceptions, e-cigarette dependence, e-cigarette harm perceptions, and current conventional cigarette smoking. Results: Lifetime e-cigarette/JUUL quit attempts among respondents was prevalent at 76%. Of those that made a quit attempt, one-third indicated they only used methods *other* than those traditionally used for conventional smoking cessation (i.e., NRT, prescriptions, counseling) or those specifically designed for vaping cessation (i.e., text program), as going "cold turkey" reported as the most common method used. Significant correlates of previous quit attempt included 1) e-cigarette dependence (i.e., time to first e-cigarette in the morning) with those more dependent being less likely to have made a quit attempt and 2) perception of cessation difficulty with those perceiving quitting to be more difficult being more likely to have made a quit attempt. Thirty-five percent of the sample reported a desire for campus-based cessation services. This desire was significantly associated with elevated e-cigarette harm beliefs and with a heightened perception of cessation difficulty. Conclusions: Most college students that currently use e-cigarettes/JUULs have tried to quit, yet many are not using any standard methods and there is a desire for campus-based services dedicated to vaping cessation. To address these unmet student needs, colleges may consider developing cessation programming that target e-cigarette harm perceptions and emphasizes that such services can help lessen cessation difficulties.

FUNDING: Academic Institution

POS1-106

STOP VAPING CHALLENGE, AN APP-BASED INTERVENTION FOR SUPPORTING YOUTH VAPING CESSATION: A MIXED-METHODS EVALUATION OF FEASIBILITY AND EFFECTIVENESS

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Significance: There is growing evidence underscoring a strong demand for effective vaping cessation interventions targeting young people. The Stop Vaping Challenge is a youth-focused intervention for supporting vaping cessation by assisting youth in identifying their own motivations, triggers, and behaviours relative to vaping. The app was co-designed with youth and was based on clinical guidance promoting the use of an "abstinence challenge" where one tries to stop vaping for a limited period of time—if the challenge proves to be more difficult than expected, it can be a revealing experience that can aid youth in quitting vaping. The app is available for free to Apple and Android device users. Methods: This is a prospective cohort study evaluating the feasibility and real-world effectiveness of an app-based intervention for supporting youth vaping cessation. Data were collected from November 2021 to May 2022 using online surveys and app analytics. Youth ages 16-18 and young adults ages 19-29 were eligible to participate. Study participants were recruited from individuals who downloaded the app. The main outcomes were increased motivation and readiness to quit vaping, and increased self-awareness of vaping behaviours based on qualitative responses. For secondary outcomes, demographic characteristics were analysed between those reporting the app promoted vaping cessation and those who reported it did not. Results: As of May 10, 2022, the app has 1,289 users. Of this, 453 agreed to participate in the study. There were 341 unique individuals attempting abstinence challenges with a total of 989 challenges completed. The number of attempts ranged from 1 (n=155) to 37 (n=1) with 77% completing three or fewer challenges. The median time for a challenge completed was 20 minutes and duration of abstinence challenges ranged from one minute to more than one month. Among participants who completed the follow-up surveys, 64.4% reported that they learned something from their experience with the abstinence challenge and 71.4% said they would try again with a new challenge within the day. Increased self-awareness of vaping behaviours was evident in participant responses (n=36) describing their understanding of the relationship between self and vaping. Five relevant themes were identified: self-efficacy, helpfulness of the challenge, enjoyment of the challenge, cessation goals, and cessation challenges, including self-reported triggers and cravings. Conclusions: Findings demonstrated that the Stop Vaping Challenge was effective in promoting vaping cessation among youth. Results from this study suggest that co-designed, youth-focused vaping cessation interventions are a promising area for intervention research and development.

POS1-107

COMPARISON OF ELECTRONIC CIGARETTE CHARACTERISTICS AS MEASURED BY SELF-REPORTS VERSUS PICTURES

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Background: Researchers often rely on user self-reports to evaluate electronic cigarette (ECIG) characteristics. Unfortunately, self-reports are sometimes inaccurate because users lack knowledge about certain characteristics and/or an understanding of the terminology used to describe them. The purpose of this study was to compare ECIG device/liquid characteristics as measured by self-reports or pictures. Methods: Respondents (N=196; 88.3% white; 57.1% female) were ECIG users [mean (SD) = 6.9 (.25) days/week for 4.7 (2.5) years] who formerly smoked cigarettes [3.2 (3.4) years since smoking]. They answered questions online about the individual characteristics of their preferred device/liquid. They also were asked to choose the term that best described their device ('cigalike', 'pen', 'mod', 'pod') and the picture that best resembled their device (cigalike, pen, box mod, USB-shaped pod, teardrop-shaped pod, none). Finally, they uploaded a picture of their device/liquid that was coded by independent raters. Agreement was examined with Cohen's kappa (k) and intra-class correlations (ICC). Results: Agreement was highest for individual features of disposable (k=.92), refillable (k=.92), and brand (k=.83), and lowest for nicotine concentration (ICC=.15), nicotine formulation (k=.44), and flavor (k=.54). "Don't know" responses were most prevalent for power levels (e.g. voltage=69.4%; missing data prevented agreement analyses) and nicotine formulation (17.9%). For device type, agreement was moderate for both the term used and the picture resemblance (k's=.57-.60). Of devices classified as 'pods' by raters (n=110), a notable portion of users chose the term 'vape pen' (16.4%) or 'mod' (6.4%) or responded 'don't know' (20.0%). Similarly, raters considered 90 devices to resemble USB-shaped pods; some users thought these same devices resembled teardrop-shaped pods (14.4%) or none of the pictures (6.7%). There also was variability with devices classified as mods by raters (n=77), with users choosing the picture of a USB- or teardrop-shaped pod (7.8%) or none of the pictures (9.1%). Conclusions: Findings support the idea that users' have limited knowledge of certain product characteristics and report characteristics that deviate from those determined by researchers. Even for device type, discrepancies were observed whether users relied on common terms or example pictures. To enhance the validity of self-reports, users might be required to provide a photo of their device.

FUNDING: Federal

POS1-108

PREDICTIVE FACTORS OF SMOKING CESSATION, A CROSS SECTIONAL STUDY FROM TUNISIA

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Significance: Tobacco use remains a major public health threat all over the world. The tobacco control strategy has several axes, including the smoking cessation help. The aim of this study was to describe predictive factors of tobacco cessation in 3 months after the start of the professional help Methods: It was a cross sectional descriptive study conducted in the Department of Epidemiology and Statistics in Abderrahmane Mami Hospital in Ariana, Tunisia. Patients were enrolled from December 2019 to August

2021 from the medical consultation of smoking cessation conducted by the tobacco control specialist of the department. All smokers willing to quit and attending the consultation were eligible to this study. Smokers who attended the first consultation and then disappeared were excluded. The investigation tool was mixed. The first step was to search for necessary information from the medical records of the patients to look for epidemiologic, clinical and tobacco related information. The second step was to call them by phone in last August to have their cessation status. The nicotine dependence was evaluated through Fargestrom scale. Data were analyzed using SPSS software. Chi square test was used to compare percentages. Logistic regression was conducted to conclude the independent factors of smoking cessation. A threefold of 0.05 was considered significant for all tests. Results: We collected files of 151 consultants. Sex Ratio (M/F) = 3.5. Mean age was 42.6 +/- 14 years old. Half were consuming from 11 to 20 cigarettes per day. Fifty-seven percent had Fargestrom scale higher than 7 over 10. Eighty-three percent of our population said they it was their personal decision to get the physician help to quit. Two-thirds of the smokers confirmed they were able to stop smoking for at least one week after their first appointment with the doctor. The mean period for abstinence was 16.8 weeks +/- 20. A decrease in the number of daily cigarettes was seen in 93% of the cases. Forty percent of smokers were capable of cessation in 3 months. The independent factor for smoking cessation for 3 months was the familiar support (AOR = 0.139, 95%CI = [0.024-0.79], p=0.027). Conclusion: This study confirmed that we have a good prevalence for tobacco cessation in our department. Familiar support is crucial for the benefit of smokers. We need to extend our results to more departments and hospitals to build a national database for smokers in our country.

FUNDING: Unfunded

POS1-109

THE ADOPTION OF HOME SMOKING AND VAPING RESTRICTIONS AND THE ASSOCIATION WITH TOBACCO USE PATTERNS AMONG CONCURRENT USERS OF COMBUSTIBLE CIGARETTES AND E-CIGARETTES

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Background: Effects of home smoking restrictions on smoking behavior have been well documented, but little is known about restriction effects on smoking and vaping behaviors among concurrent users of cigarettes and e-cigarettes (ENDS). This study evaluates the adoption of smoking and vaping restrictions in homes of concurrent users of combustible cigarettes and ENDS and examines the association between having the restrictions and concurrent use behaviors. Methods: Using data from a national survey (conducted between December 2020 to October 2021), we analyzed asub-sample of 250 concurrent-users of cigarettes and ENDS who had (re-)initiated vaping within the past month. Outcome variables were pattern of concurrent use (predominant smoker, equivalent dual user, and predominant ENDS user) and vaping frequency (every day vs. some days). Primary explanatory variables were home smoking and vaping restrictions (full, partial, or no restriction). Multivariable ordinal logistic regression and multivariable logistic regression were used to examine the association between the restrictions and outcomes, adjusting for covariates. Results: Less than half (47%) of concurrent users reported having a smoking restriction, 13% reported having a full vaping restriction, and 12% reported having a full restrictions on both smoking and vaping inside their homes. We found concurrent users with a full smoking ban were almost three times more likely to be a predominant vaper versus equivalent dual user or predominant smoker (OR=2.97, 95%CI: 1.49, 5.91) compared to dual users with no ban on smoking. In addition, dual users with a full smoking ban were almost three times (OR=2.82, 95%CI:1.35, 5.86) more likely to be an everyday vaper than a non-daily vaper. However, we did not observe a significant association between a partial ban on smoking and concurrent use behaviors. The association between vaping restrictions and concurrent use behaviors was not statistically significant, but having a full ban on vaping is associated with a lower likelihood of being daily vapers than those without the ban. Conclusions: Low proportions of concurrent users reported having full smoking and vaping restrictions adopted in their homes. Our findings suggest a potential effect of home smoking ban on supporting concurrent users to substitute smoking cigarettes with ENDS use.

FUNDING: Federal; Nonprofit grant funding entity

POSTER SESSION 2

POS2-1

WHAT HAPPENS WHEN YOU SMOKE A CIGARETTE MINDFULLY?: A DEDUCTIVE QUALITATIVE STUDY

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Background: Mindful smoking is a mindfulness practice that has been incorporated into mindfulness- and acceptance-based smoking cessation treatments. Mindful smoking instructs participants to pay full attention to a range of experiences while smoking a cigarette (e.g., the five senses, thoughts, emotions). Theoretically, mindful smoking should modify the automatic process of smoking, but its utility has not been empirically examined. The current study aimed to examine smokers' lived experience with mindful smoking during an 8-week telehealth group-based smoking cessation and alcohol modification trial through a deductive qualitative analysis. Method: Participants were daily smokers who endorsed past month binge drinking. The recordings of two group treatment sessions (sessions 3 and 4) and follow-up interviews in which a discussion on mindful smoking took place were transcribed and hand-coded for qualitative analysis. A thematic content analysis was conducted to identify themes. Results: Participants (N=20) were 75% female and 40% Black/African American (mean age=49.8, average cigarettes per day=16.4, average number of drinks per drinking day=5.3). Identified themes mapped onto both the theoretical rationale for mindful smoking (e.g., attention/awareness, decentering, similarity/difference between mindful versus automatic smoking) and cognitive-affective-behavioral responses (e.g., unpleasant/pleasant experience, shifts in desire to smoke, cognitive reappraisal). The most prominent themes were attention/awareness, similarity/difference between mindful versus automatic smoking, and unpleasant/pleasant experience. At the follow-up interview, perceived helpfulness/usefulness of mindful smoking for cessation emerged. Conclusions: Our findings indicated that intentionally paying attention to smoking led to a heightened awareness of automatic smoking behavior, accompanied by noticing unpleasant aspects of smoking. Such awareness could contribute to the ultimate goal of smoking cessation.

FUNDING: Federal

POS2-2

EFFECT OF WARNING MESSAGING ON SMOKING ASSOCIATED COVID-19 RISK ON SMOKING CESSATION: A MOBILE PHONE-BASED RANDOMIZED CONTROLLED TRIAL

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Significance: Ample evidence has shown that smoking is associated with COVID-19 severity and death. Observational and experimental studies have suggested educating smoking associated COVID-19 risk might promote smoking cessation. This randomized controlled trial (RCT) tested the effectiveness of educating harms of COVID-19 attributed to smoking via instant messaging compared to general cessation advice via text messaging on validated smoking abstinence. Methods: In this two-arm, mobile-based RCT following CONSORT-EHEALTH under Quit to Win 2020 of Hong Kong Council of Smoking and Health, 1166 adult daily smokers (79.1% male) were proactively recruited from smoking hotspots (76.4%) or via online platforms (23.6%) amid the 3rd wave of COVID-19 outbreak in Hong Kong in 2020. Participants in the control group (n=583) received generic cessation advice at baseline and via text messaging for 3 months. Participants in the intervention group (n=583) received additional warning messaging on smoking associated COVID-19 risk at baseline and via mobile instant messaging for 3 months. The primary outcomes were biochemically validated abstinence (salivary cotinine <30 ng/mL or exhaled CO <4ppm) at 3 and 6 months. Secondary outcomes included self-reported 7-day point-prevalent abstinence (PPA), and smoking reduction by at least 50% reduction in daily cigarette consumption compared with baseline. We measured 3-month outcomes using intention to treat analyses and will report 6-month outcomes at the conference. Trial registration: ClinialTrials.gov: NCT04399967. Results: At baseline, participants smoked an average of 13.5 cigarettes per day and 50.3% were ready to quit within the next 30 days. At 3 months, by intention-to-treat, biochemically validated abstinence was not significantly different between the intervention and control groups (9.6% and 11.8%, P=0.22). Self-reported 7-day PPA was significantly lower in the intervention group than the control group at 3 months (14.8% vs. 21.8%, P=0.002). Smoking reduction rates were similar at 3 months. Exploratory subgroup analyses showed greater intervention effect in participants who smoked less than 20 cigarettes per day, who were ready to quit in 30 days, and who were recruited onsite (vs. online). Conclusion: COVID-19 warning messaging did not increase abstinence compared with the generic cessation messaging amid the pandemic.

FUNDING: Nonprofit grant funding entity

POS2-3

PATIENT EXPERIENCES AND ATTITUDES ABOUT SMOKING CESSATION DISCUSSIONS IN HEALTHCARE SETTINGS

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Significance: Clinical practice guidelines recommend providers address cigarette smoking at every visit. A commonly identified provider barrier to providing tobacco treatment is fear of undermining the provider-patient relationship. The current study focuses on patient perceptions and preferences regarding discussions with providers about smoking. Methods: We interviewed patients in two healthcare systems (*n* =51; 49% male; 43% Black, 39% White; 56% currently use tobacco; *M* pack years=39.04) who were 55 to 80 and had a smoking history. Patients were recruited from a cancer screening survey, and were invited for a qualitative interview to discuss tobacco use and lung cancer screening. Interview transcripts were double coded and codes were summarized for analysis using Applied Thematic Analysis. Results: 49 participants provided data about conversations with clinicians about smoking. Although the majority of patients reported that their providers regularly addressed smoking, a significant minority had not discussed smoking with their providers. A few avoided conversations with providers because they did not feel ready to quit. Most felt positively about these conversations, citing that their providers emphasized the importance of quitting without being disrespectful. Many received cessation medications from their providers, but often struggled with side-effects. A few patients reported negative interactions including providers getting upset or threatening to deny care (e.g., withholding surgery until patient is abstinent). Former smokers were more likely to advocate for the use of a firm tone, and for information about the negative consequences of smoking. Patients who currently smoke felt there was a need for doctors to have a better understanding of people who smoke, and emphasized the importance of empathy, feeling listened to, and having their autonomy respected. Many patients wanted resources from providers including written or verbal information, medications/medication instructions and referrals. Conclusions: Most patients want to have smoking addressed by providers. Although providers often recommend cessation medications, additional guidance on proper medication use and non-medication resources would be helpful. When comparing patient preferences to current treatment models, requests for empathic listening, individual needs assessment, and autonomy align with motivational interviewing approaches.

FUNDING: Federal

POS2-4

CORRELATES OF NICOTINE DEPENDENCE AMONG CURRENT ESTABLISHED CIGARETTE SMOKERS IN NIGERIA

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Background: The level of dependence on nicotine, the main addictive chemical in tobacco, is a substance-related disorder that can be utilized to characterize diverse populations of cigarette smokers and also to determine the effectiveness of individualized smoking cessation intervention programs. This study investigates the correlates of nicotine dependence among current established cigarette smokers in Nigeria. *Methodology:* We conducted a cross-sectional survey among a cohort of current established cigarette smokers (100+ sticks in a lifetime and someday/everyday cigarette smokers) in Lagos, Nigeria. The dependent measure was nicotine dependence (ND) using the Fagerstrom scale (low vs. moderate/severe); independent measures were demographic variables, cigarette harm perception, past month alcohol use problems, and past-year internalizing and externalizing problems. Logistic regression models were used to investigate factors

associated with severe nicotine dependence. *Results*: The analytic sample was drawn from 487 adults (=18 years) with 95.9% current established smokers. Among current established smokers, 69%, 27%, and 3.9% had low, moderate, and severe ND levels, respectively (*p-value*: 0.02); while among P30D daily cigarette smokers, 48.1%, 44.3%, and 7.6% had low, moderate and severe ND levels, respectively (*p-value*: <0.001). In the regression analysis, older age (OR:1.03; 95% CI:1.01,1.06) and being male (vs, females) (OR:3.59; 95% CI:1.58,8.15) were associated with increased odds of moderate/severe ND. Conversely, college undergraduates, compared to those with no formal education, had lower odds of moderate/severe ND (OR:0.32; 95% CI:0.11,0.93). Likewise, respondents with severe past-year externalizing problems had higher odds of moderate/severe ND compared to those with no/low problems (OR:3.19; 95% CI:1.07,9.49). *Conclusion*: Our findings suggest ND levels are primarily low among smokers in the study sample. In addition, we found that older age, men, and those with severe past-year externalizing problems had increased odds of moderate/severe ND. These results validate prior knowledge of ND among current established smokers in the literature. However, our preliminary findings provide baseline results characterizing use behaviors among relatively understudied current established cigarette smokers in Nigeria, providing evidence for further research and the need for cessation interventions.

POS2-5

TOBACCO/NICOTINE ADDICTION AS A RISK FACTOR FOR SUBSTANCE ABUSE AND RELATED MENTAL HEALTH CONDITIONS AMONG CANCER PATIENTS

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Significance: The observation of tobacco/nicotine addiction in a cancer patient may warrant preventive intervention which is not exclusive to the direct biological impacts of tobacco or nicotine. Compared to cancer patients without tobacco/nicotine addiction, those with tobacco/nicotine addiction may be at heightened risk for other conditions warranting assessment and preventive intervention. An extensive characterization of these comorbidities has not been assessed based on empirical observation of patient records. Methods: Data were obtained from a database of electronic health records any patient from the five health systems of the University of California who had ever been tested for COVID-19. Two datasets were generated: one with cancer patients not having tobacco/nicotine disorder and another with cancer patients with tobacco/nicotine disorder. The odds for all comorbid conditions was compared between datasets. Stratified analysis was conducted for each of the twenty most common cancers observed in health records. Effect estimates were adjusted for gender, ethnicity, and race. Results: 3,791 cancer patients with tobacco/nicotine disorder had 252,619 total conditions and 51,711 cancer patients without tobacco/nicotine disorder had 2,310,880 conditions. After adjusting for confounders, the condition for which tobacco/nicotine disorder most exacerbated risk among cancer patients was psychoactive substance-induced organic anxiety disorder (OR=16.3, p<0.001). This appeared consistent with the second, third, and fifth most-exacerbated conditions: stimulant abuse (OR=12.8, p<0.001), cocaine induced mental disorder (OR=11.0, p<0.001), and cocaine abuse (OR=11.0, p<0.001). Different conditions exacerbated by tobacco/nicotine disorder among cancer patients include acute alcoholic intoxication (OR=11.4, p<0.001), opioid abuse (OR=7.6, p<0.001), schizoaffective disorder (OR=7.4, p<0.001), and cannabis abuse (OR=6.3, p<0.001). Among patients with the top twenty most represented cancers, tobacco use exacerbated psychoactive substance-induced organic anxiety disorder for colorectal cancer (OR=3.1, p=0.032) and patients experiencing neoplasm-related pain (OR=3.4, p=0.019) in adjusted models. Conclusion: Cancer patients with tobacco/nicotine disorder are at heightened risk for substance abuse and related mental health conditions. An update of clinical guidelines for cancer patients presenting with tobacco/nicotine disorder should be considered.

FUNDING: State

POS2-6

WHAT CHARACTERISES PEOPLE WHO SMOKE WHO HOLD INACCURATE BELIEFS ABOUT THE HARMFULNESS OF NICOTINE REPLACEMENT THERAPY RELATIVE TO CIGARETTE SMOKING IN CANADA, UNITED STATES, ENGLAND AND AUSTRALIA: FINDINGS FROM THE 2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: Nicotine replacement therapy (NRT) is a government-approved medical therapy for smoking cessation in many countries and is recommended in clinical practice guidelines as a safe and effective smoking cessation aid. However, some people who smoke are reluctant to use NRTs for smoking cessation purposes because they erroneously believe that NRTs are equally or more harmful than cigarette smoking. This study examined the characteristics of people who smoke who were more likely to hold inaccurate beliefs about the harmfulness of NRT relative to conventional cigarettes. Methods: People who smoke regularly (daily/weekly) from Australia, Canada, England, and the US, and participated in the 2020 ITC Four Country Smoking and Vaping Surveys (n=8642) were asked: "Compared to smoking cigarettes, how harmful do you think nicotine replacement products are". A similar question was also asked about nicotine vaping products. Data were analysed using multivariable logistic regression models. Results: Australia has the highest (30%), while US has the lowest (22%), proportion who believed NRT is *much less* harmful than smoking, with England (27%) and Canada (26%) in between. Across the four countries, around 36-48% believed NRT is either *equally or more* harmful than smoking cigarettes or did not know the answer. Multivariable logistic regression analyses revealed that believing nicotine vaping products are equally or more harmful than cigarettes, believing nicotine is harmful to one's health, lower knowledge of smoking harms along with younger age and lower education were significantly and independently associated with inaccurate beliefs about NRTs being equally or more harmful than cigarette smoking. Conclusions: Misbeliefs about the harmfulness of NRT relative to cigarettes remained substantial among people who currently smoke daily or weekly in all four countries and were more likely among those who lack an accurate understanding of the absolute and/or relative harms of cigarette smoking, nicotine and nicotine vaping products. Comprehensive education targeting subgroups of people who smoke regularly who are either misinformed or uninformed about the risk profile of different nicotine products is needed to enable informed choices to be made about the use of NRT as an aid for smoking cessation.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS2-7

BEHAVIOR CHANGE MECHANISMS ASSOCIATED WITH A GENETICALLY-INFORMED SMOKING CESSATION INTERVENTION

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Significance: Genetic variation in nicotinic receptor subunits explains differences in smoking behaviors and risk of smoking-related diseases. Despite promising findings in proof-of-concept testing, it remains unknown whether returning genetic risk results can motivate smoking cessation and personalize treatment. The potential mechanisms of behavior change and extent to which a genetically-informed smoking cessation intervention can reduce smoking warrant investigation. Methods: In a fully-remote randomized controlled trial, we enrolled 148 adult participants who smoke. Participants completed genetic testing via 23andMe, received a genetically-informed risk feedback tool (*RiskProfile*) or active comparator (brief cessation advice) via Zoom, and completed assessments at 30-day and 6-month follow-up. *RiskProfile* uses a participant's smoking-specific genetic information to calculate, categorize, and communicate personalized risks for lung cancer and recommendations for treatment and cessation. We conducted effect size estimations and significance testing using repeated-measures ANOVA controlling for baseline cigarettes per day (CPD). Results: At 30-day follow-up, there was very little reduction in average CPD (n=136; partial eta-squared=.01, small effect size; *p*=.29). However, at 6-month follow-up, interim analyses indicated clinically meaningful and statistically significant reductions in CPD of 5.5 in the *RiskProfile* intervention group versus 1.9 in the active comparator group (n=78; partial eta-squared=.06, medium effect size; *p*<.03). Importantly, 36% in the intervention group versus 21% in the comparator group sought medication for smoking. Increases in perceived importance

of tobacco treatment, as well as higher personal relevance and systematic processing with *RiskProfile* compared to the active comparator, appear to be promising mechanisms of behavior change. Discussion: Rapid turnaround of genetic results and an established protocol for completing all study visits remotely yielded robust participant engagement and retention. In this ongoing fully-remote trial, we have (1) significantly reduced access-related barriers to participation, (2) protected the health and safety of participants and research staff by avoiding COVID exposures, and (3) generated emerging evidence of behavior change mechanisms leading to reduced cigarette smoking. These promising findings with evidence of efficacy can pave the way for effectiveness testing in pragmatic settings.

FUNDING: Federal

POS2-8

KENTUCKY PERINATAL ACTION FOR CONCURRENT TOBACCO TREATMENT (K-PACT): AN ONLINE TOBACCO TRAINING PROGRAM TO ASSIST PRENATAL PROVIDERS CARING FOR MOTHERS WITH SUBSTANCE USE DISORDER

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Significance: Smoking during pregnancy is a primary contributor to infant morbidity and mortality, with risks further compounded when smoking is combined with other illicit substance use. In Kentucky alone, nearly 1 in 5 women reported smoking during pregnancy, which is over double the US rate (7%). Although individuals in substance use disorder (SUD) treatment often resist the idea of quitting smoking, smoking cessation during recovery is associated with an increased likelihood of long-term sobriety. While almost 80% or more prenatal providers ask their patients about smoking, assess quit readiness, and advise their patients to quit, less than 60% assist with tobacco cessation, reporting lack of time, expertise, and confidence as barriers. Online educational modules represent a convenient and innovative platform for provider education, though the effectiveness of virtual cessation models that include information about concurrent SUD has been understudied. Methods: K-PACT (Kentucky Perinatal Action for Concurrent Tobacco Treatment) is an evidence-based program consisting of four free, online, self-paced modules that address the following topics: 1) Basics of Tobacco Treatment, 2) Electronic Nicotine Delivery Systems, 3) Concurrent Tobacco and Substance Use Disorder, and 4) Get Fit and Quit (A Behavioral Model for Cessation). Clinical and community stakeholders providing perinatal and substance use treatment across Kentucky were invited to participate. Perinatal providers completed the training and provided qualitative and quantitative data via pre and post assessments and a program evaluation. Upon completion of the training, continuing education credits were provided. For each module, pre/post assessment scores were used to determine perinatal tobacco knowledge changes, and evaluations were reviewed for consistent themes. Results: To date, 64, 44, 35, and 31 providers completed modules 1, 2, 3, and 4, respectively, including pre and post assessments and evaluations. Nearly half of the providers were nurses, with the remaining comprised of social workers, educators, and other health care professionals. There was a significant increase in knowledge scores from pre to post assessments across all four modules: Module 1 (M=54, SD=22; M=91, SD=15; p<.01); Module 2 (M=64, SD=18; M=88, SD=16; p<.01); Module 3 (M=85, SD=23; M=95, SD=13; p=.01); Module 4 (M=57, SD=27; M=93, SD=17; p<.01). Almost 80% of participants "strongly agreed" that "effective teaching methods" were used, they "obtained information and ideas that will be useful", and they felt "confident that the knowledge/skills gained will improve their ability to practice". Conclusions: An online tobacco cessation training platform that includes information about concurrent substance use is a feasible and effective modality for educating prenatal health care providers.

FUNDING: State

POS2-9

CO-USE OF CIGARETTES AND MARIJUANA AMONG PEOPLE WITH HIV: RESULTS FROM A RANDOMIZED CONTROLLED SMOKING CESSATION TRIAL

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Significance: People with HIV (PWH) who smoke cigarettes have lower cessation rates than the general population. Marijuana use has been associated with fewer attempts to quit smoking cigarettes among PWH, however, it is unclear whether marijuana use impedes cigarette cessation among PWH who are motivated to quit. Methods: Between 2016-2020, N=506 PWH who smoked cigarettes were enrolled in a 6-month randomized controlled trial for cigarette smoking cessation. Descriptive statistics and multivariable logistic regression were used to evaluate changes in marijuana use from baseline to 6 months and associations with biochemically confirmed intent-to-treat past 7-day cigarette abstinence at 6 months among the N=178 participants who reported past 30-day (P30D) marijuana use during at least one visit. Covariates included study site, smoking cessation intervention condition, sex, race, ethnicity, age, nicotine dependence, P30D use of any other illicit substance(s), housing stability, having a smoking partner, P30D use of any other tobacco product(s), and average cigarettes smoked per day at baseline. Results: More than one-third of participants (35.2%) reported P30D marijuana use during at least one visit. Among persons with marijuana use, 9.0% did not use, 16.3% used once per month, 16.3% used 2-3 times per month, 10.7% used 1-2 times per week, 14.6% used 3-6 times per week, and 33.1% used daily at baseline. Marijuana use prevalence decreased over the 6-month period (p=0.051), with 27.0% reporting no P30D use at 6 months. Between baseline and 6 months, 21.9% increased their frequency of use, 43.8% decreased their frequency of use, and 34.3% stayed the same. Controlling for covariates, an increase (vs a decrease) in marijuana use frequency was associated with reduced odds of past 7-day cigarette abstinence at 6 months (aOR=0.16; 95% CI=0.02, 0.77; p=0.042). Conclusions: Results highlight the association between increased (vs decreased) marijuana use over 6 months and reduced odds of 7-day cigarette smoking abstinence among PWH who were motivated to quit. PWH with marijuana use who quit cigarette smoking showed decreases in marijuana use. Interventions that directly address co-use of marijuana and tobacco are in need of further study.

FUNDING: Federal; Academic Institution

POS2-10

MENTAL HEALTH AND OTHER COMPARISONS OF MOTHERS WITH AN INFANT IN THE NICU: THOSE WHO SMOKE COMPARED TO THOSE WHO DO NOT SMOKE

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Significance: Environmental tobacco smoke exposure (ETSe) is a significant problem for infants after neonatal ICU (NICU) discharge, as they face greater risks for myriad respiratory issues. We tested an intervention to reduce ETSe in infants admitted to a NICU who live with 1 or more adults who smoke. We stratified participant allocation at randomization based on current maternal cigarette use at baseline (yes/no). Maternal smoking was also included in the primary outcome analysis of infant urine cotinine, which was not statistically significant—driving a need for further innovation. Our current aim was to analyze baseline differences by maternal smoking status to identify potentially modifiable factors to inform future refinements and amplify effects. Methods: Eligible mothers had an infant in the NICU, smoked tobacco or lived with an adult who smoked; had a telephone; lived in a 50-mile radius; and, spoke English or Spanish. Participants (N=360) were randomized to conventional care (n=178) or a 4-session motivational interviewing intervention and financial incentives (n=182). Baseline data collected in the hospital were analyzed using chi-squared tests (for ethnicity) and t-tests for all subscales administered at baseline. Results: Mothers were 62.2% African-American, 24.4% Hispanic, 11.1% White, non-Hispanic, and most (86.9%) received Medicaid. Mothers who were Hispanic were less likely to smoke compared to non-Hispanic mothers (22.1% vs. 10.2%; $p<0.05$). Compared to non-smoking mothers, mothers who smoked reported more depressive symptoms on the Center for Epidemiological Studies, Depression scale ($M=19.4[SD=12.3]$ vs $M=16.2[SD=10.7]$; $p<0.05$), less efficacy to avoid ETSe for their infants on a 14-item scale ($p<0.01$), lower readiness to set/maintain a total smoking ban on a 1-10 ruler ($M=8.9[SD=1.4]$ vs $M=9.6[SD=1.4]$; $p<0.05$), greater encouragement of smoking-related behaviors by others in the home or family on an author-constructed scale ($p=0.01$), and more anxiety symptoms on a 7-item Generalized Anxiety Disorder scale ($M=8.5[SD=6.5]$ vs $M=6.0[SD=5.5]$; $p<0.01$). Conclusions: Our secondary analysis of RCT data in a population of mothers with vulnerable NICU infants is a critical step to understand group differences and bolster future intervention efficacy. Addressing maternal mental health (e.g., depression, anxiety, and confidence) and home-related factors for women who smoke may be key to incorporate in future ETSe-reduction interventions.

FUNDING: Federal

POS2-11

ANXIETY SYMPTOMS DURING THE PRECESSATION PHASE PREDICT SUBSEQUENT WITHDRAWAL SYMPTOMS IN SERIOUSLY MENTALLY ILL SMOKERS: A PILOT FEASIBILITY TRIAL

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Background: Individuals with serious mental illness (SMI) report increased anxiety and depression prior to making a quit attempt compared with non-SMI smokers that are associated with withdrawal in smokers. Withdrawal symptoms are a leading cause of relapse during a quit attempt. We used the phase-based model of smoking cessation and examined the precessation phase (the 3-weeks prior to target quit date) in relation to the cessation phase (target quit date to 2-weeks post-quit) to better understand: (1) whether anxiety or depression symptoms predict subsequent withdrawal symptoms in adult SMI smokers, and (2) whether these withdrawal symptoms affect the ability to quit smoking in SMI individuals. Methods: Participants were 28 adult cigarette smokers who met DSM-5 criteria for either bipolar disorder (BD; 51.8%) or schizophrenia spectrum disorder (SSD) and were enrolled in a 12-week, randomized, pilot feasibility trial of low- (0.5 mg twice daily) versus standard-dose (1.0 mg twice daily) varenicline combined with Acceptance and Commitment Therapy (ACT). Participants were asked to preload with varenicline for up to 5 weeks and set a target quit date by day 35. They completed bi-weekly assessments including the Hospital Anxiety and Depression Scale (HADS) and the Questionnaire for Smoking Urges-Brief (QSU-B). We conducted a series of linear regression models to test if anxiety and depression symptoms in the HADS significantly predicted withdrawal symptoms in the QSU-B in SMI smokers at the subsequent time points. Results: Anxiety symptoms experienced in Week 2 (t_{25}=3.48, p=0.002) and Week 4 (t_{25}=2.98, p=0.007) of active treatment significantly predicted withdrawal symptoms in Weeks 4 and 6, respectively. No significant relationships were found with depression symptoms or during other times frames in treatment. A significant main effect for quitting was found at both Weeks 4 (t_{25}=-3.20, p=0.004) and Week 6 (t_{25}=-2.40, p=0.025) indicating that lower QSU-B craving symptoms were associated with higher quit rates at Week 12. No interactions were found for diagnostic (BD vs. SSD) or treatment (low vs. standard) group. Regardless of participants' quit outcome, precessation HADS anxiety score was predictive of the QSU-B score for the specified weeks. Conclusions: Taken together, these findings suggest that anxiety symptoms during the precessation phase predict subsequent withdrawal symptoms during the cessation phase in SMI smokers actively receiving varenicline and ACT. Moreover, increased withdrawal symptoms during the cessation phase are associated with lower quit rates at Week 12. Future research should explore targeting anxiety symptoms in SMI smokers during the precessation and cessation phases to reduce withdrawal and increase quit rates.

FUNDING: State; Pharmaceutical Industry; Academic Institution; Nonprofit grant funding entity

POS2-12

PRELIMINARY EVIDENCE THAT AN INCREASE IN SELF-EFFICACY DURING TREATMENT PREDICTS SMOKING CESSATION IN SMOKERS WITH SERIOUS MENTAL ILLNESS

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Background: Although smoking rates have decreased on average in the United States, rates of smoking among those with serious mental illness (SMI) remain high. Smoking self-efficacy (SE), one's confidence to abstain from smoking, is an important mediator of smoking cessation and relapse. Studies have found that Acceptance and Commitment Therapy (ACT) may increase an adult's SE, and it has been demonstrated that SE predicts cessation success. However, it is unclear: 1) if ACT is effective in increasing SE in SMI smokers, or 2) if SE changes predict cessation success for SMI smokers. Methods: Adult cigarette smokers (N=28) who met DSM-V criteria for Bipolar Disorder (BD; 53.6%) or Schizophrenia Spectrum Disorder (SSD; 46.4%) were enrolled in a 12-week, randomized, pilot feasibility trial combining pre-cessation varenicline with ACT. Participants received either low- (0.5 mg twice daily, N=14)) or standard dose (1 mg twice daily) varenicline both delivered using a flexible quit date paradigm that allowed preloading of varenicline prior to the target quit date alongside ACT. Among other assessments, participants completed the Smoking Self-Efficacy Questionnaire (SEQ-12) at Week 0, 8, and 12, comprised of two subscales: internal stimuli and external stimuli. We performed repeated measures ANOVA and logistic regression to investigate whether SE scores changed throughout the trial and if that change significantly predicted an SMI smoker's ability to quit. Results: There was a significant effect of time for the external subscale ($F_{2,40}$=6.3;p=0.004), but not internal subscale. SE scores significantly increased from Week 0 to 8 (p=0.003) of active treatment but did not change from Week 8 to 12. An increase in SE on both internal and external subscales from Week 0 to 8 significantly predicted 7-day point prevalence abstinence at Week 12 (p=0.03; Odds Ratio (OR)=1.17; p=0.03; OR=1.26, respectively). Conclusions: Although additional control conditions are needed to fully evaluate this, these preliminary findings suggest that ACT delivered in combination with precessation varenicline may enhance SE among people with SMI. Furthermore, an increase across both internal and external SE subscales significantly predicted whether an SMI individual abstained from smoking at end of treatment. Combining interventions to enhance SE may be a useful target for SMI smokers making a quit attempt.

FUNDING: State; Pharmaceutical Industry; Academic Institution; Nonprofit grant funding entity

POS2-13

SPECIFIC TYPES OF MULTIMORBIDITY ARE ASSOCIATED WITH INCREASED WITHDRAWAL SYMPTOMS IN SMOKERS WITH SERIOUS MENTAL ILLNESS MAKING A QUIT ATTEMPT: A PILOT STUDY

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Background: Persons with serious mental illness (SMI) such as bipolar or schizophrenia spectrum disorders typically have other multiple chronic conditions (i.e., multimorbidity) that reduce the odds of quitting smoking. SMI smokers also experience more severe withdrawal symptoms than smokers without mental health conditions; however, the relations among different types of multimorbidity (e.g., specific medical; other psychiatric; and substance use disorders) and nicotine withdrawal are not well understood. We explored whether the presence of multiple chronic conditions within 15 organ systems were associated with withdrawal symptom severity in SMI smokers making a quit attempt. Methods: As part of a pilot feasibility trial (the ACTSLow Trial) combining precessation varenicline with Acceptance and Commitment Therapy (ACT) in SMI smokers, we conducted both structured medical and psychiatric diagnostic interviews in 28 participants with bipolar disorder (N = 15) or schizophrenia spectrum disorder. Withdrawal symptoms were assessed biweekly for 12 weeks during the active treatment period with the Minnesota Tobacco Withdrawal Scale (MTWS). We used general linear mixed-effects analyses where diagnoses (i.e., total number of multimorbid diagnoses, specific diagnostic classes) served as between-subject variables and MTWS total scores over time served as a within-subject variable. Results: There was a significant main effect of the number of multimorbid diagnoses on withdrawal symptom severity: a greater number of current co-occurring diagnoses was associated with higher MTWS scores ($F_{1,10}$=3.65, p<0.001). Analyses of individual organ system classes revealed a main effect of both psychiatric and cardiovascular diagnoses: having 2 or more co-occurring psychiatric diagnoses ($F_{1,39.82}$=18.59, p<0.001), and having a current cardiovascular disorder ($F_{1,38.79}$=6.69, p=0.014), were both associated with higher MTWS scores. Further, there was a significant interaction effect between reporting a history of a non-tobacco substance use disorder (SUD) and psychiatric diagnoses; the effect of a co-occurring psychiatric diagnosis on MTWS scores was most prominent in those with a history of SUD. Conclusions: The results suggest that the presence of multiple chronic conditions in SMI smokers is associated with more severe tobacco withdrawal. Additionally, there may be some specificity to the types of multimorbidity most associated with tobacco withdrawal during a medication- and counseling-assisted quit attempt. Our preliminary findings indicate the need for further research on the effects of multimorbidity on withdrawal symptoms and cessation success in smokers with SMI.

FUNDING: State; Pharmaceutical Industry; Academic Institution; Nonprofit grant funding entity

POS2-14

CESSATION OF SMOKING TRIAL IN THE EMERGENCY DEPARTMENT

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Significance: Tobacco smoking is the leading cause of years of life lost, and negatively impacts significantly on physical health conditions and recovery outcomes from injury or surgery. Most current smokers will, if asked, state that they want to quit, but need support. To date there have been no randomised controlled trials of smoking cessation interventions in the Emergency Department (ED) using e-cigarettes. This approach may offer a valuable opportunity to reach unmotivated quitters and provide them an acceptable alternative to tobacco, with the ultimate aim of encouraging complete tobacco cessation. The aim of this study is to definitively test real-world effectiveness

of an ED based smoking cessation intervention (including provision of an e-cigarette) with usual care. Methods: Two-group, multi-centre, pragmatic, individually randomised, controlled trial (ClinicalTrial.gov: NCT04854616). We randomly assigned people who smoked tobacco and were attending one of six EDs across the United Kingdom. They were randomised to either control (in which case they were given written information about local stop smoking services) or intervention (in which case they received a brief smoking cessation intervention with a trained advisor, provision of an e-cigarette starter kit, training on its use and referral to stop smoking services). Qualitative observations of intervention delivery across the six sites were undertaken as part of the process evaluation. Both groups were followed up 1, 3 and 6 months after randomisation and asked if they had smoked tobacco in the past 7 days. Smoking cessation is biochemically verified at 6 months. Results: A total of 972 participants have undergone randomisation and recruitment has now closed. Follow-up is still in progress but by March 2023 we will be able to report: overall smoking status at 1, 3 and 6 months, demographic data of recruits (gender, age, ethnicity, level of deprivation, employment status) and smoking trajectory (overall number of cigarettes per day at baseline and 6 months) as well as changes in e-cigarette usage (percentage who had used an e-cigarette in the last 3 months at baseline and frequency of use at 6 months). Conclusion: It is feasible to implement a smoking cessation intervention in EDs with dedicated staff to deliver the intervention. Recruitment was above target indicating that EDs may represent an excellent opportunity to engage hard to reach smokers.

FUNDING: Federal

POS2-15

RECRUITING TO TRIALS IN A POST-PANDEMIC WORLD: LESSONS FROM THE BABYBREATHE TRIAL - PREVENTING RETURN TO SMOKING POSTPARTUM

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Significance: Many women quit smoking for or during pregnancy, but up to 75% return to smoking within 6 months. BabyBreathe™, is a complex intervention offering a combination of one-to-one behavioural support, delivered either face-to-face or remotely, alongside digital and tailored pharmacological support to postpartum women. The BabyBreathe trial has been recruiting since September 2021, with substantial adaptations to protocol to enable innovative recruitment routes due to limitations with face-to-face recruitment experienced as a result of the Covid-19 pandemic. This caused major disruption to the provision of clinical care, thus impacting research. Methods: Multi-centre randomised controlled trial (RCT). The trial is recruiting pregnant women who quit smoking for or during pregnancy across England and Scotland (n=880). Face to face recruitment working with midwifery teams has not been possible, so a combination of remote screening of records, direct phone contact, advertising, identification by other health care professionals, and paid for online targeted recruitment are utilised. Results: Recruitment start was delayed due to pandemic restrictions causing major disruption to clinical research. Face to face recruitment as originally planned was not possible. Remote screening of maternity records and direct phone contact to eligible participants has been successful, although is limited by personnel. Targeted online recruitment has been highly successful. This presentation will report on the success rate of different recruitment approaches, estimating time needed, resource required, and presenting conversion rates from consent to contact through to randomisation of each method. Conclusions: Remote approaches to recruitment may be best suited to trials where interventions can be delivered remotely, as an adjunct to routine healthcare.

FUNDING: State

POS2-16

PATIENT GENERATED HEALTH DATA (PGHD) INTEGRATED INTO EHR AS AN INNOVATIVE STRATEGY TO ENHANCE TOBACCO TREATMENT IN CANCER CARE

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Significance: Smoking has important negative effects on cancer prevention and treatment outcome but is often unaddressed in cancer care due to time and resource constraints. Patient generated health data (PGHD) are health-related data created by patients relevant to a health concern. The health benefits of PGHD are most evident when these data are aligned with a specific care focus. PGHD have the potential to increase patient treatment engagement, satisfaction, and intervention support. This study provides data on both implementation and effectiveness outcomes of PGHD integration into EHR using a patient portal, as an extension of a point of care model outpatients at a large cancer center, as part of the Cancer Center Cessation Initiative (C3I). Methods: We implemented the PGHD strategy using the My Chart patient portal to collect relevant data during the echeck-in process about one week before scheduled appointments. Data were collected on smoking status, patient interest in smoking cessation medication and counseling, and to support medication prescribing (e.g., smoking quantity and time to the first cigarette). We report 1) implementation outcomes (reach of MyChart survey access, response rate), 2) patient interest in treatment, and 3) the comparison of reach of tobacco treatment (% receiving cessation pharmacotherapy) in pre vs. post- intervention periods (1/1/2021-6/30/2021 vs. 7/1/2021-5/31/2022). PGHD was implemented in 7/2021 in 7,816 patients in a medical oncology clinic. Results: MyChart is accessed by 66% (7,816 out of 11,842 patients) of medical oncology patients. Among 7,816 patients who received the My Chart survey via automatized delivery, 2,189 responded to it (28%). Among 150 patients who self-reported as current or some-day smokers, 20 (13.0%) reported currently taking cessation medication, 52 (34%) reported interest in taking cessation medication, and 78 (53%) reported no interest in medication. In follow-up, of 52 patients who reported interest in taking cessation medication, 20 received it and 32 did not. EHR data revealed that the medication rate has significantly increased from pre to post-intervention in the medical oncology clinic. (13% to 26%, N=150, z=2.88, p=0.0040). Conclusion: A low-burden PGHD strategy via the patient portal, MyChart, identified cancer patients who were interested in smoking treatment and led about 40% of patients to use medication who were not already doing so. PGHD may be a low-cost and low-burden method to engage more cancer patients who smoke in smoking treatment. Future research should use experimental designs that increase strength of inference.

FUNDING: Nonprofit grant funding entity

POS2-17

E-CIGARETTE SCREENING IN PRIMARY CARE

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Background: While e-cigarette use is rising within the general population, less is known about the prevalence among patients presenting to primary care. This is likely due to nascent e-cigarette screening and documentation procedures. The current project seeks to explore the capture rate of e-cigarette assessment within a large primary care network and determine which variables are associated with greater likelihood of being screened. Methods: Data include 134,931 patients who visited one of 41 primary care clinics within a 12-month period (6/1/2021-6/1/2022) at a healthcare system in the southeastern United States. Information concerning demographics, combustible tobacco use, alcohol use, illicit drug, and e-cigarette use were extracted from electronic medical records. Logistic regression was utilized to examine variables associated with differential odds of being screened for e-cigarette use. Results: Rates for e-cigarette screening within the patient visits (n=46,997; 34.8%) were considerably lower than tobacco (n=134,196; 99.5%), alcohol (n=129,766; 96.2%), and illicit drug use (n=129,766; 92.6%). Of those assessed, 3.6% (n=1,669) of patients reported current e-cigarette usage. Of those with documented nicotine use (n=7,032), 23.7% (n=1,207) were mono e-cigarette users, 76.3% (n=5,364) were mono combustible tobacco users, and 6.6% (n=461) were dual users. Those documented as being current smokers had 1.32 time the odds (95% CI = 1.28 - 1.37) to be screened for e-cigarette usage, while those documented as being current or former illicit substance users had 1.57 times the odds (95% CI = 1.51-1.63) to be screened. Gender and ethnicity were not associated with meaningfully different risks for being assessed. Conclusions: Overall rates of e-cigarette usage screening were significantly lower than that of other substances. Additionally, use of combustible tobacco or illicit substances was associated with an increased likelihood of being screened. This may be due to the relatively recent proliferation of electronic nicotine delivery systems, or the relative dearth of well-established evidence-based treatments for e-cigarette cessation. However, most e-cigarette users report interest in quitting, making improved assessment and documentation of usage within primary care clinics a vital first step toward providing assistance.

FUNDING: Federal; Academic Institution

POS2-18

DEMOGRAPHIC AND SMOKING HISTORY CORRELATES OF ANTICIPATED REASONS FOR ENDS USE

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Background: Electronic nicotine delivery systems (ENDS) are battery-powered devices that deliver aerosolized, nicotine-containing e-liquid into the lungs. As ENDS popularity has grown in the US, there remains limited and mixed research on reasons for use, with most studies focusing on reasons for use solely among existing users. This study investigated the relationship between demographic and smoking history characteristics and the anticipated reasons for ENDS use among adult smokers. Anticipated reasons for ENDS use may better reflect initial motivations and expectations for use. Design: The study was a secondary analysis of baseline data from a nationwide RCT, for which enrollment is complete. Smokers were randomized to receive a 1-month sample of ENDS (or not), testing its impact on a) naturalistic uptake, b) smoking behaviors, and c) toxicants. Participants: 638 adult smokers who were not recent or regular ENDS users were included in the final analyses. Of these, 53.6% were female, with Mean (*M*) (*SD*) age = 42.3 (11.5), CPD *M* (*SD*) = 15.6 (9.1), and motivation to quit [0-10 scale] *M* (*SD*) = 4.3 (3.2). Measurements: Primary analyses investigated bivariate and multivariable associations between demographic and smoking-related characteristics as correlates of self-reported anticipated reasons for e-cigarette use. Descriptive statistics were run for participant demographics and smoking histories, and frequencies of reported reasons for ENDS use. Results: The three most common anticipated reasons for ENDS use were: 1) quitting/reducing cigarette use (86.5%), predicted by motivation to quit (*AOR* = 1.23; *95% CI* = 1.13, 1.33); 2) reduced odor (85.6%), predicted by sex (*AOR* = 2.19; *95% CI* = 1.36, 3.51) and income (*AOR* = 1.83; *95% CI* = 1.02, 3.26); and 3) craving suppression (84.8%), predicted by race (*AOR* = 0.54; *95% CI* = 0.32, 0.92), motivation to quit (*AOR* = 1.14; *95% CI* = 1.06, 1.23), nicotine dependence (*AOR* = 1.20; *95% CI* = 1.08, 1.33), and ever ENDS use (*AOR* = 1.67; *95% CI* = 1.03, 2.71). Conclusion: Although multiple demographic and smoking history characteristics were predictors of anticipated reasons for ENDS use, smoking history characteristics (motivation to quit, nicotine dependence, previous ENDS use) most frequently predicted different reported reasons for use. Overall, smoking history characteristics are likely important for characterizing who is using ENDS, and for what purposes.

FUNDING: Federal

POS2-19

SMOKING ABSTINENCE EXPECTANCIES AMONG LATINX SMOKERS: AN INITIAL TEST AND EVALUATION OF INDIVIDUAL DIFFERENCE FACTORS

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Prior research has not examined the impact of smoking abstinence expectancies on smoking behavior in Latinx/Hispanic (hereafter Latinx) smokers. Therefore, the present investigation sought to explore the relevance of smoking abstinence expectancies in terms of smoking severity indicators (e.g., cigarette dependence) and to characterize individual difference factors related to such expectancies among Latinx smokers from the United States. Participants included 338 English-speaking Latinx adult daily cigarette smokers (Mage = 35.53 years; SD = 8.65; age range 18-61; 37.3% female). Negative abstinence expectancies showcased positive relations to cigarette dependence, number of prior quit attempts, and problems experienced when quitting; positive abstinence expectancies demonstrated negative associations with these same smoking variables. Results also supported statistically significant main effects for anxiety symptoms anxiety sensitivity in relation to increased negative mood abstinence expectancies. Moreover, anxiety sensitivity was significantly associated with greater abstinence expectancies for somatic symptoms and harmful symptoms and negatively related to positive consequence abstinence expectancies. Overall, the current investigation is the first to evaluate smoking abstinence expectancies among Latinx smokers in the US and empirically documents their relation to smoking severity indicators and characterizes individual difference factors that underlie their expression.

FUNDING: Federal

POS2-20

SOCIOECONOMIC DIFFERENCES IN TOBACCO OUTLET AVAILABILITY, DENSITY, AND PROXIMITY IN FOUR CITIES IN THE NETHERLANDS

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Introduction: Previous studies found that tobacco outlets were unevenly distributed by area socioeconomic status (SES). However, evidence from continental Europe is limited. This study aims to assess differences in tobacco outlet availability, density and proximity by area SES in the Netherlands. Methods: All tobacco outlets in four Dutch cities (Amsterdam, and medium-sized cities Eindhoven, Haarlem, and Zwolle) were mapped between September 2019 and June 2020. We estimated associations between average property value of neighbourhoods (as an indicator of SES, grouped into quintiles) and 1) tobacco outlet availability in the neighbourhood (yes/no), 2) density (per square kilometre (km^2)), and 3) proximity to the closest outlet (in meters), using logistic and linear regression models. Results: 46% of neighbourhoods contained at least one tobacco outlet. Tobacco outlets were mostly situated in city centres, but the distribution of tobacco outlets varied per city due to differences in urban structures and functions. In the medium-sized cities, each quintile higher neighbourhood-SES was associated with lower tobacco outlet availability (Odds Ratio (OR):0.71, 95% Confidence Interval (CI):0.59;0.85), lower density (Beta (B):-1.20 outlets/km^2, 95%CI:-2.20;-0.20) and less proximity (B:40.2m, 95%CI 36.58;43.83). Associations were the other way around for Amsterdam (OR:1.22, 95%CI:1.05;1.40, B:3.50, 95%CI:0.81;6.20, and B:-18.45, 95%CI:-20.41;-16.49, respectively). Results were similar for most types of tobacco outlets. Conclusion: In medium-sized cities in the Netherlands, tobacco outlets were more often located in low-SES neighbourhoods than high-SES. Amsterdam presented a reverse pattern, possibly due to its unique urban structure. We discuss how licensing might contribute to reducing tobacco outlets in low-SES neighbourhoods.

FUNDING: Nonprofit grant funding entity

POS2-21

DISCRIMINATION, IDENTITY CONNECTEDNESS, AND TOBACCO USE IN A SAMPLE OF SEXUAL AND GENDER MINORITY YOUNG ADULTS

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Introduction: Studies show that tobacco use among sexual and gender minority (SGM) populations is disproportionately higher than heterosexual or cisgender populations. However, few studies have examined how tobacco use relates to SGM-specific discrimination and connection to SGM identity within diverse SGM subgroups. Methods: This study analyzed 2016-2019 survey data from 11,313 SGM (gay, lesbian, bisexual, other sexual minority, gender minority) young adults in the United States and reported current cigarette, e-cigarette, other tobacco (cigar, smokeless tobacco, hookah), and poly-tobacco use. We used multinomial logistic regression to estimate associations between (a) SGM subgroup, SGM-specific discrimination, and SGM identity connectedness and (b) each tobacco use outcome (versus never use of tobacco). We conducted post-estimation testing to assess predicted probabilities of tobacco use against the sample average. Results: Gender minority participants had the highest levels of discrimination, and gender minority participants and lesbian females had the highest levels of identity connectedness. Lesbian females had higher-than-average probability of poly-tobacco use. Higher levels of discrimination were associated with poly-tobacco use. Higher levels of identity connectedness were protective against certain tobacco use behaviors among gender minority participants and participants with high levels of discrimination experience. Conclusions: We found variations in discrimination and identity connectedness by SGM subgroups. Discrimination may be a risk factor for certain tobacco use behaviors. However, SGM identity connectedness may be protective against tobacco use among gender minority individuals and individuals experiencing SGM-specific discrimination. These findings can inform targeted approaches to reach SGM subgroups at greater risk of tobacco use.

FUNDING: Federal

POS2-22

THE EFFECT OF FLAVOR AND NICOTINE FORM IN E-LIQUIDS AMONG ADULTS WHO SMOKE MENTHOL CIGARETTES: A PILOT STUDY

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Background: Those who use menthol cigarettes have lower cessation rates than those who use non-menthol cigarettes. E-cigarette use could reduce use of cigarettes; however, they are not FDA approved smoking cessation aids. E-cigarettes come in multiple nicotine formulations (nicotine salt v. freebase nicotine) and flavors (menthol v. tobacco), yet there is no data on how these constituents influence appeal among adults who use menthol cigarettes. Methods: Adults (= 21 years old, = 5 menthol cigarettes per day, use e-cigarettes = 10 times in past 6 months, biochemically verified tobacco use) received 36 mg/ml of nicotine in the following e-liquid formulations: 1) nicotine salt + menthol flavor, 2) nicotine salt + tobacco flavor, 3) freebase nicotine + menthol flavor, 4) freebase nicotine + tobacco flavor. Using a double blind, randomized cross-over design, during one laboratory session participants were instructed to take one puff of each of the 4 e-liquids. Afterwards with all 4 e-liquids available, participants used e-liquids ad libitum for 60 minutes. Liking and irritation from single puff exposures and number of puffs during the ab-lib portion were assessed. Results: Participants (n=16) were on average 39.3 years old, 69% male and 60% Non-Hispanic White. Mixed models revealed that nicotine salts were liked more and exhibited less throat and airway irritation than freebase nicotine for the single puff exposures. Nicotine salts (vs freebase) had more puffs during the ad-lib portion. There were no differences in liking and puffs based on flavor and no significant interactions between nicotine form and flavor. Conclusion: At similar concentrations, nicotine salt e-liquids were preferred compared to freebase nicotine amongst those who used menthol cigarettes, regardless of the presence of menthol. Our pilot findings suggest that those who use menthol cigarettes may prefer nicotine salt e-liquids and may not require menthol flavor.

FUNDING: Federal

POS2-23

CIGAR CESSATION PREVALENCE AND TRENDS AMONG VARIOUS DEMOGRAPHIC GROUPS UTILIZING TUS-CPS DATA 2010-2019

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Significance: Disproportionate cigar use rates across demographic groups can contribute to tobacco-related health disparities in the U.S. Yet, there is little research published on trends in cigar cessation. Such data could be leveraged to develop equitable tobacco control policies and programs. We assessed overall and demographic-specific cigar cessation rates from 2010-2019. Methods: To characterize cessation rates among various demographic groups over time, we analyzed data from the 2010-11, 2014-15, and 2018-19 Tobacco Use Supplement to the Current Population Survey (TUS-CPS). Individuals who reported either 1) current cigar smoking for at least 2 years or 2) quitting cigar smoking within the past 12 months were included in the study. Respondents who reported not smoking a cigar within the past six months were considered quitters. Chi-square tests were used to test differences in cessation prevalence between two survey waves (e.g., comparing cigar cessation prevalence of NH White respondents in 2010-2011 versus 2018-2019) within the same demographic group as well as between different groups within the same survey wave (e.g., comparing cigar cessation prevalence of NH White to NH Black respondents in the 2018-2019 survey wave). Results: The prevalence of cigar cessation decreased from 2010-11 to 2018-19 for Non-Hispanic (NH) White and Hispanic individuals, both genders, respondents with an annual household income >$50,000, and respondents living in the Southern United States ($p < 0.05$). NH White individuals had significantly higher cessation rates than those who identified as NH Black (33.8% vs. 25.0% in 2010-11; 33.4 vs. 20.4 in 2014-15; 31.1 vs. 22.3 in 2018-19, $p < 0.05$) while those aged 18-20, 21-24, and 25-44 years had significantly higher cessation rates than those aged 65+ years ($p < 0.05$). Additionally, females quit at higher rates than males ($p < 0.05$ for each wave). Conclusion: Overall cessation prevalence statistically decreased from 2010-11 to 2018-19. Differences in cessation prevalence among NH Whites vs NH Blacks suggest important health equity concerns that policymakers could consider when pursuing regulations that promote cigar smoking cessation. Funding: Federal

FUNDING: Unfunded; Nonprofit grant funding entity

POS2-24

TRENDS IN NICOTINE STRENGTH IN ELECTRONIC CIGARETTES SOLD IN THE UNITED STATES, 2017-2022

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Introduction: Most e-cigarettes contain nicotine, which is highly addictive. Higher nicotine strength may increase nicotine dependency. This study assessed trends in nicotine strength in e-cigarette products sold in the U.S. during January 2017-March 2022. Methods: Retail e-cigarette sales data in the 48 U.S. contiguous states, plus the District of Columbia, during January 2017-March 2022 were obtained from The Nielsen Consumer LLC. Average nicotine strength, overall, by e-cigarette product and flavor types, and by top manufacturers was assessed. Assessed product types were disposable e-cigarettes, pods/cartridges, and e-liquids; assessed flavors were beverage, candy/sweet, fruit, menthol, mint, and tobacco; and assessed manufacturers were the top ten manufacturers based on e-cigarette product unit sales in 2020. A Joinpoint regression model was used to assess the magnitude and significance of changes in nicotine strength. Results: During January 2017-March 2022, average nicotine strength of e-cigarette products nearly doubled from 2.5% to 4.4%; increasing by an average of 0.8% per month ($p<0.001$). Average nicotine strength of disposable e-cigarettes increased the most (Average Monthly Percentage Change [AMPC]=1.26%, $p<0.001$) as compared to prefilled pods (AMPC=0.6%, $p<0.001$) and e-liquids (AMPC=0.5%, $p=0.218$). Average nicotine strength for all flavors of e-cigarette products increased except for mint-flavored products. Increases were greatest for beverage-flavored products (AMPC=2.1%, $p<0.001$), followed by menthol-flavored products (AMPC=1.2%, $p<0.001$). Average nicotine strength decreased slightly for Juul products (AMPC=-0.1%, $p<0.001$) but increased significantly for five manufacturers' products and remained unchanged at a high nicotine level (5-6%) for four manufacturers' products. Conclusions: Average nicotine strength of e-cigarette products increased overall as well as for certain product and flavor types and for some manufacturers in the U.S. during the study period. Comprehensive strategies including restricting sales of all flavored e-cigarettes and lowering nicotine strength of e-cigarettes may help to reduce the demand for e-cigarettes among youth. Lowering nicotine strength may additionally increase tobacco cessation among adults by decreasing dependence.

FUNDING: Federal

POS2-25

RACIAL DISPARITIES IN ENGAGEMENT AND RETENTION IN SMOKEFREEVET TEXT MESSAGE PROGRAM

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SIGNIFICANCE: Black veterans consistently report higher smoking rates than White veterans in the Veterans Health Administration (VHA). Previous studies conducted outside VHA have documented significant differences in tobacco cessation outcomes by race but few studies have examined potential disparities among users of mHealth tobacco cessation programs. SmokefreeVET is an automated text message program for Veterans. This quality improvement project explored racial differences in engagement and outcomes among SmokefreeVET enrollees. METHODS: Administrative data from SmokefreeVET's English language arm for cigarette smokers from December 1, 2017 to June 30, 2022 was used to examine engagement and self-reported outcomes of Black and White, non-Hispanic enrollees. Early engagement was defined as responding to any of the program's automated prompts during the first post-quit week. Other measures of engagement included opting out during the first week, number of days enrolled, and completion of the 6-week program. Self-reported smoking status was assessed at the end of treatment, 3-months, and 6-months post-treatment. Models examined engagement and outcomes by race and adjusted for age, gender, nicotine replacement therapy (NRT) use, and baseline smoking characteristics. The impact of race on self-reported quit rates was modeled based on an intent-to-treat (missing=smoking) analysis. RESULTS: The analysis sample (N=12,113) was comprised of 29.5% (n=3,568) Black enrollees. Black enrollees were more likely to be light smokers (10 or fewer cigarettes per day); less likely to be daily smokers and less likely to report use of NRT than White enrollees. In models examining engagement, Black smokers (AOR=0.72; 0.65-0.80) were significantly less likely to respond to any prompts during the first post-quit week, however, they were significantly more likely to complete the program and had more days enrolled. In models examining self-reported quit rates, early engagement with the program was consistently related to cessation at all endpoints. There were no effects of race on cessation outcomes. CONCLUSIONS: While Black smokers were less likely

to use NRT and respond to automated prompts of the SmokefreeVET program, they were more likely to complete the program. Importantly, there were no racial differences in cessation outcomes detected. mHealth interventions increase reach of smoking cessation interventions and may help reduce disparities in smoking outcomes.

FUNDING: Federal

POS2-26

MOTIVATION TO QUIT, CONFIDENCE IN QUITTING, AND EXPECTED SUCCESS IN QUITTING CIGARETTES BY RACIAL/ETHNIC STATUS FOLLOWING A SELF-CONTROL INTERVENTION

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Introduction: Motivation to quit smoking is required to initiate and maintain a quit attempt. While Black individuals report greater quit motivation than White and Latino/a individuals, they appear less likely to quit and have greater tobacco-related consequences. Novel treatments that increase motivation-related factors may be useful to reduce these disparities. This study is a secondary analysis of a pilot study that used a self-control-related intervention in individuals who reported no baseline motivation to quit smoking. Because the parent study found an increase in motivation to quit cigarettes, confidence in quitting, and expected success in quitting smoking among the entire sample following the intervention, this study aimed to examine whether racial/ethnic subgroups differentially reported changes in the above-mentioned variables. Methods: This analysis included 64 adults in the Bronx, New York (54.7% Black; 25.0% Latino/a; 17.2% White) who reported smoking at least 10 cigarettes per day (M=13.6, SD=4.27). Following the baseline appointment, participants were randomly assigned to practice either a general self-control task or a smoking-specific self-control task for one week. Self-reported quit motivation, quit confidence, and expected quit success were assessed using the Thoughts about Abstinence Scale at baseline and follow-up. We used repeated measures ANOVAs to evaluate whether White, Black, or Latino/a participants reported differences in changes in motivation to quit smoking, confidence in quitting, and expected success in quitting cigarettes by race/ethnicity. Results: We observed no racial/ethnic differences in changes in expected quitting success ($F(3, 60)=1.266$, $p=.294$), confidence in quitting ($F(3,60=0.935$, $p=.430$), or motivation to quit cigarettes ($F(3, 60)=0.513$, $p=.675$). Within each racial/ethnic subgroup, participants reported an increase in quit motivation and quit confidence. Interestingly, White participants reported a decrease in expected quit success in contrast to the increase reported by Black and Latino/a participants. Conclusions: The observed increases in quit motivation, quit confidence, and expected success in quitting cigarettes following the practice of self-control tasks did not differ by race/ethnicity. These results suggest that strengthening self-control may help increase motivation and confidence to quit cigarettes similarly in White, Black, and Latino/a adults and quit success in Black and Latino/a adults.

FUNDING: Unfunded

POS2-27

FACTORS ASSOCIATED WITH SMOKING CESSATION ATTEMPTS IN A PUBLIC, SAFETY-NET PRIMARY CARE SYSTEM

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SIGNIFICANCE: Cigarette smoking prevalence is high among vulnerable populations receiving care in safety-net settings. Factors associated with smoking cessation in safety-net settings have been understudied. We examined electronic health record (EHR) data from a large safety-net health system to identify factors associated with smoking cessation attempts. METHODS: We conducted a retrospective cohort analysis using EHR data among adult current smokers in San Francisco Health Network, a network of primary care clinics that serve San Francisco's diverse low-income populations. Patients who had at least three unique primary care encounters with documented smoking status between August 2019 to April 2022 were included in the analysis. Current smokers were identified based on the recorded smoking status in the EHR at the index visit (i.e., the first encounter during the study). The outcome was any cessation attempt, a dichotomous variable indicating a transition in smoking status from "current smoker" to "former smoker" during the study. We used a generalized estimating equation (GEE) logistic model, accounting for clustering within clinics with exchangeable structure, to examine factors associated with any cessation attempt. We adjusted for age, gender, race/ethnicity, primary language, insurance status, homelessness status, and number of comorbidities. RESULTS: We identified 7,410 (18.2%) adult current smokers at the index visit out of 40,640 adult patients. Of the current smokers, 1,312 (17.7%) had made any cessation attempt during the study period. Compared to the reference groups, factors associated with greater odds of any cessation attempts included self-identifying as being Hispanic/Latino (adjusted odds ratio [AOR]=1.36; 95% confidence interval [CI]=1.10, 1.69), reporting Spanish as primary language (AOR=1.45,95% CI=1.13,1.86) and having =3 comorbidities (AOR=1.32,95% CI=1.08,1.60). Factors associated with lower odds of any cessation attempt included age 45-64 (AOR=0.76, 95% CI=0.65,0.89), Asian language as primary language (AOR=0.69, 95% CI=0.51,0.92), uninsured/self-pay (AOR=0.46, 95% CI=0.27,0.80), and experiencing homelessness (AOR=0.54, 95% CI=0.46,0.64). CONCLUSION: Study findings highlight multiple patient factors, including older age, Asian language as primary language, being uninsured or self-pay, and experiencing homelessness, that could be targeted to increase smoking cessation attempts in the safety-net settings.

FUNDING: State

POS2-28

GENDER DISPARITIES IN ENGAGEMENT AND OUTCOMES IN THE SMOKEFREEVET TEXT MESSAGE PROGRAM

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SIGNIFICANCE: Women veterans smoke at higher rates than civilian women and some studies have demonstrated disparities in treatment outcomes. SmokefreeVET is an automated text message mHealth program for veterans designed to increase the reach of smoking cessation treatment. The purpose of this evaluation was to explore gender differences in engagement and outcomes among SmokefreeVET enrollees. METHODS: Administrative data from SmokefreeVET's English language arm for cigarette smoking enrollees from December 1, 2017 to June 30, 2022 was analyzed. The sample was limited to veterans who identified as either male or female (N=12,113). Early engagement was defined as responding to any of the program's automated prompts during the first post-quit week. Other measures of engagement included opting out during the first week, number of days enrolled, and completion of the 6-week program. Self-reported smoking status was assessed at the end of treatment, and 3- and 6-months post-treatment. Models examined engagement and cessation outcomes by gender adjusting for age, race, nicotine replacement therapy (NRT) use, and baseline smoking characteristics. The impact of gender on quit rates was modeled based on an intent-to-treat (missing=smoking) analysis. RESULTS: The analysis sample was comprised of 46.5% (n=5635) women. Women enrollees were slightly younger; more likely to be light smokers (10 or fewer cigarettes per day); more likely to be daily smokers and less likely to report use of NRT than men enrollees. In models examining engagement, women smokers (AOR=0.77; 0.70-0.85) were significantly less likely to respond to any prompts during the first post-quit week but did not differ from men in rates of first week opt out, total days enrolled, and treatment completion. In models examining self-reported quit rates, early engagement with the program was consistently related to cessation at all endpoints. NRT use was related to end of program abstinence (AOR=1.34; 1.04-1.74) but not 3- or 6-month post-program abstinence. Women were less likely than men to be abstinent at end of program (AOR=0.70; 0.54-0.92), 3-month (AOR=0.59; 0.43-0.81) and 6-month (AOR=0.56; 0.39-0.80) follow-ups. CONCLUSIONS: Engagement as measured by response to automated prompts in the first post-quit week was highly related to post-program abstinence. While text to quit programs such as SmokefreeVET increase smoking cessation intervention reach, efforts are needed to increase engagement among women.

FUNDING: Federal

POS2-29

CURRENT TOBACCO USE PATTERNS ASSOCIATED WITH HEALTHCARE UTILIZATION AMONG NON-HISPANIC BLACK AND HISPANIC MEN WITH CHRONIC CONDITIONS

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Significance: Tobacco use is a risk factor for many preventable chronic conditions and disabilities, and disparities persist with highest rates among racially/ethnically diverse men. This study assessed current tobacco use patterns associated with past 12-month healthcare utilization among non-Hispanic Black and Hispanic men with =1 chronic condition. Methods: Data were collected from a sample of non-Hispanic Black and Hispanic men ages =40 years old from across the U.S. using an internet-delivered survey. Tobacco products included combustible cigarettes, cigar products, electronic cigarettes, hookah, pipes, and bidis. Participants were categorized into four current (past 30-day) tobacco use groups: nontobacco users (did not use any tobacco product); exclusive cigarette smokers (smoked combustible cigarettes only); dualtobacco users (smoked combustible cigarettes + one other tobacco product); and polytobacco users (smoked combustible cigarettes + =2 other tobacco products). Participants reported whether they had a past 12-month: primary care visit, emergency department (ED) visit, and overnight hospital stay. Three multivariable logistic regression models were fitted while adjusting for participant age, race/ethnicity, education level, marital status, insurance coverage, body mass index, and number of chronic conditions. Results: On average (SD), participants were age 56.9 (10.1) years and had 4.0 (2.9) chronic conditions. Concerning tobacco use patterns, 71% were nontobacco users, 16% were exclusive cigarette smokers, 8% were dualtobacco users, and 5% were polytobacco users. Relative to nontobacco users, exclusive cigarette smokers were at decreased odds to have a primary care visit (AOR=0.68, 95%CI=0.47-0.99). Exclusive cigarette smokers (AOR=1.66, 95%CI=1.25-2.19), dualtobacco users (AOR=1.75, 95%CI=1.23-2.50), and polytobacco users (AOR=4.10, 95%CI=2.46-6.84) were at increased odds to have an ED visit compared to nontobacco users. Additionally, polytobacco users were more likely to have an overnight hospital stay (AOR=2.72, 95%CI=1.73-4.29) than nontobacco users. Conclusion: Findings suggest current tobacco use patterns are uniquely associated with past 12-month healthcare utilization among non-Hispanic Black and Hispanic men, while taking into consideration important factors including complex disease profiles. Efforts focusing on tobacco cessation and disease self-management education may help decrease ED utilization and hospitalizations.

FUNDING: Federal; Academic Institution

POS2-30

THE ASSOCIATION BETWEEN RACE/ETHNICITY AND TOBACCO USE CESSATION METHODS BEFORE AND DURING THE COVID-19 PANDEMIC?

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While smoking rates have declined in recent years, millions of adults still currently smoke cigarettes. Since people who smoke have a higher likelihood of developing severe COVID-19 symptoms than people who don't, some tobacco users may have been motivated to quit since the COVID-19 pandemic. As the pandemic disrupted health-related services and disproportionally impacted certain racial/ethnic groups, it is unclear how these changes may influence commercial tobacco use cessation methods across racial-ethnic groups. Data from a nationally representative sample of 809 U.S. adult (age > 21 years) current commercial tobacco users, were collected from January-February 2021. Participants reported various cessation methods (e.g., cold turkey, FDA-approved treatments, switching to other tobacco products, cannabis use) used prior to and during the pandemic and socio-demographics. We used weighted multivariable logistic regression models to examine the associations of race/ethnicity with each cessation method prior to and during the pandemic while adjusting for age and sex. The most reported cessation methods used prior to and during the pandemic were cold turkey quitting (76.08% and 70.54%, respectively) and FDA-approved treatments (60.45% and 53.64%, respectively), and the use of each cessation method decreased during the pandemic. Cessation methods significantly differed by racial/ethnic groups such that prior to the pandemic in comparison to white individuals, racial/ethnic minority populations were less likely to quit tobacco cold turkey (e.g., Black vs. White: AOR=0.45). Asian individuals were more likely to use FDA-approved methods than White individuals (AOR=2.64) only during the pandemic but not prior. Hispanic and Black individuals were more likely than White individuals to use cannabis to quit tobacco, both prior to (Hispanic vs. White: AOR=2.01; Black vs. White: AOR=3.77) and during (Hispanic vs. White: AOR=2.45; Black vs. White: AOR=3.55) the pandemic ($p<0.05$). In conclusion, commercial tobacco use cessation methods varied by race/ethnicity and somewhat between before and during the pandemic. Certain racial-ethnic groups may be having unique experiences both prior to and during the pandemic which seemingly may impact their use of certain cessation methods. Promotion of effective cessation methods need to consider this influence, and researchers should explore reasons behind racial/ethnic disparities and associations with cessation methods.?

FUNDING: Federal

POS2-31

RACIAL AND ETHNIC DISPARITIES IN ADOLESCENT COMBUSTIBLE TOBACCO SMOKING FROM 2014 TO 2020: DECLINES ARE LAGGING AMONG NON-HISPANIC BLACK YOUTH.

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Objective. We quantified the linear trend in combustible tobacco smoking among adolescents in the United States from 2014 to 2020, then compared these trends across racial and ethnic groups. Additionally, we tested the effect of e-cigarette use on these trends for all youth across racial and ethnic groups. Methods. We pooled and analyzed seven years of National Youth Tobacco Survey (NYTS) data. The total sample was n=124,151 middle and high school students from 2014 to 2020. Weighted logistic regression analyses calculated the annual change in combustible tobacco smoking (i.e., cigarettes, cigars, and hookah) from 2014 to 2020. Stratified analyzes examined linear trends for non-Hispanic White (NHW), non-Hispanic Black (NHB), Hispanic/Latino, and non-Hispanic Other (NHO) youth. All models controlled for sex, grade level, and past 30-day e-cigarette use. Results. Combustible tobacco smoking declined for all youth but at significantly different rates across races and ethnicity. From 2014 to 2020, combustible tobacco smoking declined by 21.5% per year for NHWs, which was considerably greater than Hispanic/Latinos (17% per year; $p=0.025$), NHOs (15.4% per year; $p=0.01$), and NHBs (5.1% per year; $p<0.001$), adjusting for sex, grade, and e-cigarette use. Trends and disparities in trends were observed independent of e-cigarette use. Conclusions. From 2014 to 2020, combustible tobacco smoking dropped by more than 50% for NHW youth, more than 40% for Latino and NHO youth, compared to just 16% among NHB youth. Declines in combustible tobacco smoking are substantially lagging among NHB youth. Interventions are critically needed to address this disparity. Implications. Targeted, evidence-based intervention aimed at reducing combustible tobacco smoking among NHB youth is crucial and should follow the Best Practices for Comprehensive Tobacco Control Framework that incorporates sustainable funding for school-based intervention, public health education, and adult cessation.

FUNDING: Other

POS2-32

IQOS AND CIGARETTE ADS IN ISRAELI MEDIA - A CONTENT ANALYSIS

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Significance: Heated tobacco products (HTPs) are increasingly popular globally. Philip Morris International (PMI)'s IQOS, the global HTP leader, endured several regulatory changes in Israel - from no oversight (12/2016-04/2017), to minimal tobacco legislation (04/2017-12/2018), to progressive legislation that included a partial advertisement ban (exempting print media) (03/2019) and plain packaging (01/2020). This study aimed to assess and compare changes in IQOS and PMI cigarettes ad content across the different regulatory periods. Methods: Content from PMI's IQOS and cigarette ads (12/2016-08/2020) was coded using a predefined framework. Ad characteristics included regulatory period, target population, product presentation, age and use restrictions, retail accessibility, additional detail cues (e.g. phone number or QR code), and promotions. Ad themes included product features, legislation-related elements, social norms, and comparative claims. Ad content was compared between IQOS and PMI cigarettes, and across the different regulatory periods for each product separately, using Chi-square test or Fischer's exact test. Results: During the study period, 125 unique IQOS ads and 71 unique PMI cigarette ads were advertised. IQOS ads featured more age restrictions, retail accessibility, and additional detail cues, compared to cigarette ads (93.6% vs. 16.9%; 56.0% vs. 0.0%; and 95.2% vs. 33.8%, respectively). Cigarette (vs. IQOS) ads featured more price promotions (52.1% vs. 10.1%). The main ad themes were innovation for IQOS (92.0%) and quality for cigarettes (50.7%). For IQOS, as regulatory restrictions tightened, ads featured more direct comparison to cigarettes, QR codes, indoor settings, and did not feature product packaging. Conclusion: PMI used different marketing strategies for IQOS in comparison to their cigarette brands. IQOS advertisement content shifted as more restrictions went into effect, with the print media exemption from the advertisement

ban used to circumvent legislation (e.g. QR codes, products not in plain packaging). Findings from this study point to the necessity of a complete advertisement ban, and ongoing marketing surveillance.

FUNDING: Federal

POS2-33

APPROACHES TO NICOTINE POUCH REGULATION AROUND THE GLOBE

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Significance: Nicotine pouches are sold in countries throughout the world; some contain tobacco-derived nicotine, while others contain synthetic nicotine. Synthetic nicotine pouches may evade some countries' existing tobacco product regulations since many countries define tobacco products based on tobacco plant constituents rather than the presence of nicotine. We provide a snapshot for how countries around the globe are currently regulating tobacco-derived and synthetic nicotine pouches. Methods: Approaches to nicotine pouch regulation were obtained through active policy surveillance work in which we requested information on the availability of nicotine pouches and applicable policies from in-country tobacco control experts from 130 countries and analyzed responses. Where policies existed, we categorized which regulatory domains were included. Results: We received responses from 64 countries. Among this sample, nicotine pouches were reported being sold in 33 countries. Eight countries where nicotine pouches are sold regulate only tobacco-derived nicotine pouches with 10 countries regulating tobacco-derived and synthetic nicotine pouches. An additional 12 countries regulate nicotine pouches where these products are not reported to be sold; sale is largely prevented through bans or requirements for pre-market authorization. Of the 12 countries regulating nicotine pouches where nicotine pouches are not sold 3 regulate only tobacco-derived nicotine pouches with the remaining regulating both forms of nicotine pouches. Countries regulating synthetic nicotine pouches most commonly regulate these under a medicinal classification while countries regulating only tobacco-derived nicotine pouches most commonly regulate these products under a tobacco products classification. Policies regulating nicotine pouches commonly restrict marketing (13 countries), require health warning labels (10), impose minimum age of purchase requirements (9), or ban sales (7). It was comparatively rare for countries regulating nicotine pouches to restrict ingredients (3 countries), limit the nicotine concentration (1), or tax nicotine pouches (2). Conclusion: The results of this study demonstrate that most countries are not regulating these nicotine products and further, that the use of synthetic nicotine presents possible regulatory loopholes for the marketing of these products. Classifying products that use synthetic nicotine as medicinal products may be a practical regulatory pathway for some countries.

FUNDING: Federal; Nonprofit grant funding entity

POS2-34

E-CIGARETTE LEGISLATION AND PREVALENCE OF E-CIGARETTE USE AMONG ADULTS IN THE UNITED STATES

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Significance: State laws on e-cigarettes continue to be updated over the past several years to deal with the explosion of e-cigarette use among adolescents and adults in the United States. It is essential to evaluate the association between state-level e-cigarette legislation and the prevalence of e-cigarette use. Objective: To evaluate whether stricter e-cigarette legislation is associated with a lower prevalence of e-cigarette use among adults. Methods: This study used an ecological and cross-sectional method to analyze the association between the prevalence of e-cigarette use and state-level legislation in 42 states. A legislative strength score was created for each state based on four categories of laws including e-cigarette taxation, youth access restriction, retail licensure, and smoke-free air legislation using data from the 2020 Behavioral Risk Factor Surveillance System (BRFSS), the 2019 State Tobacco Activities Tracking and Evaluation (STATE) System, and the U.S. Census Bureau. Linear regression models were fitted to examine the association between the state-level e-cigarette legislative strength scores and e-cigarette prevalence, controlling for state-level demographic characteristics. States were divided into three quantiles by overall legislative scores and sub-scores in the four categories. ANOVA was used to determine whether the differences in e-cigarette prevalence were statistically significant between quantiles. Sensitivity analysis was conducted using different cut-off points when legislation involved money values. Results: The e-cigarette legislative strength varied considerably across states. Rhode Island and Vermont had the strictest e-cigarette legislation with a total score of 13 (out of 19 maximum) while Mississippi and Wyoming had the least stringent legislation with a 0 score. The prevalence of e-cigarette use in all states ranged from 3.77% to 9.25%. Idaho had the highest vaping prevalence (9.25%), followed by Utah (7.20%), Tennessee (6.94%), and Kentucky (6.73%). Massachusetts had the lowest prevalence (3.77%), followed by New York (3.26%) and Maryland (3.77%). The prevalence of e-cigarette use was negatively associated with state legislative strength before and after controlling for the age distribution ($P<0.05$). ANOVA results showed significant differences in e-cigarette prevalence among states in three quantiles of legislative strength ($P<0.05$). The average e-cigarette prevalence in the 13 states with the strictest legislation was 1% lower than in the 15 states with the most lenient legislation. Results of regressions and ANOVA were robust in the sensitivity analysis. Conclusions: Higher overall legislative scores were associated with lower e-cigarette prevalence. Establishing comprehensive legislation may be effective in reducing the prevalence of e-cigarettes.

POS2-35

THE INTERACTION OF SMOKE-FREE WORKPLACE AND HOSPITALITY LAWS AND CIGARETTE TAXATION AMONG YOUTH

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Significance: Despite decades of strengthening tobacco control policies, smoking remains a leading cause of preventable death in the United States. Previous studies have demonstrated that cigarette taxes and smoke-free laws can reduce smoking behaviors among youth. However, few studies have examined how these policies interact to affect youth smoking behavior. *Methods:* Using a nationally representative probability sample of 8th, 10th, and 12th graders from the 2001-2020 Monitoring the Future study, we investigated the interaction of taxation and smoke-free policies on youth smoking participation, initiation, and intention, and examined differences by sex, race/ethnicity, parental education, and college plans. We estimated the average marginal effects (AMEs) of the relationship using modified Poisson regression with a sandwich variance estimator, stratifying by grade. *Results and Conclusions:* Our results showed that, among 12th graders, the relationship between taxation and lower smoking participation was more pronounced in populations covered by either hospitality or workplace smoke-free laws in comparison to those not covered by smoke-free laws (Workplace: AME = -0.010, 95% CI = -0.018, -0.002, P = 0.017; Hospitality: AME = -0.011, 95% CI = -0.019, -0.004; P = 0.003). Taxation and smoke-free policies, however, did not interact to affect any smoking outcome among 8th or 10th graders, nor to affect smoking initiation or intention among 12th graders. We also examined three-way interactions between taxation, smoke-free policies, and sociodemographic subgroups. Among 8th graders whose parents had some college education, we found that taxation was more strongly associated with a lower probability of initiating daily smoking when individuals were covered by hospitality smoke-free laws as opposed to not being covered, compared to 8th graders whose parents had lower education levels. In contrast, we found that among 8th graders with a highest parental education level of college or more, cigarette taxation was more strongly associated with a lower probability of daily smoking initiation when they were not covered by hospitality smoke-free laws versus covered. There were no other differences in the taxation/smoke-free policy interaction effects by sociodemographic subgroups after adjusting for multiple comparisons. Future research is needed to further characterize the interactions of multiple tobacco control policies on youth smoking behaviors, including differences across populations.

FUNDING: Federal

POS2-36

ASSESSING TOBACCO WASTE AS A FORM OF POST-CONSUMPTION MARKETING THROUGH AN OBSERVATIONAL STUDY IN KOLKATA, INDIA

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Background: Tobacco litter is a universal issue. In India, numerous types of tobacco are consumed including smokeless (SLT), cigarettes and bidis. Tobacco packaging in India is required to have health warning labels (HWLs) to educate about the harms of tobacco use. Colorful packaging littered throughout communities may support the advertising of products, reinforcing social norms around use, in addition to the negative environmental impact and burden of clean up. We conducted an observational study to assess the presence of branded tobacco litter in Kolkata, India. Methods: During June-July 2022, we observed tobacco litter (cigarette/bidi butts and packaging; SLT packaging; e-cigarette/

heated tobacco product waste) in the South, Central and North regions of Kolkata. In each region we conducted observations in four different neighborhoods for a total of 12 observation routes. Each route ranged from 500-700m in distance and was observed twice. Using a mobile data collection app, data collectors recorded the location of each piece of tobacco litter, classified the type of litter, and recorded if the litter had a visible brand (name and/or logo) and/or a visible HWL. Data collectors also took pictures of each piece of litter. Results: Tobacco product litter was identified in each of the 12 routes during each observation. Of the N=2,227 litter pieces, SLT packaging comprised the largest proportion of the sample (45%;n=1,010), then cigarette butts (33%;n=738), bidi butts (12%;n=268), cigarette packaging (7%;n=147) and bidi packaging (3%;n=64). In total, 33% (n=736) of the litter was branded. A brand was visible in the majority of cigarette (95%;n=110) and bidi (78%;n=50) packs, over half of all SLT packaging (52%;n=526) and in 3% (n=20) of cigarette butts. A HWL was visible on 94% (n=138), 5% (n=24) and 32% (n=321) of the cigarette, bidi, and SLT packs, respectively. Conclusion: Beyond the environmental impact of this litter, this study found that most of the packaging was branded and could function as a form of post-consumption marketing, although further research is needed to explore consumers' perceptions of it. Nearly one half of the litter observed was SLT packaging which highlights the contribution this class of product makes to the litter problem. Plain and standardized packaging of all tobacco products including eco-friendly packaging, could reduce this potential post-consumption marketing, and it would improve visibility of HWLs on packaging. Funding This work was supported with funding from Bloomberg Philanthropies' Bloomberg Initiative to Reduce Tobacco Use (bloomberg.org).

FUNDING: Nonprofit grant funding entity

POS2-37

YOUTHS' ENGAGEMENT AND PERCEPTIONS OF MARKETING OF E-CIGARETTES ON SOCIAL MEDIA: USING FOCUS GROUPS

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Youths' engagement and perceptions of marketing of e-cigarettes on social media: using focus groups Marissa J. Smith (PhD)[1] corresponding author email: marissa.smith@glasgow.ac.uk and Professor Shona Hilton (PhD)[1] [1]MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, G3 7HR, UK Background: Evidence suggests that youth experimentation with using electronic cigarettes (e-cigarettes) is increasing. E-cigarettes are widely promoted on the internet and social media represents an important influence in shaping youth's understanding of issues and products. Considering the growing popularity and rapid evolution of e-cigarettes, we explored youth's experiences and engagement with e-cigarettes. Methods: Twenty focus groups were conducted between March and May 2022, with 82 youths (female n=47, male n=35) aged 11-16 living in the Central belt of Scotland. Youths were asked about smoking and vaping behaviours, social media use, vaping advertisement exposure, and were shown illustrative examples of typical social media content (e.g., images and videos) which were used to stimulate discussion about different messages, presentations, and contextual features. Focus groups were audio recorded, transcribed verbatim, and coded using thematic analysis methods. Results: Youths mentioned seeing e-cigarette advertising mostly through Instagram and TikTok. Youths agreed that e-cigarettes portrayed on social media as 'attractive', and 'cool' and viewed as a modern lifestyle 'accessory'. They perceived e-cigarettes as less harmful compared to combustible cigarettes, perhaps due to marketing and lack of product regulation, but also expressed concern about the lack of health and age warnings on social media posts. This was viewed as problematic, especially for younger children who spend time on these social media platforms. Conclusions: Most youths use social media daily and depiction of products on social media represents a key influence on youth's understandings of products. Our study suggests the growing need for policymakers to work together to develop and implement comprehensive policies relating to the advertising and marketing of e-cigarettes on social media used by youths, including posts by influencers who appeal to youths. Furthermore, prevention efforts should consider highlighting negative attributes as they may discourage use and product trial among youths. Funding: Cancer Research UK, Medical Research Council and Chief Scientist Office

FUNDING: Academic Institution; Nonprofit grant funding entity

POS2-38

THE IMPACTS OF PRODUCT CHARACTERISTICS AND REGULATORY ENVIRONMENT ON SMOKERS' PREFERENCES FOR TOBACCO AND ALCOHOL CO-USE: EVIDENCE FROM A VOLUMETRIC CHOICE EXPERIMENT

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Objective: To evaluate the impact of excise taxes, tobacco use restrictions in restaurants and bars, and regulation of the availability of alcohol flavors in tobacco products on tobacco and alcohol co-use and consumption levels. Method: A sample of 181 participants (current or recent US adult smoker who recently (re-)initiated e-cigarette use and reported past 30-day alcohol consumption) completed an online volumetric choice experiment (2020-2021) to assess stated preferences for tobacco and alcohol consumption. Participants were presented four options (usual brand of cigarettes, a closed-system e-cigarette (ENDS) product, beer, and either wine or liquor) and asked how many they would purchase for consumption over a week assuming their usual budget, with varying characteristics in the following attributes: excise taxes, tobacco product flavor and whether the tobacco product could be consumed in restaurants and bars. Pre-tax prices were based on average prices matched to the state of residence and excise tax levels were manipulated, as was whether the tax amount was separated from the base price or shown as a single total price. Results: Among study participants, 44% had an Alcohol Use Disorders Identification Test (AUDIT) score of 8 or higher and 49% reported binge drinking in the past month. When drinking alcohol, 82% reported that their cravings to smoke were somewhat or strongly increased and 74% reported smoking cigarettes somewhat or a lot more than usual. To a similar extent, cravings to use ENDS were increased (85%), though fewer (42%) reported using ENDS somewhat or a lot more than usual. We found (a) significant own price elasticities, with higher tax burden (as a percentage of retail price) associated with lower consumption of alcohol and tobacco; (b) cross price elasticities suggesting that higher tax burden for cigarettes or ENDS was associated with lower alcohol consumption, especially for beer; (c) if ENDS were allowed to be used in bars/restaurants, ENDS consumption would be higher and cigarette consumption would be lower, indicating a substitution effect; and (d) when ENDS were alcohol flavored, beer consumption increased but liquor/wine consumption decreased. Conclusion: The findings provide policymakers and researchers with information on the role of alcohol use in tobacco outcomes among concurrent smokers and ENDS users that could inform local, state, and federal policymaking to reduce the health burdens of tobacco and alcohol use.

FUNDING: Federal

POS2-39

THE IMPACT OF LOCAL CIGAR PACK POLICIES ON YOUTH AND ADULT CIGAR USE

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Significance: Nearly 300 communities across the US have adopted cigar policies regulating price and/or pack size to eliminate the sales of inexpensive, small packs to reduce use, particularly among young people and other vulnerable populations. We examined the associations between cigar pack policies and changes in cigar use for (1) New York City (NYC), whose policy became effective in 2014, and was updated in 2018, (2) DC, whose policy became effective in 2017, and (3) Minnesota (MN), which had 26 cities and counties with policies effective between 2014 and 2020. Methods: We conducted separate multivariable logistic regression analyses to examine the impact of policies on cigar use among (1) 111,236 youth and (2) 62,295 adults in NY using 2000-2020 and 2003-2019 annual NY Department of Health data, (3) 5,027 adults in DC using 2015-2019 annual BRFSS data, and (4) 569,528 youth in MN using 2007-2019 triennial MN Student Survey data. For NY, NYC was compared to the rest of the state as an interaction term. For DC, change in cigar use was examined from pre-policy (2015-2017) to post-policy (2018-2019). For MN, we estimated the percentage of each county covered by a policy between 2007 and 2019. Analyses control for sex, age/grade, race and ethnicity, income/education, and cigarette use. Results: NYC cigar pack policies were associated with greater reductions in the likelihood of cigar use compared to the rest of the state for youth in 2014-2017 (AOR 0.68; 95% CI 0.51, 0.92) and 2018-2020 (AOR 0.52; 95% CI 0.35, 0.78) and for adults in 2014-2017 (AOR 0.78; 95% CI 0.63, 0.96) but not 2018-2019 (AOR 0.75; 95% CI 0.52, 1.07). The policies were not associated with changes in use in DC (AOR 0.94; 95% CI 0.59, 1.50) and MN (AOR 0.97; 95% CI 0.79, 1.18). Conclusions: Decreases in cigar use were greater following policy adoption for both youth and adults in NYC, suggesting cigar pack policies may impact cigar use, but

these findings were not identified in DC or MN. Ongoing analyses examining the impact of 186 cities with policies in Massachusetts on youth cigar and cigarette use as well as differences by policy type and sociodemographic characteristics will provide additional insight into the impact of cigar pack policies.

FUNDING: Federal

POS2-40

SUBSTITUTABILITY OF COMBUSTIBLE MENTHOL CIGARETTE ALTERNATIVES: A RANDOMIZED CLINICAL TRIAL

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SIGNIFICANCE The goal of this study was to assess the substitutability of plausible combustible menthol alternatives compared to usual brand menthol cigarettes (UBMC) in adults who smoke menthol cigarettes. METHODS Eighty current menthol cigarette smokers aged 21-50 completed a 4-session clinical lab study using a within-subjects design (Phase 1), smoking their UBMC at the first session and one of three menthol cigarette alternatives (MCAs) in random order at subsequent visits: 1) a pre-assembled menthol roll-your-own cigarette (mRYO), 2) a menthol filtered little cigar (mFLC), and 3) a non-menthol cigarette (NMC). At the end of Phase 1, participants were instructed to completely substitute their preferred MCA for their UBMC for one week and complete daily assessments of their MCA use behavior (Phase 2). At a final lab visit, substitutability of the preferred MCA was assessed in progressive ratio and cross-price elasticity tasks (Phase 3). MCA adherence at Phase 2, MCA subjective effects at Phases 1 and 3, and behavioral economic measures at Phase 3 were analyzed to assess MCA substitutability for UBMC. RESULTS At the end of Phase 1, 65% (n=52) of participants chose mRYO as their preferred product, followed by NMC (n=18 [22.5%]) and mFLC, n=10 [12.5%]). Adherence to the study product was high for all products across the 7 days of Phase 2 (range: 63-88%). Positive subjective effects for mRYO decreased between Phases 1 and 3, as did smoking satisfaction, aversion, and enjoyment. Craving reduction also decreased for NMC across phases. In the progressive ratio task, participants chose their UBMC in 61.7% of choices; this did not differ by preferred MCA, though the median breakpoint was highest for mRYO and similar for mFLC and NMC. Cross price elasticity comparing UBMC and the preferred product indicated high substitutability of each MCA at Phase 3 (*I* values -0.70 to -0.82). CONCLUSION mRYO cigarettes were the most preferred MCA among study products, but all MCAs appeared to be acceptable substitutes for UBMC using behavioral and economic measures. This suggests that a menthol cigarette ban will be most effective if it also includes mRYO and supports inclusion of mFLC in FDA's proposed flavored cigar ban.

FUNDING: Federal

POS2-41

BEHAVIORAL AND SUBJECTIVE INDICES OF ABUSE LIABILITY VARY BY ELECTRONIC NICOTINE DELIVERY SYSTEM NICOTINE FLUX

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Significance: Nicotine flux, the amount of nicotine emitted per second, is a component of abuse liability and potential target of product standards that aim to encourage switching to electronic nicotine delivery systems (ENDS) from smoking. We investigated the abuse liability of ENDS varying in nicotine flux among cigarette smokers. Methods: Participants (n=16 adult smokers) attended five laboratory sessions, evaluating own-brand (OB) cigarettes and 4 experimental ENDS. ENDS were identical in wattage (30W) and puff duration (2s) but varied in nicotine concentration and resulting flux: 0 mg/mL (no flux), 6 mg/mL (low flux), 15 mg/mL (cigarette-like flux) and 30 mg/mL (high flux). Linear mixed models assessed differences in behavioral indices of abuse liability (progressive ratio task) and subjective effects (0-100 visual analog and labeled magnitude scales) between products ($p<0.05$). Results: Participants earned significantly more puffs of OB (mean 9.7 [standard deviation 3.0]) than of cigarette-like flux (7.7 [3.9]) or high flux ENDS (6.6 [4.9]), and earned significantly more puffs of the low flux (8.5 [3.8]) than high flux ENDS. One hour after product sampling, cigarette cravings were higher in the no flux (73.9 [27.8]) and low flux conditions (71.9 [26.3]) than OB (49.6 [32.0]). High flux ENDS were associated with the lowest ratings of 'tastes good' (mean 20.6 versus 39.7-82.8) and the highest ratings of harshness/irritancy (58.5 versus 19.6-44.9) and throat hit (65.7 versus 30.5-58.4) of any condition. Conclusions: ENDS with high nicotine flux appear to have lower abuse liability than cigarettes, with the fewest puffs earned, relatively greater harshness, and worse taste profile. No and low flux ENDS suppressed cigarette cravings to a lesser extent than OB but were more acceptable based on other measures. Further investigation of ENDS with low or cigarette-like flux is warranted as they may hold sufficient abuse liability to encourage transitions from cigarettes. A nicotine flux product standard for ENDS may help limit their abuse liability, supporting smokers transitioning from cigarettes.

FUNDING: Federal

POS2-42

RESIDENTIAL LOCATION DIFFERENCES IN THE IMPACT OF PICTORIAL HEALTH WARNINGS IN VIETNAM: FINDINGS FROM THE ITC VIETNAM SURVEY FROM 2018 TO 2020

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Introduction: The aim of this study was to examine (1) the impact of pictorial health warnings (PHWs) on changes in self-reported warning labels responses (warning salience, cognitive response, behavioural reactions, and the Label Impact index - a weighted combination of four indicators), and (2) whether theses changes differed by smokers' residential location. Methods: Data were drawn from three waves of a cohort of adult smokers from the International Tobacco Control (ITC) Vietnam Survey. Wave 1 was conducted in 2018 with 1990 smokers. Waves 2 (n=1701) and Wave 3 (n=1545) were conducted at 13 months and 25 months, respectively. Six established indicators of warning effectiveness were used to evaluate the effect of PHWs on smokers' perceptions and behaviour. All results presented here were weighted using the cross-sectional weight in Stata 17. Results: Except for salience, other indicators of warning effectiveness (cognitive, and behavioural reactions) and the Label Impact Index (mean=2.40 and 2.02, respectively) fell significantly from Wave 1 to Wave 3. However, a subgroup analysis found a significant decline in the proportion of those indicators among smokers living in rural areas only (mean=2.79 at Wave 1 and 2.16 at Wave 3), whereas a small increase was observed among those in urban zones between Wave 2 (mean=1.85) and Wave 3 (mean=1.95). Conclusions: This study confirmed the weakening impact of PHWs in Vietnam significantly after 9 years of implementation, especially among those in rural areas. The replacement of the new PHWs package will be beneficial to counteract wear out and strengthen the tobacco control policies.

FUNDING: State; Nonprofit grant funding entity

POS2-43

CIGARILLO FLAVOR AND CO-USE WITH CANNABIS AMONG YOUNG ADULTS: A QUALITATIVE STUDY

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Significance: Co-use of cannabis and cigarillos is an increasingly prevalent behavior among young adults and can increase exposure to health harms. The United States Food and Drug Administration has proposed a rule to ban flavors in cigar products, which could impact co-use of cigarillos with cannabis. Focusing on young adult cigarillo and cannabis users, we sought to inform the following questions: 1) How does cigarillo flavor impact co-use with cannabis? and 2) What social-contextual factors are influential in patterns of co-use? Methods: Recruited from 15 target geographic areas known for high cigar use prevalence, the sample was comprised of 38 young adults (21-28) who smoked cigarillos and cannabis in the past month. Semi-structured phone interviews were conducted to understand participants' experiences smoking cigarillos and cannabis. Transcribed interviews were double-coded and analyzed for emergent themes. Results: Most participants co-administered cigarillos and cannabis through blunts (cigarillo wrapper; 58%), while others typically smoked them separately on the same (26%) or different occasion (34%); co-use pattern was context- or mood-specific. While most participants smoking blunts believed cigarillo flavor enhances the experience, many did not believe it made any impact at all, and others felt that flavors interfered with the experience. Despite the predominant opinion that cigarillo flavor positively impacts cannabis use, participants mostly felt that a flavor ban in cigar products would not impact their cannabis use, stating that they would either continue using unflavored cigarillos to roll blunts or would migrate to another method of smoking or consuming cannabis. Other influential cigarillo characteristics (e.g., burn time) and social-contextual factors emerged from the data, including co-use to manage mental health and daily stressors (e.g., work, childcare);

symptoms of dependence, particularly on cannabis; and easy access to cigarillos and price promotions in the retail environment. Conclusions: Although many young adult co-users of cigarillos and cannabis in this study did not anticipate quitting cannabis use if cigarillo flavors were banned, none expected to increase cannabis use, suggesting a neutral impact of this product standard. To reduce co-use, policymakers should consider additional approaches, such as reducing retail accessibility of cigarillos or interventions to address psychosocial and structural determinants of use.

FUNDING: Federal

POS2-44

WHAT TOBACCO-RELATED POLICY VIOLATIONS DOES THE PUBLIC COMPLAIN ABOUT? AN ASSESSMENT OF VIOLATION REPORTS ON A MOBILE-BASED APPLICATION IN JAKARTA, INDONESIA

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Significance: About 26% of adults smoke in Jakarta, the capital of Indonesia, a country that hosts 60 million smokers. The city has banned indoor and outdoor tobacco advertising and promotion (TAPS), product display at the point-of-sale (POS), and smoking in public places. Since 2019, people in Jakarta can report policy violations on a government-owned mobile application called JAKI, under the category "cigarette ads". Despite these policies, no study has examined the policy violations that people report in Jakarta. We assessed the nature and patterns of violation reports on JAKI, and how the agency responded to the reports. Methods: We included violation reports in JAKI database from January 2021-April 2022, during which Jakarta's POS policy was issued and COVID-19 restrictions were in place. We described the number and percentage of violations by violation type (e.g., TAPS for the presence of tobacco advertisement-related materials, POS for the display of tobacco products at the point of sale), venue type (e.g., educational facilities, workplaces), and follow-up action status (i.e., resolved, non-resolved; according to the enforcement agency). Duration for a complaint to be resolved was also calculated. Reports by month were plotted against the period of COVID-19 restrictions and tobacco control policies. Results: Of 5,462 violations reported on JAKI, 97.2% (n=5,308) were TAPS violations, 2.5% (n=135) were POS, and 0.3% (n=19) were related to smoking. Violations were mostly reported in public places (60%, n=3,276), such as cafeterias and bus stations, with POS complaints mainly reported in convenience stores (97%, n=131). A drastic rise of reports occurred from June (n=87) to August 2021 (n=543), during which the Jakarta governor ordered the removal of cigarette displays at POS. There were more complaints while the city's COVID-19 restrictions were less stringent. About 99% reports were resolved by the local enforcement agency. The median days to resolve a complaint were 1.8, 2.1, and 1.3 for TAPS, POS, and smoking, respectively. Conclusion: During the 2021-2022 COVID-19 restrictions in Jakarta, TAPS violations in public places were highly reported on JAKI. The low figure of POS and smoking-related reports might be partially due to the TAPS-centric design of the app. The violation reporting trend seems to be associated with the dynamic of COVID-19 restrictions and POS ban in the city. Education on TAPS and POS ban should target venues with the highest complaints, such as convenience stores.

FUNDING: Nonprofit grant funding entity

POS2-45

IMPACT OF FINANCIAL DISCLOSURES AND HEALTH WARNINGS ON YOUTH AND YOUNG ADULT PERCEPTIONS OF PRO-E-CIGARETTE INSTAGRAM POSTS

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Introduction: The use of e-cigarettes among youth and young adults is a public health concern. E-cigarette industry sponsors social media influencers to promote e-cigarette products and normalize e-cigarette use among youth and young adults. Given the unregulated and changing landscape of social media marketing, it is critical to understand what regulations could effectively discourage youth and young adults from using e-cigarettes. Methods: Youth (n=752; 14-17-years-old) and young adults (n=935; 18-29-years-old) in the U.S. were recruited via online crowdsourcing platforms, Lucid and MTurk, from March to May 2021. Participants were randomized to one of four conditions that consisted of four Instagram posts promoting e-cigarettes: 1) with a financial disclosure, 2) with a warning label, 3) with both a financial disclosure and warning label, or 4) no financial disclosure or warning label. Next, participants completed self-reported measures on attitudes toward the posts and attitudes towards the advertised e-cigarette product. We examined the main effects of regulations (i.e., financial disclosures, warning labels) and the interaction effects of e-cigarette use susceptibility and regulations on attitudes toward the posts and products using multiple regression. Results: Participants who viewed Instagram posts with a financial disclosure reported more positive attitudes toward the posts and e-cigarette products compared to those who viewed posts with a financial disclosure and warning label (ps<.05). When participants were susceptible to e-cigarette use, those who viewed the posts without a financial disclosure or warning reported more positive attitudes toward the products than those who viewed posts with a financial disclosure and warning label; conversely, when participants were not susceptible to using e-cigarettes, those who saw posts with a financial disclosure and warning label had more positive attitudes toward the products than those who saw posts without them (p<.05). Conclusions: Results suggest that using both financial disclosures and warning labels in industry-sponsored content can shape unfavorable attitudes toward the Instagram posts and the advertised e-cigarette products among youth and young adults. Posts with both regulatory features led to more negative attitudes toward the posts and the product than posts with only a financial disclosure. Those who saw posts with both regulatory features reported more negative attitudes toward e-cigarettes compared to posts without any regulatory features among susceptible youth and young adults. Our findings suggest that using a financial disclosure and warning can help improve regulations of social media marketing of e-cigarettes to deter e-cigarette use in susceptible youth and young adults.

FUNDING: Federal

POS2-46

THEMES IN E-LIQUID CONCEPT NAMES AS A MARKETING TACTIC BASED ON EVIDENCE FROM PREMARKET TOBACCO PRODUCT APPLICATIONS

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Background: Concept naming of flavors is popular among e-liquid manufacturers. Concept flavors (e.g., Arctic rush, Rainbow, Gator slush) are used to describe products with ambiguous flavors that elicit tastes, aromas, and sensations common to characterizing mint, menthol, fruit, or other sweet flavors. Concept naming is not novel. Historically, tobacco companies utilized similar strategies to circumvent flavor restrictions and maintain sales for combustible cigarettes by modifying product characteristics. However, there is a lack of research focused on surveillance of concept naming of flavors, which could be used as potential marketing tactics and increase youth appeal to e-cigarettes. Methods: Authors of this ad watch used publicly available csv files with e-liquid characterizing flavors (N=1,396,737) submitted by e-cigarette manufacturers as part of Premarket Tobacco Product Applications (PMTAs). Concept names submitted as characterizing flavors were selected to create a typology of concept flavors. In January-July 2022 concept names (N=6,565) were non-systematically reviewed and clustered into themes based on the authors' qualitative semantic assessment. Common themes were selected as representative examples of concept theme classifications. Results: Identified themes (with examples of concept names) included: 1) physical/emotional experiences such as positive states (Blissful, Luscious Nirvana) or rebellion (Killer, Al Capone), 2) identities and status such as patriotism (All American, 2nd Amendment) or money/wealth (Crypto Currency, Bank Merger), 3) interests such as mythology (Dragon Whisperer, Fairy Blood, Elf Magic) or pop culture (Jedi, Dead Elvis, Adams Family). Conclusions: Given the U.S. Food and Drug Administration (FDA) restrictions on marketing and sales of flavored e-cigarette products, concept flavors may introduce a legislative loophole and a way of bypassing restrictions to continue marketing and selling flavored e-cigarette products with concept names. Continuation of these naming practices by industry, either to obscure non-tobacco flavors or potentially increase appeal of tobacco flavoring, may undermine efforts to reduce youth tobacco use. Research is needed to expand on this initial typology of e-liquid concept names. A typology of common name themes could provide insight into industry's naming conventions so they can be tracked over time and potentially regulated.

FUNDING: Federal

POS2-47

THE IMPACT OF GRAPHIC IMAGERY AND WARNING SIZE ON THE EFFECTIVENESS OF CIGAR WARNINGS

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Significance: Almost 9 million US adults currently smoke cigars, which cause multiple cancers. Over the last two decades, while cigarette consumption declined 48%, cigar consumption increased 115%, mostly due to increased use of little cigars and cigarillos (LCCs). Implementation of recently mandated text only cigar warnings has been held up in litigation, primarily due to lack of product specific evidence on their effectiveness with cigar users. No published research has examined the potential effectiveness or impacts of graphic cigar warnings on cigar users. Methods: Participants included 809 US cigar smokers recruited from a probability-based national panel. In a 2x2 between-subjects online experiment (i.e., text only warning vs text + image warning; 30% vs 50% of pack size), participants sequentially viewed 6 newly developed cigar warnings on a cigarillo pack, rating the warnings for message effectiveness, new knowledge gained, and health perceptions of cigars. Cigar warnings and images were selected from recent surveys we conducted demonstrating effective cigar warning statements and images. We estimated linear mixed models to examine warning-type (text only vs. text + image) and warning-size (30% vs. 50% package size) differences on multiple outcomes and to account for the nested structure of the data (6 ratings per participant). Main effects of warning-type and warning-size (30% vs. 50% package size) and an interaction between the two were included in models. Results: Perceived warning effectiveness ratings were significantly higher for text + image warnings compared to text only messages (*b*?= 0.34,?*p*?< .001). The same pattern of results was obtained for perceptions of understanding consequences of smoking cigars (warning type:?*b*?= 0.20,?*p*?= .01) and how the new LCC warnings promoted thinking about risks of smoking cigars (warning type:?*b* = 0.18,?*p*?= .03). A logistic mixed model showed that gaining new knowledge about cigars through the warnings was significantly and positively associated with the presence of graphic images, as the text + image warnings had higher likelihood of new knowledge gained than text only messages *(OR =?*1.4,?*CL?*1.11, .82). There was no significant effect of warning size on outcomes, nor was there a significant interaction between warning type and size. Conclusions: This research provides the first experimental evidence that adding graphic images to cigar packaging is much stronger than text statements alone. Graphic images on cigar warnings, similar to cigarette warnings, may decrease cigar use.

FUNDING: Federal

POS2-48

UNDERSTANDING SWITCHING AND TRANSITION BEHAVIOR OF CIGARETTE USERS: EVIDENCE FROM PANEL DATA

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Background: Developing countries are increasingly imposing taxes on cigarettes—an effective tool to curb consumption. Like many other developing countries, in Bangladesh, the cigarette industry is largely occupied by the formal sector, while some smokeless tobacco or some local version (those are informal sector) is run by informal sectors that are not heavily taxed—even if it is taxed at al. Therefore, facing this gradual increase in the prices of cigarettes, cigarette smokers may switch or transition to other versions of tobacco: *bidi*, smokeless tobacco, etc. However, little is known about transiting and switching behavior of cigarette smokers. Methods & data: To understand the switching and transition behavior of cigarette smokers, this study uses the International Tobacco Control (ITC) dataset, which is longitudinal data of tobacco users and non-users of Bangladesh. Four waves of data were collected from January 2009 to April 2016 by the International Tobacco Control Policy Evaluation Project by the University of Waterloo. The dependent variable of this study is whether individuals switch/transition from cigarettes to bid, dual (i.e., bid & cigarettes), and smokeless tobacco in various waves of the study. Along with typical socio-demographic variables, this study uses the level of addictiveness, social networks (no of friends who also smoke), etc. Multinomial regression logistic regression is applied to estimate the effects. All four waves of data are used in the current study. Even though direct price effects are not estimated in this study, an understanding of switching and transition behavior may help decipher the net impact of such policies. Findings: The study finds that females tend to switch to smokeless tobacco. The location of the respondents also appears to be an important factor, with people of rural areas being more likely to switch to smokeless tobacco or transition to mixed (smokeless and smoking tobacco) or dual (cigarettes and *bidi*). The addiction variable is found to be insignificant once controlled for other variables. People with higher education and higher income have a lower chance of switching or making any transition. Hence, socio-economic variables appear to be significant predictors of switching and transition for cigarette users. Conclusions: Using the panel data of four waves, the study finds that the transition and switching behavior of cigarette users is not uniform across people with different socio-economic or demographic characteristics. While male tends to stick to what they are using, the female has a higher chance of switching from cigarette to non-smoke tobacco. Hence, the real benefit of a reduction in cigarette consumption often resulted from taxation or other instruments, will have lower net effect

POS2-49

PILOTING A MOBILE APP DATA COLLECTION FOR MONITORING COMPLIANCE WITH SMOKE-FREE AIR REGULATIONS: EXPERIENCE ACROSS 24 COUNTRIES

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Significance: Secondhand smoke (SHS) causes diseases and premature death among people who do not smoke. The enactment of smoke-free air laws is an attempt to protect nonsmokers from the harmful effects of SHS. The use of smartphones offers the opportunity to efficiently collect data on individuals' perceptions, experiences, and interactions with their environments, supporting effective tobacco control policies. We aim to describe the development and piloting of a mobile app data collection protocol to assess the degree of compliance with smoke-free regulations in public settings. Methods: We launched two waves of data collection using the Premise App-based platform; wave 1 took place during Fev-Mar 2020 in 4 countries, and wave 2 in Apr-Jun 2022, in 24 countries. We chose countries with varying levels of tobacco smoking and tobacco control policies. Surveys were offered to participants aged 18 or older enrolled in the App. In wave 2, we set a target of 900 responses by country and implemented age and sex quotas to reduce bias. Instruments included questions on interactions with smoking activities at school and/or the workplace, public transportation, and other public settings in the previous week or month. Wave 1 included an observation checklist for real-time data collection that included the upload of photos of smoking-related items (eg. no-smoking signs, cigarette butts, ashtrays, and smoking areas). The platform pays its contributors for each approved survey submission. Results: In wave 1, we received 232 checklist submissions from occupational settings, 390 from public transportation, and 249 from public settings across Brazil, Mexico, Bangladesh, and Indonesia, with good geographic spread within countries. In wave 2, we received over 18k survey submissions across 24 countries, including over 900 responses in Brazil, Taiwan, Indonesia, Turkey, Philippines, Venezuela, South Africa, and Mexico. Most of the submissions occurred in the first 5 days of the survey launch in each location. In wave 1, the sample was biased towards young males and individuals with high levels of education. The implementation of quotas improved the sample distributions in wave 2 but might have contributed to the low number of responses reached in some locations. Conclusion: Despite limitations, mobile technology can support timely and accurate data collection with reduced costs. These protocols can be adapted to assess compliance with other types of public health policies.

FUNDING: Nonprofit grant funding entity

POS2-50

FLAVOR CLASSIFICATION/CATEGORIZATION AND COMPARATIVE TOXICITY OF ORAL NICOTINE POUCHES (ONPS)

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Smokeless oral nicotine pouches (ONPs) are available in various flavors (mint, fruity, tobacco, dessert, citrus, coffee, wintergreen, and berry) and may use either Tobacco-Derived Nicotine (TDN, snus) or Tobacco-Free Nicotine (TFN). There is a growing concern that flavored ONPs may not only induce oral health effects but may also induce systemic toxic effects due to nicotine and other ONP byproducts being absorbed into systemic circulation through the oral mucosa. These byproducts can act locally on other tissues and may potentially cause redox dysregulation and heightened inflammatory responses systemically in the respiratory, cardiovascular, and/or renal systems. Hence, we determined the effects of flavored ONPs like from four of the most widely sold brands in the U.S/Europe in inducing toxicological effects on epithelium. Before analyzing the effects

ONPs, we first classified ONPs (both TDN and TFN) sold in the US and procured from Europe based on their flavor and the flavor category to which they belong using a wheel diagram, which represents around 174 synthetic and 63 natural nicotine flavors. The majorities of the ONPs have either menthol/mint or fruit flavor. A series of contemporary *in vitro* screening assays (cytotoxicity, oxidative stress, and inflammatory cytokine release of IL-6 and IL-8) using epithelial cells (oral and respiratory) were employed. Cells were exposed to flavored ONPs. Our data showed at 0.25% and 0.1% concentrations cells exhibited significant levels of LDH release ($p < 0.01$), and also showed differential cellular ROS production, and proinflammatory cytokine release. The most striking response was observed among cells treated with the spearmint ONP, whereas ONPs containing original tobacco and fruity flavors showed varied levels of ROS release. Our data suggest that flavored ONPs are unsafe and likely to cause systemic and local oral toxicological responses during chronic usage.

FUNDING: Federal

POS2-51

COMPARISON OF THE NICOTINE REINFORCEMENT THRESHOLD BETWEEN CIGARETTE SMOKE EXTRACT, ELECTRONIC CIGARETTE AEROSOL EXTRACT, AND NICOTINE ALONE IN A RODENT SELF-ADMINISTRATION MODEL

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Significance: Research indicates that the abuse liability of combustible tobacco cigarettes is generally greater than non-combusted tobacco products (electronic cigarettes (ECs) and nicotine replacement therapy). This may be attributable to the higher levels of behaviorally active non-nicotine constituents in cigarette smoke (CS) compared to non-combusted products. Some studies in rats have shown that CS extracts can maintain higher rates of intravenous self-administration (IVSA) compared to nicotine alone at low unit doses, suggesting that non-nicotine constituents in CS may increase the reinforcing potency of nicotine. In contrast, our prior studies have shown no difference in abuse liability between an EC liquid and nicotine alone. The goal of this study was to extend these findings by a) generating relatively detailed nicotine dose-response curves to allow more precise comparisons of the nicotine reinforcement threshold between extracts and nicotine alone and b) utilizing more complete smoke and aerosol extracts that contain ethanol as a solvent in order to capture both water soluble and insoluble constituents. We hypothesized that the nicotine reinforcement threshold would be lower for CS extract compared to EC extract and nicotine alone. *Methods*: Rats were given access to nicotine alone (N=10, 30 µg/kg/inf) or an equivalent nicotine unit dose in an EC (Vuse Solo) aerosol extract (N=10) or a CS (Marlboro Gold) extract (N=11) to assess acquisition of IVSA under fixed-ratio (FR) schedules during 2-hr sessions. The nicotine unit dose was then reduced weekly (15, 7.5, 4, 2, 1, and 0 µg/kg/inf) to obtain a dose-response curve for each formulation. *Results*: There was no difference in acquisition of IVSA between formulations. However, CS extract maintained higher IVSA rates at 2-4 µg/kg nicotine unit doses and had a lower nicotine reinforcement threshold (2 µg/kg) compared to EC extract and nicotine alone (4 µg/kg). *Conclusions*: These data are consistent with prior studies using CS extracts containing only water-soluble constituents and provide further evidence that non-nicotine constituents in CS may contribute to the greater abuse liability of cigarettes compared to non-combusted products. Identifying the constituent(s) mediating the greater reinforcing potency of CS extracts in this study could provide important insights into the mechanisms underlying tobacco addiction. A policy implication of these findings is that a nicotine standard that reduces the addictiveness of cigarettes may also be effective if it is also enforced to reduce the addictiveness of non-combusted products.

FUNDING: Federal; Nonprofit grant funding entity

POS2-52

TOBACCO-FREE NICOTINE POUCHES: RISK PERCEPTIONS, AWARENESS, SUSCEPTIBILITY, AND USE AMONG YOUNG ADULTS IN THE UNITED STATES

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Significance. Nicotine pouches containing synthetic nicotine or tobacco-derived nicotine (TDN) are increasingly available in the United States. Synthetic nicotine pouches often are marketed as "tobacco-free nicotine" (TFN), which may alter risk perceptions and/or product appeal. This study examined young adults' perceptions about TFN versus TDN pouches and associations between product perceptions and TFN pouch awareness, susceptibility, and use, respectively. Methods. 630 young adults (18-25 years) completed an online survey in 2021. Participants were informed that TFN pouches contain synthetic nicotine as opposed to TDN. Participants reported on comparative risk perceptions for TFN vs TDN pouches and on TFN pouch awareness, susceptibility, and use. Unadjusted between-groups comparisons and adjusted binary logistic regressions were run to examine relationships between product perceptions and TFN pouch awareness, susceptibility, and use. Results. Participants were aware of (37.3%), susceptible to (29.2%), or had used TFN pouches (3.8%). In unadjusted comparisons, TNF pouch awareness, susceptibility, and use were associated with disproportionately perceiving TFN pouches as less harmful/better than TDN pouches. In adjusted models, relationships between favorable perceptions and both TFN pouch awareness and susceptibility remained significant. Conclusions. The descriptor "tobacco-free" may impact risk perceptions and appeal of nicotine pouches among young adults. While no direct relationship was observed between TFN perceptions and TFN pouch use in the adjusted model, perceptions remained related to product awareness and susceptibility which may be linked to future use. Continued surveillance is needed, and regulatory efforts may become necessary to prohibit use of the term "tobacco-free" on product packaging and advertising.

FUNDING: Federal; Nonprofit grant funding entity

POS2-53

DUAL AND POLYTOBACCO USE DISPARITIES AT THE INTERSECTION OF AGE, SEX, RACE/ETHNICITY, AND INCOME AMONG US ADULTS. RESULTS FROM THE TUS-CPS SURVEY

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Significance: There are no studies that have examined disparities in dual and polytobacco use at the intersection of multiple social identities. We aim to fill this gap by describing disparities in dual and polytobacco use at the intersection of age, sex, race/ethnicity, and income. Methods: We used the 2018-2019 Tobacco Use Supplement to the Current Population Survey (TUS-CPS) to estimate the prevalence of combinations of dual (two products) and polytobacco (three or more products) use for cigarettes, e-cigarettes, cigars, and smokeless. We created four mutually exclusive categories: 1) cigarettes and e-cigarettes, 2) cigarettes and cigars, 3) dual/polyuse without cigarettes (i.e., cigars and e-cigarettes or cigars, e-cigarettes and smokeless), 4) polytobacco use with cigarettes, and examined prevalence at the intersection of age (18-34, 35-54, 55+ years), sex (male, female), race/ethnicity (Non-Hispanic White (NHW), Black (NHB), Others (NHO), and Hispanic (H), and annual household income (<$50,000, $50,000-$99,999, =$100,000), resulting in 72 sociodemographic categories. Our sample size was 137,471 observations, and our estimates were adjusted for the sample design. We created circular bar figures in software R that allow for detailed characterization and identification of dual and polytobacco use disparities. Results: Dual use of cigarettes and e-cigarettes was higher for people with low (vs. higher) income, but there was heterogeneity within income groups. Surprisingly, females were in three of the four groups with the highest prevalence of cigarette and e-cigarette dual use (low-income NHW females ages 18-34 (2.0%) and 35-54 (2.3%), and medium income-female-NHO ages 35-54 (2.1%)). Dual use of cigarettes and cigars was disproportionately high among low-income-NHB men ages 35-54 (3.5%) and 18-34 (2.7%). The highest prevalence of dual/polyuse without cigarettes was among NHW men ages 18-34, with little difference by income (range 0.9-1.2% across income levels). The highest prevalence of polytobacco use with cigarettes was among men ages 18-34, with few differences by race/ethnicity and income (range 1.0-1.4% across racial/ethnic and income levels). Conclusion: Our study reveals the population groups disproportionality affected by the use of two or more tobacco products. This information is useful for surveillance and the implementation of specific tobacco control policies.

FUNDING: Federal

POS2-54

WORKPLACE-LEVEL PROVIDER FACTORS ASSOCIATED WITH GREATER UPTAKE OF A TOBACCO-FREE WORKPLACE INTERVENTION WITHIN SUBSTANCE USE TREATMENT CENTERS

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Significance: Smoking cigarettes is the leading preventable cause of death in the U.S. and is elevated among patients with non-nicotine substance use disorders. Unfortunately, substance use treatment centers (SUTCs) do not commonly address smoking among patients. Misinformation about concurrent treatment (i.e., whether tobacco use should be addressed during substance use treatment) and a lack of related training may underlie this inaction. A tobacco-free workplace intervention based on the Social Cognitive Theory of change provided education and training to providers on treating SUTC patients' smoking. The intervention focused on use of the 5As: asking about smoking, advising to quit, assessing willingness to quit, assisting with quitting, and arranging follow-up. This study examined how factors at the center-level (i.e., beliefs, self-efficacy, and perceived barriers) affected changes in the use of the 5As from pre- to post-program implementation (i.e., over time). Methods: Providers from 15 participating SUTCs completed pre- and post-implementation surveys (pre n=259, post n=194) on (1) their belief about concurrent treatment, (2) their self-efficacy to deliver tobacco use assessments (TUAs), (3) the number of perceived barriers for addressing patient's smoking (e.g., lack of time/knowledge and beliefs that patients do not want to/cannot quit), and (4) their use of each of the 5As with smoking patients seen in the last month. Linear regression analyses explored associations between SUTC-level pre-implementation provider factors on changes in use of the each of the 5As over time. Results: Use of the 5As increased over time. SUTCs with a lower initial percent of providers believing in concurrent treatment had greater increases in asking patients about smoking (p<0.05) and assisting with cessation (p<0.05). SUTCs with a lower initial percent of providers reporting self-efficacy for TUA delivery and reporting more barriers to routine smoking care provision reported greater increases in assessing interest in quitting (ps<0.05). Conclusion: Results have implications for implementation science. Greater uptake of the evidence-based smoking cessation intervention was found within SUTCs marked by greater initial provider misinformation, lower self-efficacy for TUAs, and more barriers to treating patients' smoking. Thus, workplace interventions may be more efficacious in SUTCs that are less equipped, as they have the ability to make the greatest changes.

FUNDING: Federal; State

POS2-55

AN AUTOMATED RANDOMISED CONTROLLED TRIAL OF A JUST-IN-TIME ADAPTIVE SMOKING CESSATION APP (QUIT SENSE)

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Significance: Quit Sense is a theory-guided Just-In-Time Adaptive Intervention (JITAI) smartphone app which provides smokers with in-the-moment support to manage cue-induced cravings. The app uses a smoking-cue learning system together with location sensing and geofencing to tailor the timing and content of support messages to individual-specific high-risk locations and cues. This study aimed to estimate key parameters to inform a definitive evaluation and to estimate efficacy. Methods: A two-arm RCT allocating smokers (N=209) recruited via advertisements on Google search and Facebook to a 'usual care' arm (NHS SmokeFree website) or a 'usual care' plus Quit Sense arm. Recruitment, enrolment, randomisation and most data collection were fully automated via the study website. Outcomes were collected at 6-weeks and 6-months post-enrolment using automated text messages with an online questionnaire link and, for non-responders, by telephone. Measures included outcome completion rates, recruitment costs, app installation and engagement rates, biochemically-verified abstinence at 6 months and hypothesised mechanisms of action. The protocol and statistical analysis plan were pre-specified and published. A 'study within a trial' (SWAT) was also embedded within the trial evaluating £10 vs. £20 incentives on attrition. Results: Follow up rates were 71% and 77% at 6-weeks and 6-months respectively. In the Quit Sense arm, 75% (95% CI 67-83%) installed the app, and of these, 100% set a quit date within the app and 51% engaged with it for more than one week. The per-participant recruitment cost was £19.20. At final follow up, the rate of 6-month biochemically-verified sustained abstinence was 11.5% (12/104) in the Quit Sense arm and 2.9% (3/105) in the usual care arm (adjusted odds ratio = 4.57, 95% CIs 1.23, 16.94; p=0.02). There were no between-arm differences in hypothesised mechanisms of action. The SWAT analysis found a £20 versus £10 incentive significantly reduced the need for manual follow up (46% vs. 62%; p=0.018) and reduced response delay (7 days vs. 15 days; p=0.016), though did not significantly increase follow up rates (79% vs. 74%; p=0.36). Conclusion: This first ever trial evaluation of a proactive smoking cessation JITAI provides key information to inform a definitive trial and evidence of potential efficacy.

FUNDING: Federal

POS2-56

SOCIAL MEDIA EXPOSURE AND OTHER CORRELATES OF INCREASED E-CIGARETTE USE AMONG ADOLESCENTS DURING COVID-19 SHELTER-IN-PLACE ORDERS

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Significance: Little is known about the role of e-cigarette-related digital content on the change in adolescent e-cigarette use during COVID-19 shelter-in-place (SIP). We examined associations between exposure to e-cigarette-related social media digital content, behavioral and mental health factors, and social environment with the outcome of self-reported increased e-cigarette use (defined as more frequent use of e-cigarettes of stronger or same nicotine/THC concentration) during SIP among California adolescents who used e-cigarettes. Methods: A cross-sectional survey between August 2020 and March 2021 included 85 participants (13-19 years old, mean=16.7±1.22) who reported past 30-day e-cigarette use. Multivariable penalized logistic regressions determined associations between increased e-cigarette use and (1) exposure to e-cigarette-related digital content, (2) feeling of loneliness, (3) e-cigarette use to cope with SIP, (4) awareness of friends and family about participants' e-cigarette use, and (5) secondhand smoke exposure in respondents' residence, adjusted for demographics (age, race/ethnicity, and mother's education). Results: Almost all respondents (83/85, 98%) reported using social media *more* since SIP, and many participants (63/85, 74%) reported seeing e-cigarette digital content. More than half of respondents (46/85, 54%) reported increased e-cigarette use during SIP, while 46% (39/85) reported reduced or same amount of e-cigarette use. Most who increased were exposed to e-cigarette digital content (38/46, 83%) compared to those who did not increase e-cigarette use (25/39, 64%); but the difference was borderline significant in the unadjusted model (OR=2.58, 95%CI=0.98-7.13) and insignificant after adjusting for demographics (Adjusted OR: aOR=2.34, 95%CI=0.71-8.46). Respondents who felt lonely (aOR=3.33, 95%CI=1.27-9.42); used e-cigarettes to cope with SIP (aOR=4.06, 95%CI=1.39-13.41), or reported a greater number of people who were aware of participants' e-cigarette use (aOR=2.29, 95%CI=1.24-4.90) were more likely to report increased e-cigarette use during SIP in the adjusted analysis. Notably, 75% (64/85) of the respondents were exposed to secondhand smoke from friends or family in their residence, but secondhand smoke exposure was not associated with increased e-cigarette use during SIP. Conclusion: Participants exposed to e-cigarette digital content had twice the odds of reporting increases in e-cigarette use during SIP, but the results were not statistically significant in the adjusted analysis, possibly due to small sample size. Given almost all participants reported using social media *more* during SIP and associations of increased e-cigarette use with loneliness and coping with SIP, future e-cigarette use interventions should consider digital platforms and address the mental health consequences of the COVID-19 pandemic.

FUNDING: State

POS2-57

EXAMINING PROPERTIES OF METACOGNITION ABOUT SMOKING QUESTIONNAIRE AMONG YOUNG E-CIGARETTE USERS

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Significance:Metacognition can be understood as 'cognition of cognition' or 'thinking about thinking'. Metacognition research has primarily focused on cigarette smoking, while e-cigarette use has been relatively unexplored. The study sought to examine the properties of Metacognition about Smoking Questionnaire (MSQ), as it was adapted for use among adolescent and young adult e-cigarette users. Methods: The study analyzed data collected by the Texas Adolescent Tobacco and Marketing Surveillance System (TATAMS) in Spring 2020. The instrument consisted of 20 items found to have sound psychometric properties when validated among self-defined cigarette smokers in the UK. The instrument was adapted for e-cigarette use by providing a brief description before the items. Participants were asked "Which of the following products you use most often?", and those who selected "e-cigarettes" were included in the study. Participants were then presented with 20 statements about beliefs people hold about using e-cigarette and were instructed to determine their agreement with the statements on a four-point Likert scale with respect to e-cigarette use. Factors were extracted using Exploratory Factor Analysis (EFA) and factor structure was verified using Confirmatory Factor Analysis (CFA). Results:Participants who reported e-cigarette use in the past 30-days were included in this analysis (n=244). Participants were in 10th grade (n=46), 12th grade (n=92) and two years beyond high school (n=106). EFA was conducted and items were assessed

with varimax rotation. CFA was conducted with multiple models (one factor, two factor and three factor solutions) and the 3-factor solution showed the best fit. Factors were named as 'positive metacognitions about cognitive regulation'(PMCR) (e.g. *'...helps me think more clearly'),* 'positive metacognitions about emotional regulation'(PMER) (e.g. *'...helps me to relax when I am agitated'*), and 'negative metacognitions'(NM) (e.g. *'It is hard to control my desire for e-cigarettes'*). Cronbach's alpha showed high internal consistency (0.92, 0.90 and 0.91, respectively). The median score (range) was 7 (5-20), 10 (5-20), and 11 (10-40) on PMCR, PMER, and NM factors. Higher scores denote higher levels of outcome expectancies of that factor. Conclusion:The MSQ showed good psychometric soundness for measuring metacognitive factors associated with e-cigarette use. For cigarette smoking, the original questionnaire distinguished negative cognitions of 'uncontrollability' and 'cognitive interference', which was not seen in e-cigarette users. This indicates a difference in cognitions of cigarette and e-cigarette users. The instrument can help understand the similar role of cognition in e-cigarette use behavior and further assess association with e-cigarette use.

FUNDING: Federal

POS2-58

NOTICING EDUCATION CAMPAIGNS OR PUBLIC HEALTH MESSAGES ABOUT VAPING AMONG YOUTH IN ENGLAND, CANADA, AND THE US FROM 2018 TO 2021

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Significance. Education campaigns and public health messages about vaping have been used in several countries to communicate the risks of vaping, including risks relative to smoking. Expenditure on vaping campaigns has been greater in the US and Canada than in England. Vaping campaigns and public health messages may contribute to previously observed increases and country differences in perceptions of vaping risks. This study therefore aimed to examine trends and country differences in noticing education campaigns or public health messages about vaping among youth, overall and via specific channels (e.g., television, websites, schools). Methods. Repeat cross-sectional online surveys of youth aged 16-19 years in England, Canada, and the US from 2018 to 2021 (N=79,519). Logistic regressions assessed trends and country differences in noticing any education campaigns or public health messages about vaping, overall and across 17 exposure channels, adjusting for age, sex, race/ethnicity, perceived socio-economic status, and student status. Analyses were pre-registered (osf.io/6c2uz). Results. Noticing education campaigns or public health messages about vaping increased from 2018 to February/March 2020 in England (48.0% to 53.0%, AOR=1.05, 95%CI=1.02-1.08, p<.001), Canada (52.6% to 64.5%, AOR=1.13, 1.11-1.16, p<.001) and the US (55.2% to 74.6%, AOR=1.21, 1.18-1.24, p<.001) before decreasing (Canada) or plateauing (England, US) between February/March 2020 and August 2021. Increases were most pronounced in the US, followed by Canada, then England (all country comparisons in trends p<.01). Noticing was most common on websites/social media (range 22-55%, depending on country and survey wave), at school (range 18-51%), and on television/radio (range 17-48%), again with the most pronounced increases observed in the US and Canada between 2018 and February/March 2020. Prevalence of noticing, trends, and country differences were generally similar when stratified by smoking/vaping user groups. Conclusion. At least half of youth in England, Canada, and the US report noticing education campaigns or public health messages about vaping, mainly on websites/social media, at school, and on television/radio. Noticing increased between 2018 and February/March 2020 in all three countries, but to a greater extent in the US and Canada.

FUNDING: Federal; State; Nonprofit grant funding entity

POS2-59

E-CIGARETTE DEVICE TYPE AND VAPING BEHAVIORS OF YOUTH AND YOUNG ADULTS: FINDINGS FROM THE TRUTH LONGITUDINAL COHORT (2020-2021)

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Background: E-cigarette device types vary in the amount of nicotine delivered to users. Given that youth and young adults are using high nicotine products, including pod-based and disposable e-cigarettes, it is important to determine how e-cigarette device type influences vaping behaviors indicative of nicotine dependence. Methods: Data were obtained from the Truth Longitudinal Cohort. Baseline information was collected from September 2020 to March 2021 and follow-up information was collected from July to October 2021. To be included in analyses, respondents (aged 15-24) had to have reported current use of e-cigarettes at either baseline or follow-up. Differences in endorsement of items from the E-cigarette Dependence Scale (EDS) and source of acquisition of e-cigarettes (store, online, social) were assessed using chi-square tests. Results: Participants (N=1144) were evenly split on age (15-20, 21-24) and gender. A greater proportion of 15-20 year olds used disposable e-cigarettes (39.7%), compared to those 21-24, who primarily used pod-based devices (37.4%). Among current users, 70.1% acquired their device from a store, 17.9% from a social source, and 12.0% from online sources. This also differed by age, as a greater proportion of those aged 15-20 years obtained their e-cigarettes from social sources (87.2%), relative to 21-24 year olds (12.8%, p-value <0.01)The most common type of e-cigarette accessed from a store or from a social source was pod-based (37.7% and 40.5%), while the most common type of e-cigarette accessed online was a tank e-cigarette (56.2%) (p=0.02). Although the average EDS score did not differ by e-cigarette device type, endorsement of two items from the EDS significantly differed, with more tank users endorsing 1) reaching for a device without thinking about it (pod-based: 79.0%; disposables: 79.9%, tank: 92.6%; p=0.03) and 2) vaping more before going into a situation where vaping is not allowed (pod-based: 71.0%; disposables: 73.0%, tank: 92.9%; p<0.01). Conclusions: Results suggest that users of tank devices may be at higher risk for endorsing vaping behaviors associated with nicotine dependence and may inform future tobacco regulatory policies, including those that regulate both brick and mortar and online retailers.

FUNDING: Unfunded

POS2-60

PROVIDERS' NON-CIGARETTE TOBACCO USE INTERVENTION PRACTICES IN RELATION TO THEIR BELIEFS, PERCEIVED SKILLS, AND REFERRAL KNOWLEDGE IN TEXAS HEALTHCARE CENTERS PROVIDING BEHAVIORAL HEALTH SERVICES

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Significance: Rates of non-cigarette (hereafter, other) tobacco use in Texas are not negligible; for example, one estimate suggests 5.2% of adult Texans use e-cigarettes and 3.3% use smokeless tobacco. Other tobacco use may be even more elevated in adults with behavioral health conditions given known disparities for this group in overall tobacco use. Little is known about whether behavioral health providers are using the evidence-based 5As (Ask, Advise, Assess, Assist, and Arrange) for other tobacco use, or what provider factors may be associated with 5A use. The current study redressed this gap. Methods: Overall, 86 providers of behavioral health care in Texas, representing 9 federally qualified health centers, 16 local mental health authorities (LMHAs), 6 substance use treatment programs in LMHAs, and 55 stand-alone substance use treatment programs, took an online survey in 2021 assessing their beliefs that (1) patients were concerned about other tobacco use, and (2) want to quit; that (3) intervening on other tobacco use with counseling was an important part of their job, and (4) they had the skills to do so, as well as their (5) knowledge of referral options for treatment of other tobacco use. Logistic regression analyses were conducted to determine the association between each of these provider factors and their use of the 5As intervention for other tobacco use. Results: Results showed that 70.9% of providers asked patients about other tobacco use status, 65.1% advised them to quit, 59.3% assessed quit interest, 54.7% assisted with a quit attempt, and 31.4% arranged a follow-up. Providers who believed their patients were concerned about their other tobacco use, recognized the importance of offering other tobacco use cessation counseling, believed they had the necessary skills to treat other tobacco use, and possessed knowledge of referral options, respectively, were more likely to deliver some or all the 5As for other tobacco use to patients than their counterparts (*p*s < 0.05). Conclusion: Results add to a limited literature on provider intervention practices for other tobacco use in settings where behavioral health care is provided, highlighting the significance of provider beliefs, perceived skills, and referral knowledge to care delivery. Findings reveal opportunities to increase the delivery of the 5As for other tobacco use to behavioral health patients and suggest provider factors that could be targeted to build this capacity.

FUNDING: Federal; State; Academic Institution

POS2-61

PATTERN OF SECOND-HAND SMOKE (SHS) EXPOSURE AMONG NON-SMOKING YOUTH (15-24, 25-29 YEARS) IN INDIA: A SECONDARY DATA ANALYSIS FROM THE GLOBAL ADULT TOBACCO SURVEY (GATS) I AND II

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Background: Evidence suggests that tobacco use including SHS exposure is among the top three risk factors for global disease burden with similar complications associated with active smoking, co-existing with increased risk of exposure among younger generations. Objectives: To compute and compare the prevalence and pattern of SHS exposure in home, workplaces, any public places and/or a combination of all three among non-smoking youth (15-24, 25-29) based on socio-demographic variables and knowledge on adverse health outcomes related to smoking variables between GATS I and II in India. To determine the factors associated with SHS exposure across three places among non-smoking youth using GATS I and II survey data. Methods: Secondary data analyses incorporated data generated from previous two rounds of the cross-sectional, nationally representative GATS India covering 20,604 and 20,927 non-smoking youth (15-29) from GATS I and II, respectively. Exposure to SHS at three places among non-smoking youth was our primary outcome variable. Multivariate logistic regression analyses were used to assess adjusted associations between SHS exposure at all places with socio-demographic variables and knowledge-related parameters on harmful effects of smoking. All analyses were appropriately weighted and adjusted for complex survey design. Results: Overall weighted prevalence of SHS exposure among non-smoking youth at home (15-24: 50% *vs.* 37.6%, 25-29: 49.2% vs. 35%) and public places (15-24: 44% *vs.* 37.8%, 25-29: 42.1% *vs.* 36.8%) reduced between GATS I and II. Weighted prevalence of SHS exposure at home and public places among non-smoking youth (15-25, 25-29) significantly reduced based on gender, level of education, employment status, place of residence, wealth index and knowledge on adverse effects of smoking between GATS I and II. Exposure to SHS at workplace increased between GATS I and II for non-smoking youth (15-25, 25-29; non-significant). On multivariate regression analyses, gender, level of education, employment status, place of residence and wealth index were found to be significantly associated with SHS exposure at one/all places among non-smoking youth, between GATS I and II. Conclusion: The findings call for developing focused, multi-sectoral, and targeted community-based interventions along with stringent implementation of anti-tobacco legislation in India, to protect non-smoking youth from SHS exposure and smoking initiation.

FUNDING: Unfunded

POS2-62

PREVALENCE OF SMOKED AND SMOKELESS TOBACCO USE AND ITS ASSOCIATION WITH MENTAL AND PHYSICAL HEALTH IN PEOPLE WITH SEVERE MENTAL ILLNESS IN SOUTH ASIA

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Significance: People with severe mental illness (SMI) e.g. schizophrenia and bipolar disorder tend to die early due to cardiovascular and respiratory diseases which may be linked to their higher susceptibility to tobacco use. However, there is little information on the tobacco use among people with SMI in low- and middle-income countries where most (80%) tobacco users now reside. We share novel data on the distribution of smokeless and smoked tobacco use in people with SMI in South Asia. Our aim was to assess the prevalence and distribution of tobacco use in people with SMI and their access to tobacco cessation advice. Methods: We conducted a multi-country multi-centre survey recruiting 3,874 adults with SMI attending specialist mental health facilities in Bangladesh, India, and Pakistan. Diagnosis of SMI was confirmed using the MINI V-6.0. Data on the prevalence of smoked and smokeless tobacco use, any cessation advice received and sociodemographic information was collected using the standardised WHO STEPS survey tool. We estimated the prevalence and distribution of tobacco use among people with SMI and assessed the extent to which they received tobacco cessation advice. Results: Almost half of all men (46.8%) and one-sixth (15%) of all women with SMI consumed either smoked or smokeless tobacco. The smoking prevalence in men was 42.8% in Bangladesh, 20.1% in India and 31.7% in Pakistan, while less than 4% of women reported smoking in each county. The smokeless tobacco use in men was 16.2% in Bangladesh, 18.2% in India and 40.8% in Pakistan; and for women 19.1% in Bangladesh, 9.9% in India and 9.1% in Pakistan. Less than a third of all tobacco users (28.1%) received any advice to stop tobacco. Discussion: As found in high-income countries, tobacco use in people with SMI, particularly among men, was higher than the general population in the three high-tobacco burden South Asian countries. There was also an unmet need for tobacco cessation advice in mental health services. Given their regular contact with health services, offering tobacco cessation advice may offer a significant opportunity to close the life expectancy gap between SMI and the general population.

FUNDING: Federal

POS2-63

THE IMPACT OF TIME SINCE PRODUCT CHANGE ON TRANSITIONS IN CIGARETTE AND E-CIGARETTE USE IN A COHORT OF CIGARETTE AND DUAL USERS

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Significance: Understanding how people transition between use of different nicotine products is important for designing effective interventions that reduce those products' health effects, especially for cigarettes. We hypothesize that cigarette or e-cigarette users who have recently transitioned by starting or stopping a product have a higher transition propensity than longer-term users. Methods: We applied a multistate transition model to data from 207 adult daily cigarette users and dual cigarette and e-cigarette users who were followed every 2 months for 2 years (2015-17) and who started or stopped using cigarettes or e-cigarettes at least once. We assessed the impact of time-since-transition on transition hazard ratios (HR) for a categorized time-since-transition variable only after the first observed transition. Results: The longer participants only smoked cigarettes, the lower their propensity to transition to dual use (n=137) became, down to a HR of 0.32 (95%CI: 0.15, 0.68) for =14 vs. < 2 months since transition. After transitioning to dual use, participants' propensity to transition to cigarette-only use (n=227) decreased significantly, with a HR of 0.40 (95%CI: 0.20, 0.81) for =14 vs. <2 months since transition. The longer that participants only vaped e-cigarettes, the lower their propensity to transition to dual use (n=27) became, down to a HR of 0.16 (95%CI: 0.04, 0.70) for =14 vs. <2 months since transition. For most transitions, transition rates stabilized around 8-12 months. Conclusions: There is typically a period after starting or stopping a cigarette or e-cigarette during which further transition is more likely. The longer a person can sustain a new use pattern, the more likely they are to continue this pattern. This work may inform smoking cessation strategies by encouraging repeated cessation attempts or a longer e-cigarette trial period.

FUNDING: Federal

POS2-64

REPRESENTATION OF TRADITIONAL TOBACCO ON SOCIAL MEDIA: DECONSTRUCTING HISTORICAL NARRATIVES TO ADDRESS THE INDIGENOUS YOUTH TOBACCO EPIDEMIC

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Significance: Native American youth experience tobacco-related health disparities. Importantly, there notable differences exist between commercial and traditional tobacco. The plant has deep significance in many Native cultures and can be used in ceremonial and spiritual practices or presented as a gift. The uses of traditional tobacco vary by Tribe. The commercial tobacco industry has a history of appropriating Native imagery which may drive negative health outcomes among Native adolescents. Therefore, we sought to understand the portrayal of traditional tobacco on social media using an Infodemiology-based approach. Methods: We used data mining to collect Instagram posts containing the hashtag #TraditionalTobacco. Information collected included text, date, hashtags, and comments. A deductive coding scheme was adapted from a methodological review of tobacco-related research. Posts were categorized into six specific themes, including tobacco health education, tobacco advertising, personal tobacco use, cultural appropriation, traditional tobacco use, and tobacco-related advocacy. Hashtags were also collected to identify tobacco-related social media campaigns. A Google Images web-search was also conducted with the same search term to supplement information collected on Instagram. Results: A total of 486 posts were collected between 2014 and 2022 containing the hashtag #TraditionalTobacco.

Personal tobacco use was the most prevalent theme (66%), followed by advertising (19%), traditional tobacco use (9%), health education (6%), cultural appropriation (n = 1) and tobacco-related advocacy (n = 1). Engagement (defined as comments per post) was comparable between traditional tobacco use (1.26) and advertising (1.25) and lowest for health promotion (0.48). Identified social media campaigns included #KeepItSacred, #BreathIsSacred, and #KeepTobaccoSacred. One Google image was labeled as cultural appropriation. The images labeled as cultural appropriation contained vaping liquid and were posted from California; one seller identified as Native. Conclusion: While there are efforts to promote traditional tobacco use on social media, commercial tobacco-related content appears to be more prevalent in the #TraditionalTobacco Instagram discourse. Low engagement with health promotion content suggests that campaigns should be further tailored in order to reduce potential harms from commercial tobacco promotion.

FUNDING: Academic Institution

POS2-65

CONNECTING NICOTINE, ANXIETY, AND OBSESSIVE-COMPULSIVE SYMPTOMS

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Significance: Tobacco use amongst those with obsessive-compulsive disorder (OCD) occurs at rates lower than all other psychiatric and general populations. This stands in contrast to epidemiological data substantiating a higher rate of smoking amongst those with anxiety disorders. There is also evidence that in nicotine-dependent populations up to 26% of participants exhibit symptoms emblematic of OCD. Despite this, relatively few investigations have been undertaken to explain these symptoms or the low rate of tobacco use in those with OCD. We hypothesized that health risk from cigarette use would significantly predict higher levels of obsessive-compulsive symptoms (OCS) and that this health risk would interact with anxiety symptoms to produce higher levels of OCS. Methods: Participants included 607 smokers (69.30% female, 84.00% Non-Hispanic White) who met criteria for health risk as assessed with the ASSIST, recruited through NIH Research Match. Participants completed a single online survey containing measures of smoking-related health risk (ASSIST), OCS (OCI-R), and anxiety (IDAS). Results: A linear regression showed that ASSIST tobacco use scores significantly predicted OCS (B = .34, t(2,559) = 8.81, p < .001) predicting 12% of the variance in OCS. A moderation analysis utilizing Hayes' PROCESS Macro showed a synergistic effect where those with higher levels of anxiety experienced significantly higher OCS as a result of their tobacco use (R^2 = .50, F(3, 569) = 186.89, p < .001). The effect of smoking-related health risk on level of OCS was significant at the mean of IDAS anxiety scores (b = .27, t(571) = 4.44, p < .001, 95% CI [.15, .38). The interaction of smoking-related health risk and anxiety was also significant (b = .02, t(571) = 2.37, p < .02), 95% CI [.00, .03] resulting in an increase in OCS for those with higher levels of anxiety. Probing with the Johnson-Neyman technique revealed that this interaction was significant across all values of anxiety with the strongest effect in those with mild through severe levels of anxious arousal. Conclusions: Nicotine may act as a stimulant increasing the level of OCS, especially amongst those with anxiety-related conditions. This increase in OCS aids in explaining the previously observed phenomena of low smoking rates amongst those with OCD and OCS observed in smokers. Reducing nicotine use may lower OCS in populations where smoking co-occurs with anxiety disorders (e.g., treatment-seeking veterans).

POS2-66

PROMOTING VAPING PREVENTION THROUGH AN ONLINE CURRICULUM AMONG YOUTH: VAPING--KNOW THE TRUTH

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Significance: High usage rates of e-cigarettes among youth are concerning given the health risks associated with e-cigarette use and nicotine addiction. Increasing knowledge of empirical-based evidence regarding the harms of e-cigarette use is an important step toward preventing use. The objective of this study was to assess the impact of an anti-vaping curriculum implemented in schools by examining shifts in targeted e-cigarette knowledge items. Methods: *Vaping: Know the Truth* (VKT) is a free, online curriculum that uses a peer-to-peer approach to provide educational content to middle and high school students around the nation. The curriculum consists of four modules: "KNOW" has a brief history of tobacco use and nicotine, "UNCOVER" discusses the industry's marketing tactics and risks associated with product use, "OVERCOME" challenges learners to consider the consequences of nicotine addiction and outlines how to quit, "CHANGE" examines how e-cigarette use contradicts positive social norms. The curriculum was assigned by teachers as either an in-class or take-home assignment. The evaluation of the VKT curriculum had a sample of 103,522 students in grades 7-12, who completed at least 75% of all four modules. Each module had pre- and post-assessments. The predictor variable was the quartile of pre-module assessment scores. The outcome measure ("change score") was calculated as the change in the number of correct responses from the pre- to post-module assessments. Linear regression was performed to test the association between pre-module assessment quartile and the mean change score. Results: Students answered more than three additional questions correctly after the intervention (mean=3.24 points; SD:3.54). Students in all four quartiles showed an increase in knowledge, and the students with the lowest baseline knowledge (lowest quartile of pre-module assessment) showed the largest increase in the change score as compared to students with the highest baseline knowledge (ß=5.84, SE=0.03). Conclusion: Findings support that the VKT curriculum is an effective resource for increasing knowledge among youth about the harms associated with e-cigarette use. Further research is needed to evaluate the effects of the intervention on behavioral outcomes.

FUNDING: Other

POS2-67

TOBACCO SMOKE EXPOSURE AND GASTROINTESTINAL PROBLEMS AMONG U.S. CHILDREN

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Significance: Active tobacco product use causes gastrointestinal problems in smokers, but less is known about whether passive smoking is associated with gastrointestinal-related issues. Children are particularly vulnerable to the effects of tobacco smoke exposure. Therefore, the study objective was to examine the association between home tobacco smoke exposure status and gastrointestinal problems in the past 12-months among U.S. children. Methods: We conducted a secondary analysis of the 2018-2019 National Survey of Children's Health cross-sectional data including 20,149 children ages 4-10 years. Home tobacco smoke exposure status included: no home tobacco smoke exposure- did not live with a smoker; home thirdhand smoke exposure only- lived with a smoker who did not smoke inside the home; and home secondhand and thirdhand smoke exposure- lived with a smoker who smoked inside the home. Weighted unadjusted and adjusted logistic regression models were fitted to examine the association between home tobacco smoke exposure status and gastrointestinal problems. The adjusted model included the following covariates: child age, sex, race/ethnicity, premature birth, overweight status, current anxiety problems, and current depression; parent education level; family household structure, and federal poverty level. Results: Overall, 12.3% of children had home thirdhand smoke exposure only and 1.8% had home secondhand and thirdhand smoke exposure. Unadjusted results indicated that relative to children with no home tobacco smoke exposure, children with home thirdhand smoke exposure only were at 1.70 increased odds (95%CI=1.32-2.20) of having frequent or chronic difficulty with gastrointestinal problems over the past 12-months. Adjusted results indicated that when compared to children with no home tobacco smoke exposure, children with home thirdhand smoke exposure only were at 1.51 increased odds (95%CI=1.14-1.99) of having frequent or chronic difficulty with gastrointestinal problems, after covariate adjustment. Conclusion: Home thirdhand smoke exposure was associated with frequent or chronic difficulty with gastrointestinal problems among U.S. 4-10-year-olds. Smoke-free home bans may not completely protect children from associated risks. Therefore, interventions are critically needed to promote tobacco cessation among household smokers who live with children in order to reduce levels of both secondhand and thirdhand smoke exposure in their homes.

FUNDING: Federal

POS2-68

DEFINING ENDS DEVICE TYPE IN SURVEYS

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Significance: The electronic nicotine delivery systems (ENDS) market is highly heterogeneous and changing rapidly in the US, making classification of devices complicated, especially for surveys. This study aimed to assess the percentage agreement between self-reported device type and device type reported by manufacturer/retailer sites (identified using select self-reported device brands).Method: Population Assessment of Tobacco and Health (PATH) Study Wave five asked adult ENDS users about their ENDS device type with the following multiple-choice question: "What kind of electronic nicotine product [is/was] it?" with response options: 1) A disposable device; 2) A device

that uses replaceable prefilled cartridges; 3) A device with a tank that you refill with liquids; 4) A mod system; and 5) Something else (specify). ENDS brand names were obtained from the responses to the following question: "What brand of ENDS [do/did] you [usually/last] use?" Participants using only one ENDS device and reporting brands of JUUL (n=579), Markten (n=30), or Vuse (n=47) were included. Responses were dichotomized as "agreed=1" (response option 2 for these three brands) and "not agreed=0" (other responses) to assess the percentage agreement. Results: The overall agreement between self-reports and manufacturer/retail sites was 81.8% (n=537). This percentage was 82.7% (n=37) among Vuse users, 82.6% (n=479) among JUUL users, and 69.1% (n=21) among Markten users. Almost 1 in 3 people who use Markten did not indicate that their device uses replaceable prefilled cartridges; this was 1 in 4 among 36.6% of JUUL users with high school diploma or less educational attainment.Discussion: While at least 70% agreement could be acceptable, collecting more information about device type (e.g., cartridge, tank system, picture) may help to have more accurate information. Adjusting the PATH question (e.g., more descriptive response options, inclusion of an option for tank/pod/cartridge devices) and including photos of participants' devices may help to classify ENDS device types more accurately. This is particularly relevant for researchers analyzing small samples in areas such as disparities. Monitoring the characteristics of emerging tobacco products accurately is critical for regulatory authorities to understand ENDS toxicity, addiction, health effects, and use behaviors.

FUNDING: Federal

POS2-69

PATHWAYS TO QUITTING AMONG YOUTH AND YOUNG ADULT E-CIGARETTE USERS THROUGH CONSTRUCTS TARGETED BY THE TRUTH® ANTI-VAPING CAMPAIGN

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Background: The truth® anti-vaping campaign targets a broad audience of youth and young adults, which includes both e-cigarette users and non-users. This study examines the pathways through which youth and young adult e-cigarette users' awareness of the truth® campaign influences frequency of e-cigarette use over time. Methods: Data used three waves of the Truth Longitudinal Cohort (TLC), a probability-based, nationally representative survey: Wave 1: September 2020-March 2021; Wave 2: July-October 2021; Wave 3: January-May 2022. The sample was a cohort of 15-24-year-olds who reported current e-cigarette use at baseline (N=1,211). Latent growth structural equation modeling techniques were used to examine the pathway from cumulative ad awareness to e-cigarette outcomes via campaign-targeted attitudes (e.g., perceived risk of harm, anti-vape industry sentiments, independence from vaping, affinity for groups that reject vaping, and perceived social norms regarding disapproval of e-cigarette use). The outcome was frequency of e-cigarette use, which was coded into four categories from former user to daily e-cigarette users. Results: By the final wave of data collection, approximately 40% of the sample became former e-cigarette users. A decrease was observed in both moderate use (from 39% to 24%) and daily use (from 34% to 30%). Model fit estimates identified a three-step pathway by which awareness of the campaign reduced e-cigarette use. The overall indirect pathway was significant (B = -.09, P < .0001). Ad awareness was significantly associated with improvements in each campaign-targeted attitude. Of these, three attitudes - perceived risk of harm (B = .22, P = .006); anti-industry sentiment (B = .23, P = .040); and independence from vaping (B = .44, P = .044) - had positive effects on perceived social norms. Perceived norms about social disapproval of e-cigarette use then had a negative relationship with the growth in e-cigarette use frequency over time (B = -.49, p < .0001). Ad awareness did not have a significant direct effect on e-cigarette frequency (B = -.03, P = .623). Conclusions: Findings of this study provide evidence that greater truth® ad awareness strengthens campaign-targeted attitudes among current users. Having stronger attitudes (i.e., perceived risk of harm, anti-industry sentiment, and desire for independence from vaping) can increase perceived norms against e-cigarette use and lead to reduced frequency of use or quitting.

FUNDING: Other

POS2-70

EXAMINING E-CIGARETTES AND OTHER STRATEGIES FOR SMOKING CESSATION AMONG US ADULTS

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Significance: Cigarette smoking remains the leading cause of preventable death in the U.S. Many adults who smoke try e-cigarettes to reduce smoking and smoking-related harm. Understanding the use of e-cigarettes and other evidence-based smoking cessation methods among adults who smoke cigarettes is important for informing public health efforts to reduce smoking. Methods: Online US survey data were collected in summer 2021 from 857 adults (47.6% female, Age Mean= 40.8, SD = 12.3) who reported using e-cigarettes in a recent attempt to quit smoking. Survey items assessed strategies tried and preferred to stop smoking, and reasons for smoking relapse (among those who returned to smoking). Results: Among respondents who had used an e-cigarette to try to quit smoking, 87.5% (n=750) had also tried other strategies to stop smoking in the past; the most common methods included nicotine replacement therapy (NRT, e.g., patch, gum) (72.7%), and quitting 'cold turkey' (54.4%). E-cigarettes were the most preferred method to stop smoking (60.0%), followed by NRT (10.0%), and quitting 'cold turkey' (7.7%). However, many did not maintain smoking abstinence when using e-cigarettes to quit; at the time of the survey most were dual users of cigarettes/e-cigarettes (66.4%), 22.7% were still smoking but not vaping, and 10.9% had stopped smoking. The most common reasons for returning to smoking included missing smoking too much (41.5%), stress (36.1%), being around other smokers (34.6%), and it was easier to get cigarettes than e-cigarettes (25.8%). Conclusion: These findings suggest e-cigarettes are often used by adults in an effort to stop smoking but dual use is common and specific barriers may interfere with maintaining smoking cessation.

FUNDING: Federal

POS2-71

PERCEIVED RELATIVE HARM AND ADDICTIVENESS OF MODIFIED RISK TOBACCO PRODUCTS COMPARED WITH CIGARETTES

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Significance. Modified Risk Tobacco Products (MRTPs) are authorized to use specific reduced harm or reduced exposure statements in their marketing. Misperceptions of MRTP claims could have adverse public health consequences. This study aimed to assess perceptions of relative harms and addictiveness of MRTPs compared with cigarettes based on FDA-authorized MRTP claims. Methods. The study sample were from May 2022 participants of the Rutgers Omnibus study (n=2964)—a repeated, cross-sectional, web-based mTurk survey of 18-45-year-olds in the US that is fielded quarterly by the Rutgers Center for Tobacco Studies (CTS). Outcome measures were perceived harms and addictiveness of MRTPs in general compared with a typical cigarette and their intentions to use MRTPs. We showed participants FDA-authorized MRTP claims from General Snus and VLN King cigarettes and asked questions including perceived harms and addictiveness compared with a typical cigarette and intentions based on viewing the claims of each tobacco product. Results. About half of adults (53%) misperceived that a 'low nicotine' cigarette would be less harmful than a typical cigarette and 36% misperceived that a 'low nicotine' cigarette would be equally addictive as a typical cigarette. About one-third (32%) would likely use a product that claimed it was less harmful to health and 32% would use a product that claimed it was less addictive than other tobacco products. When shown a claim indicating reduced harm (General Snus), 31% reported the product would be equally harmful as a typical cigarette, 46% indicated it would be less addictive than a typical cigarette, and 30% would likely use this product. When shown a claim indicating reduced nicotine exposure (VLN King cigarette), 57% reported the product would be slightly or much less harmful than a typical cigarette, 30% indicated it would be equally addictive as a typical cigarette, and 30% would likely use this product. Current smokers reported significantly lower relative harms and addictiveness and higher intentions to use MRTPs than former and never smokers. Higher relative harms and addictiveness were significantly correlated with lower intentions to use MRTPs. Conclusions. Misperceptions of existing FDA-authorized MRTP reduced harm and reduced exposure claims were prevalent among a national sample of US adults. Further research is needed to assess uptake of MRTPs and how best to communicate risk among non-users, former, and current tobacco users.

FUNDING: Federal

POS2-72

DO HISPANIC/LATINX ADULTS WHO SMOKE ENGAGE WITH AND BENEFIT FROM ACCEPTANCE AND COMMITMENT THERAPY-BASED SMARTPHONE SMOKING CESSATION INTERVENTIONS?

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Background: Although the prevalence of cigarette smoking in the US is at an all-time low, the burden of smoking-attributable morbidity and mortality falls disproportionally among racial/ethnic minority people, including the Hispanic/Latinx population. Despite making more quitting attempts, Hispanic/Latinx adults are the least likely to quit smoking when compared to their non-Hispanic/Latinx counterparts. Hispanic/Latinx adults who smoke also face unique challenges to receiving cessation treatment, including being the least likely of any other racial/ethnic group to have access to health care, which further contributes to their poor cessation outcomes and higher smoking-attributable morbidity/mortality, making them a high priority population. Currently there are no known efficacious digital smoking cessation interventions for Hispanic/Latinx adults who smoke. Objective: This study used data from a randomized trial to evaluate whether Acceptance and Commitment Therapy (ACT) delivered via a smartphone app (iCanQuit) would be more efficacious for smoking cessation than the US Clinical Practice Guidelines-based app (QuitGuide) in a sample of Hispanic/Latinx participants. Methods: A total of 210 Hispanic/Latinx adults who smoke received the iCanQuit or QuitGuide app for 12 months. Participants self-reported 30-day abstinence from cigarette smoking at 3, 6, and 12-months. Participants also reported on their willingness to accept cues to smoke without smoking, which was investigated as a mediator of the cessation outcome, and satisfaction with their apps. Engagement was measured objectively using Google Analytics. Results: Compared to QuitGuide participants, iCanQuit participants were significantly more likely to report 30-day abstinence from cigarette smoking at 12 months (34% iCanQuit vs. 20% QuitGuide; p=0.026). iCanQuit participants had a greater mean number of logins to their app (22.4 iCanQuit vs. 7.3 QuitGuide; p<0.001) and reported greater satisfaction with their assigned app than those who received the QuitGuide app. Increases in participants' willingness to accept cues to smoke significantly mediated the intervention effect on smoking abstinence. Conclusions: ACT delivered via a smartphone app may be efficacious for helping Hispanic/Latinx adults abstain from cigarette smoking. Replication in a fully powered randomized trial that focuses on an independent sample of Hispanic/Latinx adults is now needed.

FUNDING: Nonprofit grant funding entity

POS2-73

SMOKERS' FACTORS AND REASONS FOR PLANNING TO QUIT SMOKING: FINDINGS FROM THE 2021 ITC SPAIN SURVEY

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Significance: Increasing quitting among smokers is key to reducing the population burden of smoking-related morbidity and mortality in Spain. Intentions to quit is the strongest predictor of future quit attempts and successful quitting. The aim of this study is to assess the factors that predict quit intentions among adult smokers in Spain. Methods: Data were drawn from the 2021 International Tobacco Control (ITC) Spain Survey, a nationally representative data sample of adult smokers (n=1006), aged 18 years and older. The survey was conducted either through computer-assisted personal interviewing or a modified computer-assisted telephone interview for those preferring to be interviewed by telephone due to COVID-19 safety concerns. Analyses were conducted among the 867 smokers who answered the questions on quit intentions. The outcome measure was quit intentions, and predictors included heaviness of smoking index (HSI), past quit attempts, perceived risks, psychosocial beliefs, reasons for intending to quit, and demographics. Multivariable logistic regression (adjusted for sex, age, income, and education) was used to determine the predictors of quit intentions. Results: Less than half (45.8%) of smokers reported intending to quit, but with only 13% intending to quit within 1 to 6 months. 27% reported a past quit attempt in the last 18 months. Factors that predicted quit intentions were: income (Adjusted Odds Ratio [AOR]=2.13; p=0.042), having attempted to quit in the last 18 months (AOR=1.91; p=0.005), receiving advice to quit from a health care provider (AOR=1.95; p=0.022), presence of smoking restrictions in public places (AOR=1.88; p=0.042), and regretting ever having started to smoke (AOR=0.41; p=0.044). Conclusions: The percentage of Spanish smokers who intended to quit in the next 6 months was very low (13%) compared to other ITC countries such as Mexico (24%), Malaysia (31%), Canada (43%), and Brazil (48%). Quit attempts were also low compared to other ITC countries. These findings highlight the challenge of increasing smoking cessation in Spain and thus the need for stronger tobacco control policy and communication efforts. Predictors of quit intention were similar to those identified in other ITC countries, and they: (1) highlight the need for legislation that encourages and supports smokers to make quit attempts, including making multiple quit attempts till they successfully quit, (2) show the importance of quitting advice given by health care providers, (3) emphasize the importance of enforcing smoking restrictions in public venues, and (4) suggest the need for targeted cessation programs, especially for low-income/SES smokers.

FUNDING: Federal; State

POS2-74

E-LIQUID EXPOSURE AND HOSPITALIZATION AMONG US YOUTH AND ADULTS RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY WAVE 5 (2018-2019)

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Background: The liquids in e-cigarettes (e-liquids) can contain chemicals which are toxic to the skin, eyes, and gastrointestinal system. Little is known about the prevalence of unintentional e-liquid exposure among youth and adults. This study used the Population Assessment of Tobacco and Health (PATH) data to determine the prevalence and predictors of dermal, ocular, or oral e-liquid exposure and subsequent outcomes (feeling sick, going to the hospital) among youth and adult e-cigarette users. Methods: We used data from individuals who reported past 12-month e-cigarette use in Wave 5 (2018-2019) of PATH. We estimated the prevalence of: (1) e-liquid exposure (i.e.,"In the past 12 months, did you swallow e-liquid or get in your mouth, on your skin, or in your eyes?"); (2) sickness after exposure; and (3) going to the hospital for the exposure among youth (ages 12-17;N=1,813), young adults (ages 18-24;N=4,057), and older adults (ages 25+;N= 3,725). Multivariable logistic regressions examined associations between outcomes, demographics (sex, race, ethnicity, income, education) and frequency of e-cigarette use in the past 30 days. Results: Among those who used e-cigarettes in the past 12 months, dermal, ocular or oral e-liquid exposure was reported by 25% of youth (n=457), 25% of young adults (n=999), and 19% of adults (n=702). Among those with e-liquid exposure, sickness was reported by 10% of youth (n=49), 11% of young adults (n=114), and 14% of adults (n=96). A small proportion of exposed individuals went to the hospital: 4% of youth (n=18), 3% of young adults (n=29) and 7% of adults (n=46). Higher e-cigarette use frequency was associated with higher odds of exposure among youth (aOR=10.8; p<0.001). Black individuals reported lower odds of e-liquid exposure but higher odds of getting sick (aOR=6.13 for youth and aOR=2.64 for older adults) or going to the hospital (aOR=3.40 for young adults and aOR=3.56 for other adults). Conclusions: We identified that dermal, ocular or oral e-liquid exposure was common across youth and adult e-cigarette users. Future research is needed to better understand how individuals get exposed to e-liquid to inform prevention, such as whether e-liquid exposure is related to specific e-cigarette devices or behaviors, and which factors contribute to subsequent illness and hospitalization.

FUNDING: Federal

POS2-75

THE LONGITUDINAL ROLE OF DEPRESSIVE SYMPTOMS AND POSITIVE OUTCOME EXPECTANCIES ON ENDS USE IN YOUNG ADULTHOOD

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Outcome expectancies, which are the beliefs about the emotional, cognitive, and behavioral outcomes of a behavior, and depressive symptoms are associated with electronic nicotine delivery system (ENDS) use. However, no contemporary research examines if positive ENDS outcome expectancies explain the association between depressive symptoms and ENDS use. Those who are high in depressive symptoms may hold more positive ENDS-related expectancies than their peers and for this reason use ENDS. Purpose: The present study aimed to determine if positive ENDS outcome expectancies explain the longitudinal association between depressive symptoms and ENDS use. We hypothesized that positive ENDS outcome expectancies would mediate the association between depressive symptoms and subsequent past 30-day ENDS use one year later in young adulthood. Method: Participants were 1583 young adults from 24 Texas college who participated in three biannual study waves, spanning one year (Fall 2014-Fall 2015). At Wave 1, participants were 18-25 years old (M=20.27; SD=1.86); 61.53% female; 35.88% non-Hispanic white, 34.55% Hispanic/Latino, and 29.56% another race/ethnicity. A mediation model using R-Studios PROCESS was used to determine if Wave 2 positive ENDS outcome expectancies explained the association between Wave 1 depressive symptoms and Wave 3 past 30-day ENDS use. Two ENDS outcome expectancies were assessed separately; mood expectancies (e.g., help alleviate stress; negative affect) and social expectancies (e.g., have more friends). Depressive symptoms were assessed with the CES-D-10 and past 30-day ENDS use was the number of days ENDS were used in the past 30. Results: There was a significant indirect effect of Wave 1 depressive symptoms on Wave 3 past 30-day ENDS use through Wave 2 ENDS mood outcome expectancies (beta=.013, 95%BCI: [0.003, 0.025]), but not social outcome expectancies (beta=-.004, 95%BCI: [-0.010, 0.0003]). Thus, only ENDS mood expectancies explained the association between depressive symptoms and past 30-day ENDS use one year later. Conclusions: This study extends research by indicating that young adults with elevated depressive symptoms may be more likely to use ENDS because

they expect ENDS to help alleviate stress and negative affect. Intervention programs aimed at targeting ENDS use among those with elevated depressive symptoms should consider providing positive coping mechanism strategies (e.g., mindfulness meditation) that can be used in place of ENDS.

FUNDING: Federal

POS2-76

EFFECT OF CHILDHOOD AND CURRENT SECONDHAND SMOKE EXPOSURE AT HOME ON CARDIOVASCULAR DISEASE RISK FACTORS AMONG HEALTHY, NEVER-SMOKING, MULTI-ETHNIC ASIAN POPULATION

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Significance: Secondhand smoke (SHS) exposure increases the risk of coronary heart disease by 25-30%. Ethnicity modifies cardiovascular disease (CVD) incidence and mortality. Exposure to SHS in childhood increases risk for CVD in adulthood. Hence, this study investigated the association of childhood and current SHS exposure at home with current CVD risk factors in the Singapore population. Synergistic effect between childhood and current SHS exposure on CVD risk factors was examined. Heterogeneity of the impact of SHS exposure across ethnic groups was explored. Methods: This is a cross-sectional study that used data from the Singapore Multi-Ethnic Cohort, which is a prospective cohort comprised of 14,465 Singapore citizens and permanent residents. 1,219 healthy, never-smoking adults (= 21 year's old) of Chinese, Malay or Indian ethnicity were included in the analysis. Linear regression models were constructed to assess the association between SHS exposure at home and CVD risk factors. Interaction terms were introduced into the models to evaluate the synergistic effect between childhood and current SHS exposure at home, and to determine whether ethnicity is an effect modifier. Results: Current SHS exposure at home was significantly associated with elevated fasting blood glucose (FBG: 0.20; 95%CI: 0.03, 0.37 mmol/L) and reduced high-density lipoprotein (HDL: -0.05; 95%CI: -0.10, 0.00 mmol/L). Interaction between current and childhood SHS exposure was associated with elevated FBG and hemoglobin A1c (HbA1c). Compared to participants unexposed to SHS in childhood and currently, only participants exposed at both timepoints had significantly higher FBG (0.36; 95% CI: 0.15, 0.56mmol/L) and HbA1c (0.19; 95%CI: 0.06, 0.33%). Current SHS exposure at home was significantly associated with elevated triglyceride (0.27; 95%CI: 0.12, 0.43 mmol/L) and reduced HDL (-0.12; 95%CI: CI: -0.20, -0.05mmol/L) among the Malays only. Conclusion: Findings from this study suggest that the reduction of SHS exposure at home can contribute to the nation's public health effort in chronic disease prevention. In view of the potential long-term impact of SHS exposure at home on an individual's glucose metabolism, parents should limit exposing their children to SHS at home. Targeted strategies should be considered to reduce SHS exposure at home among the Malay ethnic group given the more pronounced health impact of home-based SHS exposure in this population.

FUNDING: Academic Institution

POS2-77

INTEGRATION OF AN EVIDENCE BASED TOBACCO CESSATION INTERVENTION INTO A RURAL COMMUNITY-BASED MATERNAL AND CHILD HEALTH PROGRAM IN INDIA

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Significance: Global Adult Tobacco Survey (2016-17) showed 7.5% pregnant women in India use tobacco, predominantly smokeless. Lack of cessation support by antenatal care practitioners results in missed opportunities. An intervention study was planned to assess the feasibility and outcomes of integrating a tobacco cessation service into a rural community-based maternal and child health (MCH) program in four states of India. The intervention involved task shifting by training female community health workers (CHWs) engaged in MCH program to screen tobacco users, provide brief advice and support cessation. Methodology: We conducted a mixed methods pre-implementation study using framework approach of Implementation Research Outcomes and Consolidated Framework for Implementation Research for developing qualitative data collection tools. We conducted in-depth interviews with stakeholders (n=28) like health coordinators, pregnant women and government health workers, and four focus group discussions with female CHWs (n=24). Prevalence and patterns of tobacco consumption among pregnant women (n=581) were assessed through a baseline survey. Results: 9.8% of the pregnant women reported ever tobacco use, of which 3.6% were current tobacco users (used in last 30 days) using only SLT products like Gutkha, Kharra, Mava, Gudhaku and Khaini.Among ever users, 88% quit tobacco as soon as they got pregnant and 28% expressed that they would resume post-delivery. 62% reported exposure to secondhand smoke at home. Facilitators for integrating cessation service were that objectives of the intervention aligned with the aim of MCH program and CHWs' confidence to deliver cessation service as they had the required technical and soft skills and were familiar with cultural practices and appropriate ways to engage with pregnant women. Pregnant women showed acceptability in receiving cessation support from CHWs. Barriers anticipated by health coordinators and CHWs were optimization of cessation service based on low prevalence of pregnant tobacco users and burden for documenting intervention related data. Government health workers were appreciative of the intervention, yet were judgmental of cessation outcomes of the pregnant women. Conclusion: Stakeholders perceived the intervention to be adoptable, feasible and acceptable. Findings of the study guided to tailor the training module for CHWs and implement the intervention contextualizing the needs of pregnant women.

FUNDING: Nonprofit grant funding entity

POS2-78

SMOKELESS TOBACCO CESSATION IN SOUTH ASIA: FINDINGS FROM A MULTICOUNTRY FACTORIAL DESIGN FEASIBILITY RANDOMISED CONTROLLED TRIAL

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Background: Most smokeless tobacco (ST) products are strongly associated with oral, pharyngeal and oesophageal cancers and precancerous conditions. While three-quarters of global ST consumption is in South Asia, the region lacks evidence on feasible and effective interventions for ST cessation. This study aimed to test the feasibility of delivering two evidence-based interventions for conducting a full trial of ST cessation in Bangladesh, India and Pakistan. Methods: A multi-country, factorial design feasibility trial of ST cessation was conducted in primary care settings in Bangladesh, India and Pakistan. We identified and recruited 264 adult, daily users of ST who were willing to make a quit attempt. They were randomised to receive the following either alone or in combination: a) an 8-week course of Nicotine Replacement Therapy (NRT) with very brief advice (VBA) b) a bespoke behavioural intervention for ST cessation (BISCA). Participants receiving neither intervention were given VBA. Follow-ups were conducted at 6, 12 and 26 weeks. This preliminary analysis reports recruitment and retention rates, and self-reported abstinence from tobacco products at 26 weeks verified by salivary cotinine (≤15ng/ml) and CO breath test (≤10ppm). Results: Between December 2019 and November 2020, we screened 392 individuals, of whom 272 (69.3%) were found eligible. Of these, a total of 264 (97%) participants were recruited. Follow-ups were completed for 250 (94.7%), 244 (92.4%) and 236 (89.3%) participants at 6, 12 and 26 weeks, respectively. The drop-out rate was higher in one site in Pakistan, and for participants receiving no intervention (VBA only). Biochemically verified abstinence was calculated in 235/236 (99.7%) of participants completing 26-week follow-ups. Of these, abstinence was reported in 7/59 (11.9%) in NRT arm, 9/59 (15.3%) in BISCA arm, 4/61 (6.6%) in the combination (NRT + BISCA) arm and 3/56 (5.4%) receiving no intervention. Conclusion: It is feasible to conduct a multi-country factorial design trial of smokeless tobacco cessation in South Asia as suggested by our high recruitment and retention rates. Our findings indicate favourable abstinence rates for NRT and BISCA when delivered on their own, which needs further exploration.

FUNDING: Federal

POS2-79

ONLINE SURVEY ON RISK PERCEPTION, USAGE BEHAVIOR AND USAGE MOTIVATION OF NICOTINE PRODUCT USERS IN GERMANY

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Background: In recent years, the tobacco industry has regularly introduced new products to the market, e.g. so-called "Electronic Nicotine Delivery Systems" (ENDS), and nicotine pouches have also become available in recent months. Thus, a wide variety of nicotine/tobacco products now exist. The addition of flavorings further expands the variety of products and makes risk assessment even more difficult. Research Objectives: The main objective of our study is to analyze risk perception, usage motivation

and behavior when consuming the different products. For example, we investigated whether differences exist between users and non-users regarding the risk assessment of products and how flavorings are used in the different product classes. Methods: The online survey was conducted using the LimeSurvey program. Recruitment took place nationwide in Germany via mail distribution lists, forums and Facebook groups, among others, and lasted 3 months. For this purpose, the questionnaire was written in German. Participation in the study was anonymous. The questionnaire structure can be divided into a section on risk perception, general and specific questions on product use and socio-demographics. A sample of 10 products was surveyed. Each participant was only presented with the items relevant to him or her. The completion time was approximately 5-10 minutes. Results: A total of 1754 people participated in the survey, and 917 questionnaires could be evaluated. The percentage of ever-users among the evaluated questionnaires is 76.8 percent. 52.3 percent of the participants are female, 47.7 percent male. The average age of the participants is 31.3 years. For 63.7 percent of current and former users, the tobacco cigarette (TC) was the first actively used nicotine product, followed by shisha with 23.4 percent. TC was rated as the most dangerous product by all participants. Non-users mostly rated the health risk posed by nicotine products (apart from TC) significantly higher than consumers ($p<0.05$). Flavorings were used more frequently with products in the new categories than with products of the old categories. Conclusions: More education is needed regarding the risk posed by shisha, especially among adolescents and young adults. Flavors appear to be sought after in the use of new forms of consumption, possibly facilitating entry/transition to the product and making objective risk assessment more difficult.

POS2-80

RELATIVE MORTALITY BY SMOKING STATUS FOR DIFFERENT SOCIODEMOGRAPHIC GROUPS

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Background: The impact of cigarette smoking on mortality is well established. However, while estimates of the relative mortality risks for the overall population are widely available, age-specific mortality estimates for specific sociodemographic groups in the US are lacking. Methods: Using the 1987-2014 National Health Interview Survey Linked Mortality Files through 2015, we estimated all-cause mortality risks for current smokers, recent quitters who quit smoking within two years of ascertainment, and long-term quitters compared with never smokers. Cox proportional hazards regression models were used to estimate age- and gender-specific relative risks stratified by race/ethnicity or educational attainment. Relative risks were also assessed by the number of cigarettes smoked per day (CPD) among current smokers or recent quitters. For long-term quitters, we examined relative risks by years since quitting. Results: Relative risks of all-cause mortality among current smokers or recent quitters were higher than never smokers with generally highest risks for non-Hispanic White individuals, followed by non-Hispanic Black individuals, and lowest for either non-Hispanic Other or Hispanic individuals. Relative risks also varied considerably by educational attainment, with higher education groups generally having larger relative risks than lower education groups, except for younger women. Conversely, the all-cause mortality among long-term quitters was still higher than never smokers in general but with no clear patterns across race/ethnicity and education groups. Among current smokers or recent quitters, relative risks tended to increase with higher CPD levels. Conclusions: Age-specific relative risks for all-cause mortality related to current or recent smoking varied considerably by sociodemographic factors. These factors should be considered when assessing smoking-related mortality and projecting the impact of tobacco control interventions on smoking-related health outcomes and disparities.

FUNDING: Federal

POS2-81

FLAVOR PREFERENCES FOR E-CIGARETTES AND CAPSULE CIGARETTES: CONSISTENCIES AND CORRELATES ACROSS PRODUCTS AMONG DUAL USERS IN MEXICO

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Background: Flavors increase the appeal of tobacco products, though little is known about the consistency and correlates of flavor preferences across tobacco product types. This study assessed preferences for flavors in e-cigarettes and cigarettes among adult dual users' (i.e., use both e-cigarettes and cigarettes) in Mexico, where capsule cigarettes that come in a variety of flavors are extremely popular. Methods: Data were analyzed from the first surveys of adult Mexican smokers in an open cohort recruited from an online consumer panel between November 2018 to March 2021. The analytic sample included dual users (n=2924), including those who smoke flavor capsule cigarettes (n=1549). Participants reported their preferred e-cigarette flavor, and those who smoked capsule cigarettes reported the flavors they perceived when they crushed their preferred capsule variety. Among those who used e-cigarettes and capsule cigarettes, we analyzed the consistency of preferred flavors using chi-squares. Multinomial logistic regression models identified the factors associated with preference for specific e-liquid flavors (reference=tobacco; mint/menthol; fruits; desserts/chocolate/candies; and other flavors, including clove/cucumber/coffee/alcoholic beverages) Results: Mint/Menthol 79.3%, fruits flavors 35.6% and cucumber 16.5% were the most perceived flavor in capsule cigarettes and mint/menthol 52.2%, red fruits 34.4% and tropical fruits 30.9% the most preferred flavors for e-liquids. Of mint/menthol capsule cigarette users, 52% indicated this same flavor preference for their e-cigarette, which was significantly higher than for those whose capsule cigarettes did not have mint/menthol flavor (20.9%; p=0.000). Similar converging preferences for the same flavors across products were found across all flavor categories. Models assessing correlates of e-cigarette flavor preferences indicated that preference for all non-tobacco flavors were less likely among males, daily smokers, and those who used "closed" e-cigarette devices and e-cigarettes with nicotine. Also, those who preferred flavor capsule cigarettes, menthol cigarettes or both were more likely to prefer non-tobacco flavored e-cigarettes. Conclusion: Mexicans who use both e-cigarettes and capsule cigarettes tend to use similar flavors across products. Future research should assess whether the great array of capsule flavors competes with e-cigarettes and, potentially, keeps smokers from switching and/or quitting tobacco product use.

FUNDING: Federal

POS2-82

SEX/GENDER DIFFERENCES IN ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) PRODUCT CHARACTERISTICS

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Significance: Electronic nicotine device systems (ENDS) represent a broad range of products with multiple different product characteristics such as presence/level of nicotine and/or other substances (e.g., cannabis), flavors, and device features (e.g., adjustable settings, disposable, etc.). These product characteristics are important to consider since they could impact the products' appeal, addictive potential, toxicity, or harm reduction potential. Further, given the known sex/gender differences in combustible tobacco product use and outcomes, it is important to characterize sex/gender differences in which ENDS product characteristics are used in the United States (US). Methods: We performed a systematic review of the literature which used US population representative datasets to assess sex/gender differences in the use of certain ENDS product characteristics (i.e., nicotine or other substances, flavors, device types) and which were published from 2016-2021. Results: Sixteen papers met criteria for inclusion. These papers addressed nicotine (N=3), other substances like cannabis (N=3), flavors (N=12), and/or device types (N=1); and were from 5 population-representative datasets of US youth or adults (MTF, NATS, NHANES, NYTS, PATH, TUS-CPS). Several analyses (N= 4) found more reported use of nicotine and/or cannabis in ENDS in males versus females, while other analyses (N=3) found no significant sex difference on such measures. Flavor use was common in across sexes/genders, and several studies found similar rates of flavor use across sexes/genders (N=6). However, males were more likely to use multiple flavors or to only use tobacco and menthol flavors. In contrast, females were more likely to report that flavors made e-cigarettes easier to use. While a similar proportion of males and females reported using closed system devices, more males reported using open system devices. Conclusions: Understanding the characteristics of ENDS products used by males and females in the US could shed light on sex differences in the course of ENDS use and the addictive potential, appeal, or even harm reduction potential of ENDS products in these groups. Product characteristics are a tractable target for regulation and because men and women use flavors, both groups may benefit from legislation that reduces flavorings in ENDS products, although for different reasons.

FUNDING: Federal

POS2-83

PSYCHOSOCIAL PREDICTORS OF JOINT TRAJECTORIES OF CIGARETTE AND E-CIGARETTE USE AMONG YOUNG ADULTS IN THE US

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Significance. Young adults are at greatest risk for cigarette and e-cigarette use, warranting research to identify psychosocial correlates of their use trajectories. Methods. We analyzed data from 3,006 young adults (M_{age}=24.56; 54.8% female; 31.6% sexual minority; 35.6% racial/ethnic minority) in a 2-year, 5-wave study (2018-2020), including wave 1 sociodemographics, past 6-month alcohol and cannabis use, depressive symptoms, adverse childhood experiences [ACEs], and personality traits, as well as waves 1-5 past 6-month cigarette and e-cigarette use days. We conducted repeated measures latent profile analysis to identify cigarette and e-cigarette use profiles, then multinomial logistic regression analyses to identify correlates of profile membership. Results. Six profiles emerged: stable low-level (LL) cigarette and e-cigarette use (66.3%), stable LL cigarette use and either high-level (HL) e-cigarette use (12.3%) or decreasing e-cigarette use (6.0%), stable mid-level (ML) cigarette use with LL e-cigarette use (6.2%), stable HL cigarette use with LL e-cigarette use (4.7%), and decreasing HL cigarette use and stable HL e-cigarette use (4.5%). Compared to stable LL cigarette and e-cigarette use (referent), all profiles showed greater depressive symptoms and ACEs and were more likely to be cannabis users; 3 profiles (stable ML cigarette with LL e-cigarette use, stable HL cigarette with LL e-cigarette use, decreasing HL cigarette and stable HL e-cigarette use) were higher in extraversion and older; 2 profiles (stable LL cigarette and HL e-cigarette use, stable ML cigarette with LL e-cigarette use) were more likely to be male; and 2 profiles (stable LL cigarette and HL e-cigarette use, stable LL cigarette and decreasing e-cigarette use) were higher in openness and 2 profiles (stable ML cigarette with LL e-cigarette use, decreasing HL cigarette and stable HL e-cigarette use) were lower in openness. Conclusions. Intervention efforts and messaging campaigns should address common and distinct factors associated with use trajectories to target those at greatest risk for problematic trajectories of cigarette and e-cigarette use.

FUNDING: Federal

POS2-84

EFFECTS OF CIGARETTE PACKAGE COLOR AND WARNING LABELS ON MARLBORO SMOKERS' HEALTH BELIEFS, PRODUCT APPRAISALS, AND SMOKING BEHAVIOR: A RANDOMIZED TRIAL

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Background: Plain packaging and graphic warning labels are two regulatory strategies that may impact cigarette health beliefs and reduce consumption, but data is needed to understand how US smokers may respond to such regulations. Methods: Adult, daily, Marlboro smokers (Red [n=141] or Gold [n=43]) completed a mixed factorial randomized trial. Participants smoked their usual cigarettes during baseline (5-days) and then completed three experimental periods (15-days each) where they were randomized to receive free cigarette packs with a warning label manipulation (between-subject: graphic vs. text-only) and pack color manipulation (within-subject: red, gold, plain [counterbalanced]). Participants were blinded to the fact that the experimental packs contained their preferred cigarettes. Adjusted mixed-effects models with post-hoc testing examined between- and within-subject differences on cigarette health beliefs, subjective product perceptions, and smoking behavior. Results: At baseline, most smokers held factually correct health beliefs about own cigarettes (Mean=5.98, SD=2.37; Range:0-8) with the remainder uncertain about the truthfulness of the statements (Mean=1.71, SD=2.24) or incorrect (Mean=0.31, SD=0.72). Among the text-only warning group, the cumulative number of uncertain or incorrect beliefs increased from baseline across pack color periods (Congruent pack color IRR=1.70 [95%CI=1.43, 2.03], Incongruent pack color IRR=2.01 [95%CI=1.70, 2.38], and Plain pack IRR=2.16 [95%CI=1.82, 2.55]). Similar increases were observed in the graphic group, though the effect was less pronounced (Congruent IRR=1.31 [95%CI=1.10, 1.56], Incongruent IRR=1.49 [95%CI=1.26, 1.76], Plain IRR=1.70 [95%CI=1.44, 2.00]). No differences by pack color or warning were observed for subjective ratings (satisfaction, sensory, or harshness). Relative to baseline, cigarette use increased during all experimental periods, but did not differ between experimental periods or warning groups. Conclusions: Graphic warning labels and pack color modification (including plain packaging) may generate increased uncertainty about several key cigarette health beliefs. Regulatory agencies could consider supporting policy changes, such as the ones examined, with information campaigns to maximize public knowledge.

FUNDING: Federal

POS2-85

WHAT CIGARETTE PRICE WOULD DRIVE VIETNAMESE SMOKERS TO QUIT SMOKING? FINDINGS FROM THE ITC VIETNAM SURVEYS

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Significance: As cigarettes become more affordable in Vietnam, this study investigated smokers' estimates of what price per pack of 20 cigarettes would be sufficient for them to try to quit smoking. Methods: The cross-sectional data came from Wave 3 (2020) of the International Tobacco Control (ITC) Vietnam Project. 1,106 male adult cigarette smokers who gave valid responses on the price of a cigarette pack that makes them quit smoking - price to quit - were included in the final analysis. Four hypothetical scenarios of adding specific tax were asked: "Would you try to quit smoking if the price of a cigarette pack that you smoked the most increased by VND 2,000; by VND 5,000; doubled, or tripled per pack?". Linear regression was used to assess the association between factors and log-transformed price to quit. Results: The weighted means of the purchased price of a cigarette pack and the price to quit were VND 13,200 (US$ 0.57) and VND 55,410 (US$ 2.39), respectively. The median price to quit was VND 20,000 (US$ 0.86), ranging from VND 5,000 to VND 5,000,000 (US$ 0.22 - 215.44). If the current price of a cigarette pack increased by VND 2,000; by VND 5,000; doubled; or tripled per pack, 27.13%, 42.82%, 70.59%, and 82.82% of smokers would have tried to quit smoking, respectively. After adjusting for covariates, the associated factors of the higher price to quit included younger age, preferred international cigarette brand and having intention to quit. Conclusions: Vietnam should make maximum effort to continuously raise tobacco taxes. Even a relatively small increase in price (by VND 6,800 or US$ 0.29) would motivate about half the smokers to try quitting.

FUNDING: Other

POS2-86

THE IMPACT OF HYPOTHETICAL E-CIGARETTE MODIFIED RISK AD CLAIMS ON PRODUCT PERCEPTIONS, PRODUCT INTEREST AND MESSAGE BELIEFS

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Significance: Some e-cigarette products have received authorization from the Food and Drug Administration, and could potentially apply to make modified risk tobacco product (MRTP) marketing claims (e.g., messages about reduced exposure to chemicals or reduced health risks). However, previous research has suggested skepticism of MRTP messages, which may be impacted in part by message content and perceived source. We aimed to explore these issues in an online experiment. Methods: In April 2022, we randomly assigned 1008 adult cigarette smokers (ages 18+) and 1009 young adult (YA) non-smokers (ages 18-25) to view two manipulated Vuse e-cigarette ads in one of 5 conditions: a control group that included no MRTP claim or one of 4 claim groups that included a hypothetical e-cigarette MRTP claim varying by theme (reduced chemicals or reduced harm) and claim location (embedded within the warning label or in the main ad space). We compared group differences on product interest, harm perceptions and message perceptions. Results: There were no differences by experimental group for either sample on interest in using or switching to Vuse. Among smokers, there were also no group differences on perceived harm or level of chemicals in e-cigarettes relative to cigarettes. However, among YA non-smokers, those who viewed the ads with MRTP claims were more likely to report e-cigarettes are less harmful than cigarettes (OR=1.70, p<.01) and have fewer chemicals than cigarettes (OR=1.44, p=.03) relative to those who viewed the control ads. Among all those in MRTP claim conditions, most perceived the claim to come from the brand (Vuse) (73.2%). However, this belief was less frequent among those who viewed the claim within the warning label (66.4%) versus in the main ad space (79.9%) (p<.001). MRTP claims received higher credibility ratings when presented within the warning label (mean=2.50) versus in the main ad text (mean=2.33), among YA non-smokers only (p=.019). When shown two versions of the MRTP ads which varied the claim location, most YA non-smokers (71%) picked the ad with the claim within the warning label as the version that would make them most interested in the product, while smokers were evenly split between the versions.

Conclusions: MRTP claims for e-cigarettes may have a stronger influence on impacting e-cigarette beliefs among young non-smokers versus adult smokers. Additional research on message credibility and believability may be informative.

FUNDING: Federal

POS2-87

SMOKELESS TOBACCO USE AMONG FIREFIGHTERS IN CENTRAL NC

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Significance: Smokeless tobacco (SLT) (chew or dip) use is three to six times higher among firefighters (10-18%) compared to the general population (3%) and has increased in recent years. SLT use among firefighters increases their already high cancer risk due to occupational exposures. As firefighters cannot avoid many of these workplace exposures, it is critical to understand modifiable risk factors of cancer. The purpose of this study was to examine demographic and behavioral factors associated with SLT use among professional firefighters in Central NC. Methods: Data for this report come from a survey conducted by the Duke Cancer Institute Firefighter Initiative. Firefighters were recruited from 5 departments in Central North Carolina (n=1500). Eligible firefighters were >18 years of age and currently employed as a professional firefighter. Survey questions included demographics, years on the job, role, other jobs, sleep, current and former SLT use, alcohol use, physical activity, and diet. Results: A total of 634 (42%) firefighters completed the survey between October 2020 and March 2021. The majority were male (92%), married (77%), completed college (66%), white (83%) and the mean age was 39.5 (SD=9.2). The mean number of years as a professional firefighter was 13.8 (SD=8.5). Most were currently working in field positions as firefighters (51%) or lieutenants/captains (27%). A total of 89 (14%) firefighters reported current SLT use and 110 (17%) were former users. Current and former users were more likely to be male (p=.002), white, (p<.0001) and have less education (p=.009) compared to never users. Former SLT users reported working as a firefighter longer than never or current users (p=.03). Compared to never users, current and former SLT users reported fewer hours of sleep (p=.05), more days per week of alcohol use (p=.0003), and higher numbers of alcoholic drinks per day (p<.0001). Conclusion: Firefighters that identify as white males with lower levels of education are more likely to use SLT. Firefighters that use SLT may also engage in other health behaviors that can increase risk for cancer, such as increased alcohol use. More research is needed to determine whether firefighters who use SLT engage in greater numbers of health risk behaviors in a profession with a high level of occupational hazards to develop targeted behavioral interventions to improve overall personal health decision-making reducing cancer r and other chronic diseases risk.

FUNDING: Academic Institution

POS2-88

PREDICTORS OF E-CIGARETTE AND CIGARETTE USE CESSATION PATTERNS AMONG DUAL USERS: A COHORT STUDY IN MEXICO

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Background: Adult smokers increasingly report using e-cigarettes (ECs) to try to quit; however, most continue smoking. This study evaluates the predictors of cessation attempt patterns among Mexican smokers who use ECs (i.e., dual users). Methods: Data were analyzed from seven waves (Nov. 2018-Nov. 2021) of an open cohort of Mexican adult smokers surveyed every four months and followed to the extent possible. The analytic sample (n=863 individuals, 1598 observations) responded to at least two consecutive surveys. Self-reported current smoking and e-cigarette use at followup (time "t+1" 4 months after the prior survey) defined three transitions: 1) remain dual users, 2) exclusive smoker, or 3) quitter of both products. For the first two transitions, we integrated the duration of the longest smoking quit attempt (SQA) between surveys: a) no SQA, b) SQA<30 days, and c) SQA=30 days. Predictors from the prior survey (time "t") included sociodemographics, smoking- and e-cigarette-related perceptions and behaviors, and product use among family and friends. Mixed-effects multinomial logistic models estimated crude and adjusted relative risk ratios (RRR & aRRR) for the time "t" predictors of "t+1" transitions (reference group=dual users without SQA). Results: At 4-month followup, 78.0% remained dual users, 20.9% quit only ECs, and 2.1% had quit both products for =30 days. Having recently tried to quit predicted SQAs of any duration (range aRRR=2.33-7.65). Having close friends who smoke was inversely associated with quitting both products for =30days (aRRR=0.20). Compared to nondaily smokers, those who smoked at least 5 cig/day were less likely to achieve a SQA=30 days, whether they remained dual users (aRRR=0.55) or became exclusive smokers (aRRR=0.22); higher smoking dependence increased the likelihood of SQAs <30 days in both these groups (aRRR=1.31 & 1.55). Among dual users who became exclusive smokers: e-cigarette dependence was inversely associated with trying to quit (aRRR=0.72); more frequent e-cigarette use was inversely associated with having a SQA<30 days (aRRR=0.53); and having a friend who uses e-cigarettes was inversely associated with both these outcomes (aRRR=0.46 & 0.47, respectively). Conclusions: Dual users who recently tried to quit smoking or who had no close friends who smoke were more likely to quit both smoking and e-cigarettes for =30 days at followup, whereas their e-cigarette perceptions and behaviors were unassociated with any SQA=30 days.

FUNDING: Federal

POS2-89

ASSOCIATION OF HOOKAH (WATER-PIPE) TOBACCO SMOKING AND CARDIOVASCULAR DISEASE-RELATED EXPOSURE BIOMARKERS AMONG U.S. USERS: THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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While hookah smoking, a long-established Middle-Eastern tradition, has increased in popularity worldwide, there is a substantial knowledge gap regarding its potential implications for cardiovascular disease (CVD) risk, particularly among regular U.S. adult hookah users who predominantly smoke in non-daily patterns. We examined levels of CVD-related exposure biomarkers (serum levels of high-sensitivity C-reactive protein, interleukin-6, soluble intercellular adhesion molecule, fibrinogen, and urine levels of 8-iso-prostane (oxidative stress) and nicotine metabolites (urinary total nicotine equivalents and cotinine) among chronic exclusive hookah smokers (n=75) compared to chronic exclusive cigarette smokers (n=1773), dual hookah + cigarette smokers (n=43), and never tobacco users (n=757). We used data from a nationally representative sample of adults from the PATH Study (2013-2014). Findings show that 84% of cigarette smokers reported daily use, while only 8% of hookah smokers reported daily use, with over one-third reporting monthly use. Nearly all (94%) hookah smokers reported sharing their pipe with others during smoking sessions. Adjusting for age and sex, exclusive hookah smokers had significantly lower geometric mean concentrations for all CVD-related harm biomarkers compared to exclusive cigarette smokers. A signal of harm was observed among hookah smokers compared to never tobacco users (urinary oxidative stress 8-isoprostane; $p < 0.05$). In a sensitivity analysis comparing daily (n=6) to non-daily (n=69) hookah smokers, despite higher levels of cotinine (442.90 [95% CI, 211.07-929.38] vs 7.36 [3.35-16.19] ng/mL; $p < 0.001$), daily hookah smokers had levels of CVD- related harm biomarkers comparable to those observed in non-daily users. Extending findings from acute exposure studies, our study documents evidence of greater oxidative stress, a CVD risk factor, resulting from chronic hookah smoking. Presumably due to intermittent and non-daily hookah use patterns, CVD-related exposure biomarkers are lower among exclusive hookah smokers compared to exclusive cigarette smokers. However, the data suggests that hookah smoking is not without harm compared to never-tobacco users. These findings represent hookah smoking patterns of non-daily, occasional, and shared use among U.S. adult smokers, in contrast to solitary, daily use reported in the Middle East.

FUNDING: Academic Institution

POS2-90

IS FOOD INSECURITY ASSOCIATED WITH CIGARETTE, ENDS, AND MARIJUANA USE IN YOUNG ADULTS?

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Significance: Food insecurity is characterized by the worry individuals face surrounding the lack of money to buy food and if food will run out before having money to buy more. Food insecurity may be associated with greater likelihood of tobacco use among young adults as this population tends to have reduced income but also higher rates of substance use. Additionally, stress caused by food insecurity may be associated with greater use of substances as a coping mechanism. Therefore, this study examined the association between food insecurity and current cigarette, electronic nicotine delivery system (ENDS), and marijuana use among young adults in the U.S. Methods: Participants were 1,630 young adults (51.8% female; 62% white; *m* age=21.8[*SD*=2.2]) in a cross-sectional online survey drawn from the Qualtrics panel (January-April 2022).

Food insecurity was measured by a 2-item screener from the Household Food Security Survey (HFSS) that measured food insecurity in the past year. If participants responded yes to either food insecurity question they were coded as being food insecure. Current (past 30-day) cigarette, ENDS, and marijuana use were assessed with one item each which asked about use in the past 30-days and were coded as dichotomous (any use=1/ no use=0) for the analysis. Logistic regression analyses, controlling for sex, age, race/ethnicity, and SES, were used to examine the association between food insecurity and current cigarette, ENDS, and marijuana use. Results: Food insecurity was high among the sample with 68.5% reporting food insecurity in the last year. 44.9% of participants reported current cigarette use, 44.5% reported current ENDS use, and 56.2% reported current marijuana use. The associations between food insecurity and cigarette use (OR=3.62, 95% CI=[2.84, 4.63]), ENDS use (OR=3.03, 95% CI=[2.41, 3.82]), and marijuana use (OR=2.64, 95% CI=[2.11, 3.29]) were all significant. Conclusions: Experiencing food insecurity is associated with greater risk for current cigarette, ENDS, and marijuana use. Future research is needed that examines these associations prospectively as well as possible mediators or moderators of this relationship. Learning Objective: To understand the association between food insecurity and cigarette, ENDS, and marijuana use.

FUNDING: Academic Institution

POS2-91

TOBACCO, SUBSTANCE USE, SCHOOL INSTRUCTION AND OTHER CORRELATES OF ADOLESCENTS' ACADEMIC AND MENTAL HEALTH STATUS DURING THE COVID-19 PANDEMIC

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Significance: Adolescents' school engagement and mental health have been major concerns during the COVID-19 pandemic, especially under changes and disruptions to school instruction. We aimed to examine how instruction method (e.g., in-person, remote, hybrid), tobacco, cannabis, alcohol use, and other factors were associated with adverse academic and mental health outcomes within an adolescent cohort followed during the pandemic. Methods: Data were from three semi-annual survey waves (spanning August 2020 - May 2022) of a cohort of adolescents (N=1066 students; 2242 observations) from 8 Northern California high schools. Outcomes were academic self-efficacy (scale range: 4-20; e.g., "I can master the hardest topics in my classes"), school connectedness (scale range: 3-15; e.g., "I feel like I am part of my school"), and "high" levels of internalizing problems (symptoms associated with depression, anxiety) and externalizing problems (symptoms associated with attention deficits, conduct problems). Separate generalized estimating equation models (robust variance and multiple imputation) predicted outcomes based on past 30-day use of e-cigarettes, other tobacco (i.e., not e-cigarettes), cannabis, and alcohol and school instruction method (in-person, remote, rotation/hybrid), adjusted for socio-demographic variables, physical activity, a pandemic anxiety scale, pre-pandemic school performance and depression symptoms, survey wave, and school identifier, among other factors. Results: Relative to non-use, e-cigarette use was associated with greater adjusted odds of internalizing (OR: 1.6; 95% CI: 1.2, 2.3) and externalizing (OR: 1.4; 95% CI: 1.0, 2.0) problems but not with academic outcomes. Cannabis use was associated with less academic self-efficacy (Beta: -0.5; 95% CI: -0.9, 0.0) and school connectedness (Beta: -0.5; 95% CI: -0.9, -0.1) but not with mental health. Alcohol use was associated with greater odds of externalizing and internalizing problems. Remote instruction was associated with less academic self-efficacy, less school connectedness, and greater odds of internalizing problems. Conclusions: Substance use, including e-cigarettes and cannabis, was associated with academic and mental health problems among adolescents. Adolescent substance use prevention and cessation require greater urgency under pandemic conditions.

FUNDING: Federal; Academic Institution

POS2-92

ADOLESCENTS' E-CIGARETTE CURIOSITY AND WILLINGNESS FOLLOWING FDA PRODUCT AUTHORIZATION

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Significance: In 2021, the US Food and Drug Administration (FDA) granted market authorizations to three R.J. Reynolds Vapor Company Vuse brand e-cigarette products, the first e-cigarette authorizations under the Premarket Tobacco Product Application (PMTA) pathway. We conducted a survey experiment to determine how being informed that a product has been FDA authorized affects adolescents' curiosity and willingness to use it (known predictors of future use). Methods: A subset of adolescents (N=260) participating in a Northern California cohort were randomized within an online survey to one of three conditions: A) a description and photo of Vuse Solo; B) the same description/photo with added text that FDA "authorized" Vuse Solo; and C) the same description/photo with added text that FDA "approved" Vuse Solo. All participants were then asked how curious they are about Vuse Solo and how willing they would be to use Vuse Solo if a best friend offered (both on a scale 0-100; higher value = more curious, more willing). We compared mean ratings across the three conditions, both overall and in models with an interaction term for past 30-day e-cigarette use. Results: Overall, there was no statistically significant difference in curiosity rating (Kruskal-Wallis P=0.43) or willingness rating (Kruskal-Wallis P=0.43) across conditions. However, for curiosity, there was interaction by e-cigarette use status (P=0.003). Among past 30-day e-cigarette users, the added statements that Vuse Solo has been "authorized" or "approved" were associated with meaningfully greater curiosity about Vuse Solo (both P=0.001) but with no difference between "authorized" or "approved" wording (P=0.53). Conclusions: A brief exposure to a short statement of FDA authorization or approval increased curiosity about an e-cigarette product among adolescent e-cigarette users (with no difference between "authorized" and "approved" wording). While further research is needed in larger, more generalizable, and longitudinal samples, these findings suggest potential for FDA PMTA authorizations to affect adolescent perceptions that could then predict future product use.

FUNDING: Federal

POS2-93

DISCUSSIONS OF HEATED TOBACCO PRODUCTS ON TWITTER FOLLOWING THE IQOS MODIFIED-RISK TOBACCO PRODUCT AUTHORIZATION AND U.S. IMPORT BAN

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Significance: Social media is an important source of information to understand public discourse around IQOS, a new heated tobacco product (HTP) from Philip Morris International that entered the US market in 2019. We analyzed HTP-related tweets starting a month before the US Food and Drug Administration authorized IQOS as a modified risk tobacco product (MRTP; July 2020) and a month after the import of IQOS was banned in the US (November 2021). Methods: We collected 10,454 public English tweets (posted June 2020-December 2021) using IQOS-related keywords (e.g., "iqos" "heatedtobacco" "heatnotburn") and conducted manual content analyses on a random subset (n=2,796 after removing noise). Tweets were categorized as marketing (selling or promoting HTPs), news, or positive/neutral/negative personal testimonials (sharing one's experiences/opinions of HTPs). We also coded for other themes: health, policy, and whether they mentioned IQOS or other HTP brands (e.g., Ploom). We used pairwise co-occurrence analyses to evaluate connections across the themes. All % are reported below as prevalence out of the 2,796 subset analyzed. Results: Personal testimonials were the most common type of tweets (58%), followed by news (31%) and marketing (11%). Neutral testimonials mentioning IQOS brand (44%) and policy (23%) showed the largest pairwise co-occurrence. Positive testimonials (31%) often compared HTPs to e-cigarettes or cigarettes, including the health effects of cigarettes; negative testimonials (23%) also often mentioned health, including skepticism related to "big tobacco" promoting HTPs and beliefs that HTPs are more harmful than e-cigarettes. 23% of the subset discussed health, with more personal testimonials being positive than negative. An increase in number of tweets, particularly in news and policy-related are, was observed following IQOS' MRTP authorization (7%) compared to the previous month (4%). Conversations occurring in February (9%) and September (8%) of 2021 discussed stock market performances and product availability in the US following legal disputes around IQOS. Conclusions: Policy and business events drove social media conversations on HTPs. Results suggest that favorable opinions of IQOS are based on perceived reduced health risks, although the MRTP authorization was only in "reduced exposure", not "reduced risks". Understanding public perceptions of the IQOS MRTP marketing authorization is critical to inform future regulatory decisions for HTPs, guide enforcement efforts and clear health communication strategy to minimize misinformation on social media.

FUNDING: Federal

POS2-94

"MAN-MADE" BUT MAY BE "USED TO GET PEOPLE OFF OF NICOTINE": (MIS)PERCEPTIONS ABOUT TOBACCO-FREE NICOTINE AND SYNTHETIC NICOTINE

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Significance: The use of synthetic nicotine (SN), often prominently marketed as tobacco-free nicotine (TFN), has become increasingly proliferated in the US e-cigarette market. Although SN is synthesized in lab, it shares similar chemical properties as tobacco-derived nicotine (TDN), threatening to addict more people. Currently, the FDA does not regulate how the term, i.e., SN versus TFN, is used in vape product marketing. Through this qualitative study, we attempt to understand if people interpret the two terms differently. Methods: In 2022, we collected open-ended responses from 561 U.S. adults (21-88 yrs; about half vapers and half non-vapers) within a larger online study on e-cigarette packages, to understand their perceptions about SN and TFN. Participants who indicated that they had heard about at least one of the terms were queried to provide textual descriptions. Their responses were then coded on correctness (e.g., synthesized/man-made, not derived from tobacco leaves) and valence (positive, negative, or neutral) by two coders (*alphas*= 0.82-1.00). Results: Among those who claimed to have heard about SN (*N*=206), only a third could correctly describe it as being synthesized through chemical processes and not different from TFN or TDN. Most responses were neutral in valence, with keywords such as "man-made," "chemicals," "lab" frequently mentioned. A few of them (8%) described SN negatively as "artificial," "dangerous," and "extremely addictive." For those who claimed to have heard of TFN (*N*=234), the percentage of correct descriptions was dropped to 20%. More interestingly, even fewer (3%) described TFN in a negative tone. Many responses included positive (mis)perceptions toward SN (14%) and TFN (17%), e.g., "no nicotine in it," "less harmful," "innovative". Notably, some even considered TFN as a healthy, clean alternative to TDN and a potential cessation aid (e.g., "used to get people off of nicotine," "safer," "doesn't contain impurities"). Conclusion: Findings from this study revealed that (1) a substantial proportion of the population had heard about SN and TFN, but majority lacked correct knowledge; (2) the tobacco industry's strategic use of the label TFN had "effectively" misguided people's interpretations and perceptions about the harmfulness associated with this new type of nicotine. Public education efforts and rapid regulatory actions are crucially needed to alter this situation, and to forestall further escalation of the vaping epidemic.

FUNDING: Federal; Academic Institution

POS2-95

MISPERCEPTIONS ABOUT HARMS ASSOCIATED WITH SYNTHETIC NICOTINE AND TOBACCO-FREE NICOTINE: DOES CURRENT VAPING STATUS MATTER?

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Significance: In recent years, the use of synthetic nicotine (SN) in vape products has escalated. Different from tobacco-derived nicotine, SN is manufactured in labs with poorly understood health effects. Vaping companies have increasingly switched to SN to evade regulations and marketed it as "tobacco-free nicotine" (TFN). It is crucial to examine whether the term TFN may mislead people to perceive lower harms, and if current vapers (CVs) and non-vapers (NVs) are influenced to the same degree. Methods: The current study analyzed data from a larger study where 561 U.S. adults (>21yrs, *M*=42.56, *SD*=16.71) were recruited from Qualtrics, oversampling current vapers (reported vaping during the past 30 days: n=312). Participants were first asked if they had ever heard of SN or TFN. Among those who said yes, their harm perceptions toward SN and TFN were examined along three dimensions relative to tobacco-derived nicotine using Chi-squared tests. Results: Overall, slightly more participants reported having heard of TFN (41.5%) than SN (36.5%). Among those who have heard about each term, TFN yielded significantly greater misperceptions than SN: significantly more participants misperceived TFN as containing a lower nicotine concentration (32.5% vs. SN: 22.5%; *p*=.031), was less addictive (28.1% vs. SN: 17.2%; *p*=.012), and less harmful (34.7% vs. SN: 24.7%; *p*=.034). When compared across current vaping status, more CVs held these misperceptions for both TFN (31.9%-39.4%) and SN (21.7%-30.2%), than NVs (TFN:12.2%-35.1%; SN: 0%-11.8%). Significantly more NVs held lower harm perceptions toward TFN than SN (*p*s=.022-.023). For CVs, while their misperceptions about nicotine concentration and harmfulness associated with TFN and SN were not different (*p*s=.088, .183), significantly more CVs perceived TFN as less addictive relative to tobacco-derived nicotine (32.7%), compared to that of SN (21.7%, *p*=.029). Conclusion: It is alarming that one-third of those who have heard of TFN hold misperceptions toward this term. Compared to SN, the term TFN may lead to reduced harm perceptions among both CVs and NVs, but the detrimental influence of labeling SN as TFN is potentially more pronounced for NVs. Regulating the use of term TFN on product labeling and advertising may help counter tobacco industry's devious marketing strategies that hook non-users by instilling misperceptions about reduced health risks of emerging tobacco products.

FUNDING: Federal; Academic Institution

POS2-96

ADOLESCENT, YOUNG ADULT, AND ADULT USE AND PERCEIVED MARKETING OF NON-INHALED NICOTINE PRODUCTS

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Introduction: Non-inhaled nicotine products such as pouches, lozenges, tablets, gum, patches, and toothpicks are gaining popularity. This study is among the first to estimate use patterns for these products and likelihood of liking and buying based on marketing. Methods: A cross-sectional, online survey of U.S. participants (n=6,131; ages 13-40 years) conducted in November-December 2021. Descriptive statistics analyzed use patterns of different non-inhaled nicotine products (ever, past-30-day, past-7-day, behaviors, flavors). Multivariate ordered logistic regression models assessed the likelihood of buying Zyn pouches and Lucy gum based on liking product marketing, by age group 13-21 or 21-40, after adjusting for sociodemographic factors. Results: Sample included 2,025 (33.0%) ever-users, 1,191 (19.4%) past-30-day users, and 998 (16.3%) past-7-day users of any non-inhaled nicotine product. Use patterns by age (in years): ever-users (13-21: 816 [22.3%]; 21-40: 1,209 [48.9%]); past-30-day users (13-21: 458 [12.5%]; 21-40: 733 [29.7%]); and past-7-day users (13-21: 38 [10.5%]; 21-40: 615 [24.9%]). Nicotine pouches, gum, lozenges, patches, toothpicks, and tablets were the most commonly used products in the past 30 days (in that order), with 10-18% of participants reporting nicotine strength as 6-10 mg. Fruit, sweet/dessert, alcohol, coffee, and mint were the most commonly used flavors. After viewing marketing, ever-users liked and were more likely to buy Zyn pouches compared to never users (p<0.001). Participants ages 13-20 years were more likely to buy Zyn pouches based on marketing if they perceived that marketing messages were about: good tasting flavors (AOR 1.43, 1.09-1.87; 0.009), helping to feel comfortable in social situations (AOR 1.38, 1.02-1.87; 0.033), and Zyn pouches being made by a cigarette company (AOR 1.51, 1.12-2.04; 0.006); and were more likely to buy Lucy gum after seeing marketing if they perceived such marketing to include the message that Lucy gum can be used anywhere (AOR 1.57, 1.05-2.33; 0.026). Conclusions: Adolescents, young adults, and adults are using new, non-inhaled nicotine products including nicotine pouches, patches, gum, lozenges, tablets, and toothpicks. Adolescent use of non-inhaled nicotine products and likelihood of buying products when exposed to marketing highlights the need for regulatory efforts to reduce marketing that appeals to adolescents.

FUNDING: Federal; Academic Institution

POS2-97

EFFECTS OF NICOTINE CONCENTRATION, AEROSOL PARTICLE SIZE DISTRIBUTION, & FREEBASE/PROTONATED NICOTINE FRACTION ON "THROAT HIT" FROM ELECTRONIC NICOTINE DELIVERY SYSTEMS

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Tobacco product users commonly report a harsh sensation at the back of the throat when they inhale a nicotine-containing aerosol. The sensation, referred to as "throat hit" is thought to derive from absorption of gas-phase nicotine in the region of the glossopharyngeal nerve. Products that emit high gas-phase nicotine concentration aerosols can be experienced as overly aversive; on the other hand, the tobacco industry has long designed products to produce some degree of throat hit to generate "impact", which it deemed increased sales. In recent years, ENDS manufacturers have increased nicotine concentration and lowered the freebase nicotine fraction, making products that can deliver a high nicotine dose palatably. In this study we developed a computational heat and mass transfer model of the respiratory tract and examined effects of ENDS liquid nicotine concentration/form, PG/VG ratio, aerosol particle size, and puff topography on theoretical nicotine absorption at the back of the throat. We compared model predictions of nicotine absorption to reported throat hit from previous and ongoing clinical studies in which device operating conditions and liquid composition were varied and puff topography was measured. We found that predicted nicotine throat absorption increases with the product of: nicotine concentration, freebase nicotine fraction,

device power, and flow rate. Also, predicted throat absorption increased exponentially with inhaled aerosol temperature and decreased with PG/VG ratio. In addition, for a given mass of inhaled nicotine, smaller particle diameters resulted in greater predicted throat absorption, but the effect was small. Theoretical predictions of throat nicotine absorption strongly predicted subjective throat hit score from the clinical lab (*r=0.6; p<0.0001*). We also found that high nicotine concentration products with low freebase nicotine fractions (e.g. JUUL) have lower throat hit than lower concentration nicotine products whose nicotine is predominantly in the freebase form. In conclusion, subjective throat hit from ENDS products can be readily manipulated by manufacturers and can be predicted from liquid composition and device power.

FUNDING: Federal

POS2-98

DETERMINATION OF PYRAZINES IN SHISHA

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Significance: Waterpipe tobacco smoking refers to the process of smoke passing through water before it is inhaled. This type of smoking has increased in recent years, especially by adolescents and young adults. Some of the negative effects of this type of smoking are not well researched or regulated, including the presence of pyrazines across different flavors. Pyrazines are a group of organic compounds that contribute to the roasted, nutty flavor in some shisha flavors. While not toxic themselves, pyrazines are known to reduce the harsh, irritating effects of nicotine, which eases the use of these tobacco products. Methods: In order to better understand the formulas of different shisha flavors, two methods were developed to analyze the presence of pyrazines in shisha. Headspace Solid Phase Microextraction Gas Chromatography Mass Spectroscopy (HS-SPME GCMS) was used to qualitatively identify the pyrazines present in each of the 8 flavors. Across 7 of those flavors, 10 different pyrazines were detected. Due to limitations with the first method, a method using Solid Phase Extraction (SPE) instead of SPME was developed to quantify the pyrazines. Results: The limit of quantitation (LOQ) for the 5 pyrazines quantified was 0.0108-0.3073 ug/mL (microgram per milliliter). The preliminary results found 0.7388 ug/g (microgram per gram) shisha and 1.1908 ug/g (microgram per gram) shisha of 2,5-dimethyl pyrazine in Apple Americano and Spiced Chai, respectively. Spiced Chai also contained 0.5846 ug/g (microgram per gram) shisha of trimethyl pyrazine. Conclusion: Depending on the flavor profile of different shishas, the pyrazine content varies, with more brown, roasted flavors containing both more pyrazines and higher concentrations of them. Due to the effects that pyrazines have on nicotine in the brain, the harmful effects of shisha can vary depending on the flavor and brand of manufacturer. The variability in harmful effects from flavor to flavor prompts the need for stricter regulation on shisha flavors to mitigate the risk to waterpipe tobacco users.

FUNDING: Academic Institution

POS2-99

IDENTIFYING ENDS, CIGARETTE, AND MARIJUANA TRAJECTORY CLASSES USING LATENT GROWTH MIXTURE MODELING

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Significance: There is limited research examining longitudinal patterns of electronic nicotine delivery systems (ENDS) use among young adults, and how ENDS use patterns and predictors of these patterns vary from those for cigarette and marijuana use. This study examined longitudinal patterns/trajectories of ENDS, cigarette, and marijuana use over 4.5 years among college students, and the role of depressive symptoms in these patterns. *Methods*: Participants were 2,264 18-19-year old students from 24 Texas colleges involved in a multi-wave study from 2014-2019. Past 30-day ENDS, cigarette, and marijuana use were assessed at eight waves that were spaced six months apart for first six waves and one year apart for the final two waves. Multinomial logistic regression was used to fit outcome variables (past 30-day ENDS use, cigarette, and marijuana use) using a 3-step maximum likelihood approach. Latent classes (i.e., trajectories) established in these models were regressed on depressive symptoms, assessed by CES-D-10 at baseline, as well as socio-demographic (sex, race and ethnicity, type of college attended) covariates. *Results*: Four-class models for each product were selected and entropy was excellent for ENDS, cigarette and marijuana models (.96, .98, and .96 respectively). The four classes were characterized as: Minimal/No Use, Decreasing, Increasing, and High. For ENDS, young adults with high baseline depressive symptoms were more likely to belong to Decreasing and High trajectory groups relative to the Minimal/No Use group but not the Increasing group. For cigarettes and marijuana, young adults with high baseline depressive symptoms were more likely to belong to Decreasing, Increasing and High groups relative to Minimal/No Use group. *Conclusion*: The findings demonstrate similarities across ENDS, cigarette, and marijuana use trajectories during traditional collegiate years. For all products, there was a group of minimal/non-users, a group who started low and then escalated, a group who started high then decreased, and a group that was consistently high across the 4.5-year period. Young adults with elevated depressive symptoms had an increased likelihood of belonging to all three use trajectories (compared with the minimal/non-use one). Findings point to the need for both prevention and intervention (i.e, cessation programs) efforts that target young adults with higher levels of depressive symptoms. Colleges are an ideal venue through which such efforts should be implemented.

FUNDING: Federal

POS2-100

PERCEPTIONS AND USE BEHAVIORS OF ORAL NICOTINE POUCHES AMONG COLLEGE STUDENTS

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SIGNIFICANCE: Oral nicotine pouches (ONPs) come in a variety of flavors, which may encourage experimentation in nicotine-naive potential users. Adolescent and young adult non-nicotine users have a higher likelihood of experimentation than older adult non-nicotine users, and college students can provide a reflection of these population groups. This study describes ONP-related perceptions and use behaviors in a sample of students at a western university in the US. METHODOLOGY: A cross-sectional survey was conducted among a random sample of students (=18 years) at the University of Nevada, Reno between April-May 2022. Outcomes were awareness, susceptibility to use, curiosity, tobacco/nicotine product ever use (cigarettes/e-cigarettes/ONPs), and ONP harm-perceptions among never users. Logistic regression models were used to investigate factors associated with susceptibility to use and ever use of ONPs. RESULTS: Data from 503 respondents were analyzed. The prevalence of ONP ever use was 12.5%. Among never users of ONPs, 51.1% were aware, 12.7% were susceptible to the use and 21.2% were curious about ONPs. Respondents who recalled seeing advertisements/promotions of ONPs were more likely to be curious about ONPs than those who had not (68% vs 32%, p=0.012); likewise, they were more susceptible to use than those who did not recall seeing them (66.7% vs 33.3%, p=0.047). Common reasons for use among ONP-only users were socializing, flavors and 'less smell'. Further, 50.1% of never users indicated that ONP and e-cigarettes were similarly harmful. Respondents who indicated ONPs were as harmful as combustible cigarettes (OR: 0.37; 95% CI: 0.19, 0.72) had lower odds of susceptibility compared to those with less harmful perception; and ever use of combustible cigarettes was associated with increased odds of ONP susceptibility (OR: 1.95; 95% CI: 1.02, 3.75). In addition, older respondents (=25 vs <25 years) (OR: 3.19; 95% CI: 1.40, 7.30) and e-cigarette ever use (OR: 11.31; 95% CI: 5.72, 22.36) were associated with increased odds of ONP ever use. CONCLUSION: Susceptibility and curiosity about ONPs were relatively high in this sample of college students, similar to findings with other novel nicotine products among young adults. Further, ever use of ONPs was more common among people who have tried other nicotine/tobacco products, specifically e-cigarettes. Monitoring the use behaviors and exposure of the population to ONPs have important implications for product regulation.

POS2-101

THE HEALTH IMPACT OF LIBERALIZING VAPORIZED NICOTINE PRODUCTS MARKET: CANADIAN E-CIGARETTE PROPORTIONAL MULTISTATE LIFE-TABLE MODEL

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Background: As the long-term health effects and harm reduction potential of e-cigarette use are uncertain, different e-cigarette regulations are adopted by different jurisdictions. We aimed to model the health impact of 16 different scenarios of liberalizing vaping products market in the Canadian context, compared to current policies and smoking trends continuing under business-as-usual. Methods: We used a multistate life-table model to estimate the impact of liberalizing vaping products scenarios on life-time quality-adjusted life years (QALYs) for the 2019 Canadian population over the remainder of their lifespan or age 110 years. The 16 scenarios used different relative risks (RRs) of disease incidence for vaping and dual use compared to smoking, differing probability of e-cigarette onset, rate of smoking cessation. Results: Net health benefits were observed for scenarios where RR of vaping was less than 30% that of smoking; RR of dual use was less than 64% that of smoking alone; e-cigarette onset was reduced by half; the rate of smoking cessation was doubled. Under the higher risk scenario (assuming 30% RR of vaping and 92% RR of dual use compared to smoking) liberalizing vaping products

resulted in net lifetime loss of 233,300 QALYs (95% UI -753,800 to 271,500), while the lower risk scenario (assuming 5% RR of vaping and 92% RR of dual use compared to smoking) yielded net lifetime gain of 1,811,400 QALYs (95% UI 388,200 to 3,307,400). Interpretation: Liberalization of vaping might result in substantial health gains conditional on the assumption that vaping causes significantly less than 30% of the harms caused smoking. Under moderate assumptions of risk of vaping changing current policies to decrease e-cigarette initiation, increase smoking cessation or limit youth access to e-cigarettes can also produce net public health gains.

FUNDING: Federal

POS2-102

IDENTIFYING CHARACTERISTIC FLAVORING CHEMICALS IN COOLING AND TOBACCO-FLAVORED E-CIGARETTE LIQUIDS

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Significance: Understanding the characteristic chemicals comprising differing e-liquid flavors including popular varieties of cooling and tobacco-flavored e-liquids may help identify contrasting tastes and therefore appeal among products. Methods: Characteristic flavorings were assessed from menthol (n=23), mint (n=6) and spearmint (n=13) e-cigarette liquids collected from daily vapers. Differences in flavoring chemicals between tobacco varieties were measured between Hyde ("Bold", "Gold" and "Rich"), Juul ("Virginia Tobacco") and Yeti Vape ("RY4 Double") e-liquids. Flavoring chemicals were qualitatively determined using GCMS techniques. Thresholds for unique or shared flavoring detections were established at a minimum of 50% (cooling flavors) or 66% (tobacco-flavor) of samples from at least one cooling flavor or tobacco variety, using Agilent's Mass Profiler Professional (MPP) chemometrics platform. Results: Menthol was present in nearly all menthol, mint, and spearmint flavored e-cigarette liquids. No flavorings were shared between menthol and mint flavors or menthol and spearmint flavors, however, carvone (minty) and WS-23 (minty) were identified in both mint and spearmint flavors. N-propyl benzoate (fruity) and ethyl maltol (caramellic) were unique to mint, while no unique flavoring chemicals were identified in menthol or spearmint flavors. Corylone (caramellic), ethyl maltol (sweet) and acetoin (buttery) were identified in all tobacco brands and flavors, while benzoic acid, vanillin and benzaldehyde were found in 80% of liquids. Benzoic acid methyl ester and vanillin propylene glycol acetal were found exclusively among Hyde tobacco varieties, while the coolant WS-23 was identified in both Hyde Bold and Hyde Gold. Three flavoring chemicals were unique to Hyde Bold while nine and one were unique to Hyde Gold and Hyde Rich, respectively. Five flavorings were unique to Juul Virginia Tobacco and one flavoring was unique to Yeti Vape RY4 Double. Conclusions: Our results indicate menthol continues to be an important ingredient among cooling flavored e-liquids, while other flavorings with similar cooling or sweet sensations, such as carvone and ethyl maltol may be used to differentiate between menthol, mint, and spearmint flavors. Alternatively, ethyl maltol along with corylone are important flavorings among tobacco flavors, while some, such as WS-23 may be unique to specific brands or specific to tobacco varieties within brands.

FUNDING: Federal

POS2-103

PROGRESSION TO INITIATION OF E-CIGARETTES AND COMBUSTIBLE TOBACCO PRODUCTS AMONG ADOLESCENT AND YOUNG ADULT BLUNT USERS

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Background: Little cigars and cigarillos (LCCs) are frequently portrayed by social media influencers as devices used to smoke marijuana ("blunts"). Blunt users may not consider themselves to be tobacco or nicotine users nor understand they are exposed to nicotine through the use of the LCC as a blunt wrapper. The goal of this research is to determine whether adolescent and young adult blunt users who are otherwise nicotine-naïve are more likely to initiate other tobacco products over time compared to those who have never used blunts. Methods: Data were from the Truth Longitudinal Cohort (TLC), a national probability-based sample of youth and young adults (aged 15-24 years). Data were collected from over three waves (Wave 1: February-May 2018; Wave 2: February-May 2019; Wave 3: September-December 2019). The sample was restricted to those who were nicotine naïve at baseline with the exception of ever use of blunts (N=4,594). Logistic regression analyses were conducted to determine whether ever blunts use predicted initiation of tobacco or nicotine products by the final wave of data collection. This study controlled for age, gender, race/ethnicity, sensation seeking tendencies, mental health, and perceived financial situation. Results: Over the study period, 10.5% of the sample (n=483) reported ever using a blunt. Two-thirds (64.6%) of current blunts users at the final wave reported that they were not current LCC or cigar users, despite the fact that blunts are constructed using an LCC. Those who had ever used a blunt at baseline were significantly more likely to initiate every type of tobacco or nicotine product by the final wave of data collection, compared to respondents who had not used blunts at baseline: increased odds were observed for cigarettes (OR: 1.83, (95% CI: 1.36-2.45, p=0.041) cigars (OR: 2.81, 95% CI: 2.14-3.69, p<0.001); and e-cigarettes (OR: 2.60, 95% CI: 2.11-3.19, p<0.001). Discussion: Blunt use among youth and young adults poses a significant risk of later initiation of cigarettes, cigars, and e-cigarettes. A majority of current blunt users do not consider themselves to be cigar users. The results of this study have implications for health communication and surveillance of LCC marketing approaches, particularly over social media.

FUNDING: Academic Institution

POS2-104

SUGAR CONTENT IN TOBACCO-FREE ORAL NICOTINE PRODUCTS

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Significance: Tobacco-free oral nicotine products (ONPs) such as nicotine lozenges and pouches are often marketed with sweet flavors. These products may therefore contain common sugars such as glucose, fructose, and sucrose (conventional table sugar). Increased taste appeal and consumption of ONPs, particularly among youth, could lead to higher nicotine intake and negative health effects associated with sugar, such as diabetes. However, the presence and content of sugars in ONPs are unknown. This project aimed to determine and compare the sugar content in nicotine lozenges and pouches to other consumable products. Methods: A convenient sample of Velo, Lucy, and Rogue nicotine lozenges, as well as Velo, NIC-S, and On! nicotine pouches (n=3, each), with various flavors were purchased online. E-cigarette liquids and cough relief lozenges, (n=3, each) were selected as comparator products. To extract the sugars, an inversion mixer was used to dissolve a single lozenge or mix a single pouch in water. E-liquids were mixed for 1 hour and measured directly. The concentration of D-glucose, D-fructose, and sucrose was measured using a commercially available enzyme-based test kit and ultra-violet (UV) spectroscopy. Extraction and analysis of each product was performed in triplicate and sugar content of lozenges and pouches was calculated based on one consumable unit of each product. Results: None of the nicotine pouches contained quantifiable glucose, fructose, or sucrose. Two nicotine lozenges contained glucose (3.1±0.2 mg/product) and one contained fructose (0.5±0.0 mg/product). Concentrations of glucose among cough relief lozenges were substantially higher where all three contained an average 265.4±10.9 mg/product and one contained 36.3±1.8 mg/product of fructose. One e-liquid contained sucrose (594.3±176.7 mg/L). Conclusions: Our preliminary results indicate conventional sugars such as glucose, fructose, and sucrose are not added to nicotine pouches and are included in limited concentrations in nicotine lozenges. Manufacturers may be using alternative sweetening agents however, such as sucralose, and future studies should be repeated to include additional sugars.

FUNDING: Federal

POS2-105

PEERING THROUGH THE CLOUD: EXAMINING THE RELATIONSHIP BETWEEN NEGATIVE AFFECT, EMOTION REGULATION, AND E-CIGARETTE USE AMONG US COLLEGE STUDENTS

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Significance: E-cigarette use (i.e., vaping) has dramatically increased among US college students in recent years, which has contributed to a rise in concerns about negative health outcomes (e.g., nicotine addiction). While factors associated with vaping have been widely examined, some candidate factors, including ones particularly relevant to college students, have received less attention and pose a gap in research and treatment opportunities. Therefore, we sought to understand the vulnerability of this population by examining the relationship between negative affect, emotion regulation, and vaping. Methods: Participants were 776 college students from a University in New York who were enrolled in a larger study examining psychopathology, substance use, and dysregulation in college students. Assessments included in analyses were self-report measures for depressive thoughts and behaviors (CESD), anger and hostility (BPAQ), emotion dysregulation (DERS), and a self-report measure of e-cigarette use and craving (ASSIST). Subscales from the CESD and BPAQ were combined to create a negative affect latent variable. Structural equation modeling was used to examine how negative affect and emotion regulation were associated with vaping (e-cigarette users: *n* = 110).

Results: Results demonstrated that vaping was significantly associated with negative affect (ß = 0.09, p = .04). Negative affect was also significantly associated with emotion dysregulation (r = 0.83, p < .001). When e-cigarette craving was added to the model, it was significantly associated with both negative affect (ß = 0.11, p = .02) and tended to be associated with emotion dysregulation (ß = 0.08, p = .06). However, emotion dysregulation was also associated with being non-users of e-cigarettes (ß = -.55, p = .017). Conclusion: Experience of negative emotions was shown to be related to vaping in this sample of college students. It is possible that vaping in this sample served as a way to regulate emotions, especially if those negative emotions were partially driven by craving for e-cigarettes. These findings highlight the need for researchers and clinicians to consider the role emotions and vaping to better understand this relationship and potentially help identify important factors when considering vaping cessation/reduction treatments.

FUNDING: Unfunded

POS2-106

CYTOTOXICITY OF AGED FLAVORED E-CIGARETTE LIQUIDS

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Significance: Various flavoring chemicals along with nicotine and solvents (PG/VG) make up flavored e-liquids used in e-cigarettes. With increasing legislation to ban flavored e-cigarette products nationally, users may begin to purchase and store flavored products. This is concerning as long-term stability of flavoring chemicals in e-liquids is unknown. This study aimed to determine how the age of flavored e-liquid solutions affects metabolic activity of exposed respiratory cells. Methods: Lab made e-liquids with commonly used flavoring chemicals; ethyl maltol, furaneol, maltol, and triacetin with a concentration of 1mg/mL and 40mg/mL nicotine, were prepared separately in 50:50 PG/VG. An unflavored PG/VG nicotine control was made using the same concentration nicotine and solvents (Control). To test the effect of degradation, flavored samples were aged at ambient light and room temperature for 24 months (24M). H292 human bronchial epithelial cells were exposed at Air Liquid Interface to eGO e-cigarette vapor from each flavored e-liquid from 24M aged and 0M (fresh) solutions as well as Control. The effects of flavor and age on metabolic activity was determined using a neutral red assay. T-Test were used to compare Control to 24M and 0M. Results: When compared to Control (100%), furaneol and triacetin significantly decreased metabolic activity of cells exposed to aerosols generated from the 24M aged e-liquid (97.2% and 86.9% respectively, p<0.002) compared to aerosols generated from fresh e-liquid vapor (94.7% and 93.5% respectively, p<0.001). When exposed to the aerosol generated from 24M aged solution of maltol, metabolic activity was significantly decreased as compared to the Control (96.8%, p=0.023). All other comparisons were not significant. Conclusions: Old e-liquids may degrade and increase cytotoxicity when aerosolized. Understanding the effect of fresh versus stored flavored e-liquids is important to determine the potential health effects associated with degraded liquids. Implementation of expiration dates or regulation of packaging to reduce exposure to light and heat may be necessary to protect users.

FUNDING: Federal

POS2-107

FREQUENCY OF SOCIAL MEDIA USE AND OPINIONS ON ELECTRONIC VAPOR USE IN FLORIDA'S YOUTH

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Background: Studies have found that most large tobacco brands use social media widely and that youth exposed to tobacco on social media are significantly more likely to report being current users of tobacco products. We examined differences in youth EVP usage and opinions on EVPs based on frequency of social media use. Methods: Data from the 2020 Florida Youth Tobacco Survey (FYTS) was used. The FYTS is an annual survey of public middle and high school students designed to gather information related to thoughts and behaviors on tobacco use, as well as exposure to tobacco products. This analysis focused on youth, ages 11 to 17 (n=8,863). For this study we analyzed questions on youth opinions of EVPs including do EVPs make young people look cool, help people feel more comfortable at parties, relieve stress and that EVP users have more friends. Youth were asked about frequency of use for five social media platforms (Facebook, Instagram, Twitter, Snapchat, TikTok). For this analysis, respondents were grouped as either never/infrequent users (never, every few months, every few weeks) or frequent users (1-2 days week, 3-5 days week, once a day or several times a day). A combined social media variable was created combining youth who responded as being frequent users for at least one social media platform versus those who did not. Prevalence estimates and 95% confidence intervals (CI) were calculated. Results: 75% of Florida youth are frequent users. For all social media platforms, the frequent users were significantly more likely to be ever vapers or current vapers compared to never/infrequent users. Among all social media platforms frequent users were significantly more likely to respond yes to thinking they will be using an EVP anytime soon as well as believing using EVPs make people look cool or fit in. For each social media platform minus Facebook frequent users were significantly more likely to believe using EVPs help people feel more comfortable at parties as well as believing EVPs help people relieve stress. The responses of the remaining questions on opinions of EVPs were varied between the different social media platforms. Conclusions: Frequent social media use appears to have a correlation with EVP use as well as having more positive leaning beliefs towards EVP use. A further look into Florida youth and their exposure to tobacco brands on social media could be helpful for policy efforts.

FUNDING: State

POS2-108

PREDICTIVE FACTORS OF ANXIETY DEPRESSION DISORDERS AMONG SMOKING CESSATION CONSULTANTS IN TUNISIA

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Significance: Mental health problems such as anxiety depression disorders can be an obstacle for the success of the tobacco cessation. That's why identifying these disorders at an early stage in the cessation process should be necessary. The aim of this study was to describe predictive factors of anxiety depressive disorders among smoking cessation consultants Methods: It was a cross sectional descriptive study conducted in the Department of Epidemiology and Statistics in Abderrahmane Mami Hospital in Ariana, Tunisia. Patients were enrolled from December 2019 to August 2021 from the medical consultation of smoking cessation conducted by the tobacco control specialist of the department. All smokers willing to quit and attending the consultation for the first time were eligible to this study. The investigation tool was medical records of the patients. The nicotine dependence was evaluated through Fargestrom scale. Anxiety depressive disorder was based on Hospital Anxiety Depression (HAD) scale. Data were analyzed using SPSS software. Chi square test was used to compare percentages. Logistic regression was conducted to conclude the independent factors of smoking cessation. A threefold of 0.05 was considered significant for all tests. Results: We had records of 150 smokers. Sex Ratio (M/F) = 3.5. Mean number of daily cigarettes was 25 +/- 12. Fargestrom scale was above 7 for 62 smokers (57.4%). Half of our population (54.4%) reported having a personal history of depression. The mean score for depression questions on HAD scale was 8.21 +/- while the mean score for anxiety was 4.92 +/- 4.6. Eighty-six consultants (51.2%) were having HAD score considered as anxiety. Thirty-seven smokers (22.2%) were having depression score on HAD scale. The independent predictive factors for having anxiety depression disorders were having high Fargestrom dependence (AOR=1.238, 95%CI = [1.07-1.6], p=0.036) and having a history of depression (AOR = 2.96, 95%CI = [1.12-7.7], p=0.028). Independent protective factor against these disorders was having a good mood (AOR = 0.7, 95%CI = [0.54-0.9], p = 0.007). Conclusion: This study confirmed that smokers willing to quit may be anxious. Smokers with or suspicious to have anxiety or depression should benefit from a targeted consultation that takes into consideration both items.

FUNDING: Unfunded

POS2-109

ESTIMATING THE IMPACT OF PRODUCT CHARACTERISTICS AND HARM PERCEPTIONS ON SUBSTITUTION AND COMPLEMENTARY USE OF ENDS AND HEATED-TOBACCO PRODUCTS AMONG ADULT CONCURRENT SMOKERS AND ENDS USERS: EVIDENCE FROM A VOLUMETRIC CHOICE EXPERIMENT

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Background: This study addresses the limited evidence of the impact of product characteristics and risk perceptions on demand for and the substitutability of ENDS and heated tobacco products for combusted cigarettes among smokers who have newly begun to use ENDS. Methods: A sample of 318 adult established smokers who recently

initiated/re-initiated ENDS use completed an online volumetric choice experiment (VCE) in 2020-2021 to assess stated preferences for tobacco consumption. Participants were presented five options (three ENDS options: cig-a-like, vape pen or tank, closed pod system; heated tobacco: IQOS; and their usual brand of cigarettes) and asked how many they would purchase in pack equivalent units for consumption over a week assuming their usual budget, with varying characteristics in the following attributes: price, flavor, level of harm, how well the product reduces cravings to smoke, and how discretely the product can be used. Multilevel zero-inflated negative binomial models were used. Results: Cigarettes were preferred over all ENDS and heated tobacco products, though demand for ENDS, but not IQOS, was greater when cigarette prices were higher. Higher prices for ENDS and IQOS did not increase demand for cigarettes. Consumption of ENDS/IQOS was stronger when their harm was stated as low or unknown versus being similar to cigarettes (i.e., very high). The availability of various flavor options was also associated with demand for ENDS/IQOS. Neither how well ENDS/IQOS reduced cravings to smoke nor whether they could be used discretely in public was significantly associated with consumption. Conclusions: Smokers who recently began using ENDS expressed stronger preference for cigarettes but might substitute ENDS for cigarettes when cigarette prices are higher. Policies to increase the cost of combusted cigarettes as well as communicate lower relative harm and low absolute harm of ENDS may facilitate switching behavior.

FUNDING: Federal; Nonprofit grant funding entity

POS2-110

PERCEPTIONS OF CIGARETTE SMOKING AND VAPING AMONG 2SLGBTQI+ YOUNG ADULTS IN ONTARIO AND QUEBEC, CANADA

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Significance: Canadian young adults who identify as Two Spirit, lesbian, gay, bisexual, trans, queer, intersex (2SLGBTQI+) have higher cigarette smoking rates compared to their straight cisgender counterparts. One of the reasons for this trend is the perceived social acceptability of smoking and how it relates to stress, mental health, and social connections. Methods: A sequential mixed-methods study was conducted with qualitative focus groups followed by quantitative survey data collection starting in the spring of 2020, examining perceptions of both smoking and vaping. A total of 11 virtual focus groups were conducted from April to June 2020 via Microsoft Teams. Five focus groups were held in Toronto, Ontario; two in Thunder Bay, Ontario; and four in Montreal, Quebec. A total of 33 participants joined the focus groups. Focus group transcripts were coded in NVivo 12 by two coders using the Ritchie Spencer framework approach. Online survey participants across Ontario and Quebec were recruited from November 2020 until April 2021 with a convenience sample of 1511 participants. Survey data were analyzed in SAS 9.4. Results: Across our data, we found higher social acceptability of vaping compared to smoking in the study sample. Qualitative results showed a strong link between the increase in acceptability of smoking and vaping with coping and social connections, especially with the desire to fit in, start a conversation or take a break. Quantitative results indicated that the perception that smoking acceptability was higher among those who currently smoke, currently vape, are younger, live in smaller cities, identify as a person of colour, with variation by gender and sexual orientation. Vaping was found to be more acceptable among those who currently smoke, currently vape, were younger participants, and have some post-secondary education. Conclusions: Social acceptability of smoking--and vaping in particular--was found to be an important factor when examining the culture of nicotine use in this population. The pervasiveness of vaping in general has impacted 2SLGBTQI+ young adults compared to smoking, which is becoming more stigmatized. This research is important for the development of prevention and cessation programs in addressing both the negative and positive dimensions affecting smoking among 2SLGBTQI+ young adults.

FUNDING: Federal

POSTER SESSION 3

POS3-1

INTEGRATING TOBACCO TREATMENT INTO SUD PEER RECOVERY COACHING: ATTITUDES AND PRACTICES OF PEER RECOVERY COACHES

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Significance: Individuals with substance use disorder (SUD) have high prevalence of cigarette smoking and difficulty quitting. Peer recovery coaches (PRCs; individuals with lived SUD experience) facilitate SUD behavior change in recoverees but it is unknown if/how they address tobacco treatment in SUD recovery coaching. We assessed PRC's tobacco-related practices and attitudes about TT in SUD recovery. Methods: The Tobacco use In Peer-recovery Study (TIPS) was a cross-sectional mixed-methods survey (January-March 2022) of the 26 PRCs employed by a Massachusetts-based healthcare system's 12 SUD treatment clinics/programs. PRCs completed a quantitative survey (n=23/26; 88%) and a telephone-based qualitative interview (n=20/26; 77%). Results: One-third of PRCs reported current smoking, 50% reported former smoking, and 18% never smoked. Among PRCs, 61% reported accompanying recoverees outdoors to smoke, 26% smoked with recoverees, 17% had provided cigarettes to recoverees, 32% used smoking to help build peer-relationships, and 74% rated smoking as socially acceptable in SUD treatment. PRCs reported regularly talking to recoverees about tobacco treatment (65%), believed they should have a role in helping recoverees quit smoking (52%), and were interested in tobacco treatment training (65%). A majority of both nonsmoking and current smoking PRCs (73% vs. 57%) regularly talked to recoverees about quitting smoking. Conclusion: PRCs' attitudes about integrating tobacco treatment into SUD recovery coaching were generally positive and PRCs reported they could have a role in helping recoverees with tobacco treatment. Barriers to integrating tobacco treatment into SUD recovery include use of cigarettes as a peer-recovery tool and high prevalence and social acceptability of smoking in SUD recovery.

FUNDING: Federal

POS3-2

TIMING FOR RECRUITING PREGNANT AND POSTPARTUM WOMEN FOR A SMOKING CESSATION AND RELAPSE PREVENTION TRIAL

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Introduction: Recruiting pregnant and newly postpartum women to participate in clinical research is an ongoing challenge. There are many barriers that prevent this population from engaging with research. One barrier consistently reported by this population is a lack of extra time during the busy and unpredictable pregnant and newly postpartum periods. Given this, we aimed to determine the opportune time to recruit pregnant and postpartum women interested in being smoke-free, immediately after responding to study advertising or months later. Methods: Between December 1, 2021 and May 31, 2022, 207 pregnant and newly postpartum women expressed interest in a smoking cessation and relapse prevention study by clicking a social media advertisement and providing their contact information or by responding yes to a phone call from their healthcare provider's office that they would like to hear more about the trial. Individuals who expressed interest were contacted up to 3 times by either phone, email or text by study staff within 4 weeks. Of the 207 participants, 51 were eligible, 53 were ineligible, 6 stated they were not interested, and 97 were unable to be contacted. For this project we focused on the 97 who we were unable to be contacted. Results: Between July 6, 2022 and July 12, 2022 a phone call attempt was made to the 97 participants who staff were unable to reach with the initial 3 attempts. Of the 97, 51 were left messages that were not returned, 20 told staff they were not interested, 19 were unable to be contacted (phone not in service, unable to leave a message, wrong number), 4 were not contacted (prior notes about exclusionary items), and 3 were interested and phone screened eligible. Of the 3 eligible participants, 1 attended a study enrollment visit. Conclusion: Extending the timeframe for staff to reach out to pregnant and newly postpartum women to accommodate the busy pregnant and newly postpartum time period did not result in an increase in contact, study interest or phone screens resulting in enrollment. Considerable efforts and resources go into recruitment. This is particularly true for studies of pregnant and newly postpartum women who face complex barriers to research participation. More work is needed to better understand and develop novel recruit methods to reach these populations in a way that works for them and their needs.

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POS3-3

TOBACCO AND ALCOHOL USE AMONG PEOPLE WITH HIV (PWH) IN NAIROBI, KENYA

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Significance: Although the majority of PWH in the world reside in sub-Saharan African little is known about the syndemic of tobacco and alcohol use in that region. Methods: The purpose of the study was to describe the pattern of tobacco and alcohol use among PWH in Nairobi, Kenya. Between June-November 2021, tobacco and alcohol use patterns among a convenience sample of fifty PWH tobacco users receiving HIV care(n=36) or HIV care and methadone maintenance (n=14) in Nairobi, Kenya was cross-sectionally assessed. Participants completed structured interviews by trained research assistants using standardized culturally appropriate tobacco use and alcohol use questionnaires. Women (n=25) were intentionally oversampled, since both tobacco and alcohol use are less common in women in Kenya. The study was approved by the local IRB. Results: All participants identified as African with an average age of 40 years (40.3±10.2). Most did not complete secondary school (85%). All participants were engaged in HIV care and reported receiving ART. All reported smoking tobacco. Mean number of cigarettes smoked/day was 8.2±6.9. Fifty-seven percent reported moderate/high nicotine dependence. Nearly all reported drinking alcohol (98%). The mean alcohol use disorder identification test (AUDIT) score was 18.6±9.8 with 84% reported drinking in the hazardous range. Mean number of drinks/month was 12.7±9.2. The AUDIT score demonstrated a positive correlation with nicotine dependence (?=0.32, p=0.03). No differences by gender were found. Conclusion: Tobacco and alcohol use in PWH in Nairobi, Kenya is common. This syndemic may require culturally appropriate and tailored treatment approaches to improve health outcomes.

FUNDING: Federal

POS3-4

CHANGES IN DEPENDENCE OVER TIME AMONG DUAL USERS AND EXCLUSIVE SMOKERS

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Purpose: Nicotine dependence is a multicomponent latent construct, thought to play a critical role in continued tobacco use. With an ever-changing tobacco product landscape and transitions between tobacco products becoming more commonplace, there is a need for an evolving understanding of which facets of dependence change over time, how much they change, and whether these patterns differ as a function of type(s) of product use. Method: Participants (N=389) enrolled in a longitudinal study examining tobacco use transitions and dependence over a 2-year period. Participants were either 1) "Exclusive Smokers" (n=164) who currently smoked 5 cigarettes/day for at least 6 months and denied e-cigarette use in the past 3 months or 2) "Dual Users" (n=225) who reported daily cigarette use for at least 3 months and at least weekly e-cigarette use for the past month. Participants completed measures of tobacco use behavior and dependence at baseline, Year 1, and Year 2 (i.e., FTCD and e-FTCD, WISDM and e-WISDM, and PS-CDI and PS-ECDI). Participants also reported first product used in the morning for 2 weeks via smartphone. Results: From baseline to Year 1, there were no statistically significant changes in cigarettes/day or FTCD score among sustained Exclusive Smokers (n=108), sustained Dual Users (n=100), or Dual Users who converted to Exclusive Smokers (n=90), but WISDM scores were significantly lower at Year 1 than baseline for all 3 groups. Similarly, among sustained Dual Users, all e-cigarette dependence measures decreased from baseline to Year 1, but only the changes in e-WISDM scores were statistically significant. Compared to sustained Dual Users, Dual Users who converted to Exclusive Smokers at Year 1 reported significantly greater change in number of vape events/day (25.64 vs. -1.58, p=.03) but there were no statistically significant differences in changes in any e-cigarette dependence measures. First product used in the morning appears stable over the course of a year among sustained Dual Users. Conclusions: The current study addresses gaps in the existing literature by reporting on changes over time in validated dependence measures and real-time assessments of tobacco product use among exclusive smokers and dual users.

FUNDING: Federal

POS3-5

EFFICACY, SAFETY AND TOXICOLOGY OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ESTXENDS) AS AN AID FOR SMOKING CESSATION, A RANDOMIZED CONTROLLED TRIAL

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Background: Tobacco cigarette smokers who want to quit often switch to electronic nicotine delivery systems (ENDS or e-cigarettes) to reduce their exposure to toxic compounds. We tested the efficacy of ENDS for smoking cessation when added to standard-of-care smoking cessation counseling (SOC) compared to SOC alone and explored the safety and effect of ENDS on measures of exposure to inhaled toxic compounds. Methods: Our pragmatic, open label, randomized controlled trial at 5 study sites in Switzerland randomized persons smoking at least 5 tobacco cigarettes per day and willing to set a quit date in a 1:1 ratio. For 6 months, the intervention group received ENDS with e-liquids plus SOC; the control group received only SOC, including self-purchased of nicotine replacement therapy. After the first in-person counseling visit, participants received phone counseling over two months. Primary outcome was sustained self-reported cigarette smoking abstinence over 6 months, validated by exhaled carbon monoxide at 6-months. Secondary outcomes included serious adverse events (SAE) and urinary measures of inhaled toxic compounds in a subsample of participants, e.g., 1-naphthol, and *N*-acetyl-*S*-(2-carbamoylethyl)-$_L$-cysteine (AAMA). Results: We randomized 1246 participants, and 1242 were included in the intention-to-treat analyses. Six-month follow-up rate was 91% on self-reported smoking status and SAE. Validated sustained abstinence rate at 6 months was 30.0% (n=186) in the intervention group and 16.4% (n=105) in the control group; relative risk (RR): 1.78; 95% confidence interval (CI), 1.44 to 2.20. From baseline to 6-month follow-up visit, 24 (3.8%) participants in the intervention group reported 26 SAE; 30 (4.7 %) in the control group reported 32 SAE (RR 0.81; 95% CI: 0.48 to 1.37). In the subsample of 250 participants with urinary measures, the concentrations of 1-Naphthol and AAMA in those who quit smoking was similar between baseline and 6-month follow-up, whether or not they used ENDS, and significantly lower than in continuing cigarette smokers, independent of ENDS use (p<0.02). Conclusion: Smokers who received ENDS combined with standard-of-care counseling were more likely to quit smoking cigarettes than those who only received standard-of-care. Among participants who quit smoking, levels of toxic compounds were similar in ENDS users and non-users and significantly lower than in ongoing cigarette smokers. Trial Registration: ClinicalTrials NCT03603340

FUNDING: Nonprofit grant funding entity; Other

POS3-6

PREDICTING RESPONSE EFFORT TO USE USUAL BRAND MENTHOL CIGARETTES UNDER A SIMULATED MENTHOL CIGARETTE BAN

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Significance. The hypothetical cigarette purchase task (CPT) is a valid behavioral-economic measure that estimates smoking behavior (demand) under escalating constraints on cigarettes (i.e., price). The goal of this study was to examine how indices from the CPT predict response effort for usual brand menthol cigarettes (UBMC) compared to combustible menthol alternatives in adults who smoke menthol cigarettes. Methods. Eighty menthol cigarette smokers completed a clinical lab study smoking their UBMC and 1 of 3 menthol cigarette alternatives (MCA): a pre-assembled menthol roll-your-own cigarette, menthol filtered little cigar, and non-menthol cigarette. Participants completed the CPT to assess demand after sampling each of the 4 products (Phase 1). Participants then chose their preferred MCA and were instructed to substitute the MCA for their UBMC for one week (Phase 2). At a final lab visit (Phase 3), participants completed a 90-min progressive ratio (PR) task to assess the reinforcing efficacy of their UBMC and preferred MCA. Participants earned two puffs of the MCA by clicking a mouse 10 times and two puffs of the UBMC by clicking a mouse on an escalating response requirement from 10 to 8,400 clicks. Response effort was measured by the total number of clicks. Linear regression models explored associations between demand indices assessed by the CPT and the total clicks in the PR task. Separate models were fit for each demand index, adjusting for preferred study product. Results. Several indices from the UBMC CPT (breakpoint, p=.04; essential value, p=.02; and O_{max}, p=.02) predicted the total clicks in the PR task; intensity and P_{max} were not significantly associated with the total number of clicks. For the MCA CPT, breakpoint (p=.03), essential value (p=.03), P_{max} (p=.04), and O_{max} (p=.03) were significant predictors of the total clicks, but intensity was not. Conclusion. Demand indices of the CPT in general, and indices related to demand persistence (i.e., sensitivity to price) in particular, predicted effort to obtain UBMC puffs on the PR task. Results suggest the CPT is prospectively associated with actualized response effort for UBMC.

FUNDING: Federal

POS3-7

AGE AS A PREDICTOR OF PAIN DURING NICOTINE ABSTINENCE: THE MODERATING ROLE OF PAIN-RELATED ANXIETY

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Older (vs. younger) cigarette smokers report smoking a greater number of cigarettes per day, score higher on measures of cigarette dependence, and are less likely to make a quit attempt. To inform the development of tailored smoking cessation interventions for older adults, it is important to elucidate the effects of age on factors that contribute to the maintenance of smoking. Over the past decade, pain has received increasing clinical and empirical attention as a motivator of smoking behavior and a barrier to cessation. Converging evidence suggests that smokers evince greater pain sensitivity and spontaneous pain intensity during periods of abstinence (vs. continued smoking), and this may motivate ongoing nicotine dependence. Age has been associated with greater pain intensity and reduced pain inhibition, thus there is reason to believe that age may influence pain during abstinence. Therefore, the primary goal of these secondary analyses was to test the hypothesis that age would be positively associated with pain intensity during the early stages of abstinence. A secondary goal was to test whether pain-related anxiety, which has previously been shown to influence pain perception/reporting, moderates the relationship between age and pain during abstinence. Participants included N = 49 adult daily cigarette smokers (42.9% female, M age = 37.3, M CPD = 22.9) who were recruited to participate in a larger study of the effects of smoking abstinence on experimental pain reactivity and were randomized to undergo 12-24 hours of smoking abstinence. Pain-related anxiety was assessed at baseline (PASS-20), and past 24-hour average pain intensity (0-10 NRS) was assessed at baseline (study visit 1) and following nicotine deprivation (beginning of study visit 2, prior to experimental pain induction). After controlling for gender, heaviness of smoking, baseline pain intensity, and PASS-20 scores, older age predicted greater pain during nicotine abstinence ($ß$ = .25, p = .02). Moreover, there was an age by PASS-20 interaction ($ß$ = .71, p = .04), such that the positive association between age and pain during abstinence was stronger among those with higher (vs. lower) levels of pain-related anxiety. These findings suggest that pain intensity during abstinence may increase with age, particularly among smokers with high pain-related anxiety. Interventions designed to mitigate pain during the early stages of quitting may be particularly valuable for this population.

FUNDING: Federal

POS3-8

EFFECTS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) FOR SMOKING CESSATION ON CHANGES IN WEIGHT - SECONDARY ANALYSES OF THE ESTXENDS TRIAL

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Significance: Previous data indicate that nicotine replacement therapy (NRT) moderately reduces post smoking cessation weight gain, a concern of many smokers. We aimed at testing the effect of electronic nicotine delivery systems (ENDS) on weight gain.

Methods: We included participants from an RCT on smoking cessation with ENDS and counseling (intervention group) or counseling with optional NRT (control group) that had body weight measures at baseline and after 6 months. We assessed weight gain in an intention to treat analysis (ITT). We further performed a per-exposure analysis in the intervention group (continuing smokers, quitters, dual ENDS and tobacco users, ENDS-only users with or without nicotine; based on self-reported use within the 7-days before the visit). The linear regression models were adjusted for baseline demographics, weight, use of NRT, cannabis and alcohol use. We applied inverse probability of censoring weights to account for attrition. Results: Among 1,246 randomized participants, 790 (63%) had been weighed after 6 months; median age was 40 (IQR 31 to 52 years), and 431 (55%) identified as men in our sub-study sample. After 6 months, 274 (62%) did not report smoking in the intervention and 148 (43%) in the control group. In the intervention group were 87 (20%) smokers, 48 (11%) quitters (with nobody reporting NRT use), 85 (19%) dual users, 184 (41%) ENDS-only users with nicotine, and 42 (9%) ENDS-only users without nicotine. In ITT analyses, mean weight gain after 6 months was similar in intervention and control groups (1.5kg [95% CI 1.2 to 1.8] vs. 1.8kg [95% CI 1.5 to 2.1], p=0.34). In per-exposure analyses of the intervention group, quitters and ENDS-only users without nicotine gained more weight (2.8kg [95% CI 1.6 to 5.7], p=0.04; 2.9kg [95% CI 2.0 to 5.4], p=0.02) than continuing smokers (1.2kg [95% CI -0.4 to 4.6]). ENDS-only users with nicotine (1.4kg [95% CI -0.6 to 4.2], p=0.77) and dual users (1.0kg [95% CI -0.4 to 4.2], p=0.62) had similar weight gain than continuing smokers. Conclusion: On average, those who were randomized to using ENDS besides counseling for smoking cessation gained weight similarly to those who received counseling alone, though ENDS raised the proportion of quitters, which might encourage smokers worried about weight gain to switch to ENDS. While using ENDS without nicotine was associated with weight gain in quitters, those using ENDS with nicotine had similar weight than continuing tobacco smokers.

FUNDING: Academic Institution

POS3-9

CONTEXTUAL FACTORS ASSOCIATED WITH USE OF EITHER TOBACCO OR ELECTRONIC CIGARETTES IN DUAL USERS

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Little is known about patterns of use in dual users of tobacco and electronic cigarettes (e-cigarettes), especially regarding the factors associated with use of either product in particular situations. Identifying contextual factors that predict product use would enhance understanding of the maintenance of dual product use. The present research employed ecological momentary assessment to collect data on individual instances of tobacco and e-cigarette use to examine associations between contextual factors and instances of use. Daily surveys were sent to participants' smart phones to assess momentary use of tobacco or e-cigarettes and associated context including product legality, availability, craving, the presence of other smokers/vapers, and social disapproval. Each day for two weeks, participants were sent four surveys randomly within a 12-hour period. A total of 102 dual users of tobacco and e-cigarettes were included in analyses. Data were analyzed using hierarchical logistic regression. On average, participants completed 82.8% of surveys - 2,777 tobacco cigarette events and 2,431 e-cigarette events were captured with random surveys. The contexts associated with increased likelihood of using tobacco rather than e-cigarettes included being in the presence of others smokers (OR = 2.74, p < .0001) and experiencing elevated tobacco cigarette craving (OR = 3.51, p < .0001). Decreased likelihood of tobacco over e-cigarette use was associated with smoking restrictions (OR = 0.26, p = .003), the presence of other vapers (OR = 0.46, p < .0001), and experiencing elevated e-cigarette craving (OR = 0.23, p < .0001). The legality of e-cigarettes, social disapproval, and the availability of the alternative product were not significantly associated with use of one product over the other. A measure of dual use levels, which indexed a person's relative frequency of tobacco and e-cigarette use, did not significantly interact with these effects. The results of this study provided novel information regarding dual use patterns in the natural environment by evaluating the relationships between momentary contextual and motivational factors with tobacco and e-cigarette use. The results suggested that dual users may use e-cigarettes as a substitute when there are smoking restrictions. However, in other situations, dual users seem to have exhibited unique motivation for tobacco and e-cigarettes, indicating that dual users may not view these products as interchangeable.

FUNDING: Academic Institution

POS3-10

HOW CAN WE MEET THE NEEDS OF PEOPLE LIVING WITH HIV/AIDS IN A LOW- AND MIDDLE COUNTRY STEPS TAKEN THROUGH A FEASIBILITY STUDY IN BRAZIL

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People Living with HIV (PLWH) are considered an underserved population concerning tobacco cessation given the high prevalence of tobacco use compared to the general population and the lack of evidence-based tobacco cessation programs tailored to PLWH, particularly in low and middle-income countries (LMCIs). Although it has been well established that a combination of cognitive behavioral therapy (CBT) and pharmacological management is efficacious in promoting tobacco cessation across diverse populations, these evidence-based treatments have not proven to be effective/efficacious (or even accessible) among some subpopulations suffering disproportionally from tobacco-related morbidity and mortality. Our formative assessments with all involved stakeholders pointed to a CBT (delivered by a Clinical Psychologist) + pharmacotherapy (delivered by a Pulmonologist) through the specialized public health center where PLWH receive their care. The pharmacological intervention consisted of Nicotine Replacement Therapy and/or Bupropion since these are the pharmacological aids available through the public health system and they were offered to all participants. While in high income countries the delivery of a cognitive behavioral intervention by clinical psychologists may not be cost-effective, these professionals are being under-utilized in Brazil, which represent as great opportunity to develop a capacity building program for these professionals and integrate them within health care delivery in the context of tobacco cessation. This presentation will focus on training of clinical psychologists, lessons learned, and preliminary process and outcome results as we conducted detailed treatment fidelity and scalability assessments (acceptability, feasibility, potential reach and adoption, alignment with the strategic context) to inform a full-scale efficacy trial. To date, 25 individuals were enrolled, 16 men with a mean age between 30-65 years. Of these, 12 completed three months of follow-up and another eight individuals are still in the first evaluation phase. Five individuals completed 6 months of follow-up. The overall goal of this feasibility study was to make adaptations to these evidence-based approaches, and develop, implement, and evaluate the feasibility and scalability of a theory-based, culturally relevant tobacco cessation intervention for PLWH receiving care through the public health system in a southern town in Brazil (Londrina).

FUNDING: Federal

POS3-11

POLY-NICOTINE USE AMONG INDIVIDUALS WITH MINORITIZED SEXUAL IDENTITIES: IN THE 2020 NATIONAL HEALTH INTERVIEW SURVEY (NHIS).

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Significance: Adolescents and young adults with minoritized sexual identities have been shown to use a greater number of nicotine/tobacco products relative to their straight peers, limited research has examined these relations among adults. The goals of this study were to examine whether adults with minoritized sexual identities were more likely to report poly-nicotine use than adults identifying as straight, and to examine whether associations between sexual identity and poly-nicotine use differed as a function of sex. Methods: Data was drawn from the 2020 National Health Interview Survey (NHIS). The sample included N = 5,214 adults (60% male, 78% white) aged 18 and older who endorsed current nicotine/tobacco use (i.e., current every or someday use of at least one nicotine/tobacco product). Recommended population weights were utilized in all analyses. Poly-nicotine use was defined as current every or someday use of 2 or more products. Results: Examination of weighted prevalence rates revealed that 27.3% of gay/lesbian and 22.7% of bisexual adults endorse poly-nicotine use, compared to 16.9% among straight individuals. After adjusting for relevant sociodemographic variables, sexual identity was associated with greater odds of poly-nicotine use among female nicotine/tobacco users (p < .05), such that those who identified as bisexual were more than twice as likely to endorse current poly-nicotine use in comparison to their straight counterparts (OR = 2.40). Sexual identity was not associated with poly-nicotine use among males (p > .05). There was also no association between sexual identity and type of nicotine/tobacco product used (ps > .05). Conclusion: Poly-nicotine use is highly prevalent among nicotine/tobacco users with minoritized sexual identities, and females may experience disproportionate sexual identity-related disparities in nicotine use. In the current study, females who identified as bisexual had the greatest odds of

using two or more products. Prior work has demonstrated positive covariation between multiple product use and greater nicotine dependence/exposure. Future research should examine systematic and structural determinants (e.g., lack of access to care, provider bias) that may contribute to multiple nicotine product use among individuals with minoritized sexual identities.

FUNDING: Federal

POS3-12

FACTOR STRUCTURE AND MEASUREMENT INVARIANCE OF THE REVISED FAGERSTRÖM TEST FOR CIGARETTE DEPENDENCE (FTCD-R) IN A SAMPLE OF NEAR-DAILY TO DAILY SMOKERS

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SIGNIFICANCE: Numerous studies have investigated the factor structure of the original Fagerström Test for Cigarette Dependence (FTCD, previously known as the Fagerström Test for Nicotine Dependence), and some prior work has also investigated the measurement invariance of the FTCD. To our knowledge, however, the revised FTCD (FTCD-R, previously known as the FTND-R) has only been factor analyzed in its initial development study, and no previous study has tested the FTCD-R for measurement invariance across sex. METHODS: Near-daily to daily smokers (N = 860; mean age = 38.5 years; 69.9% daily smokers) were recruited through Amazon Mechanical Turk. Participants completed demographic items, a smoking status item, and the FTCD-R. Data first was randomly partitioned into two subsets: one (n = 429) for exploratory factor analysis (EFA) and another (n = 431) for confirmatory factor analysis (CFA). The entire dataset then was used to test for measurement invariance across sex (male = 459, female = 401). Robust unweighted least squares estimation was used to conduct EFA and CFA, and to test for configural, metric, and scalar invariance across sex. RESULTS: EFA indicated that a two-factor model was the best fit for the data, and CFA further supported the same two factors as providing the most parsimonious representation of the data. These two factors, each consisting of 3 items, could be called Morning Smoking (involving a preference for smoking in the morning versus other times of day) and Persistent Smoking (involving the persistence of smoking regardless of the context or time of day). Additionally, current results evidenced the configural, metric, and scalar invariance of the FTCD-R across sex. CONCLUSIONS: The present study is among the few to evaluate the factor structure of the FTCD-R, and is the first study to test the measurement invariance of the FTCD-R across sex. Furthermore, this study extends factor analysis of the FTCD-R to a non-treatment-seeking sample of cigarette smokers. Though preliminary, the FTCD-R appears to be a two-factor measure of cigarette dependence severity that is invariant across sex.

FUNDING: Academic Institution

POS3-13

DOES LAB-BASED ASSESSMENT OF THE REINFORCING VALUE OF SMOKING PREDICT THE ABILITY TO QUIT SMOKING?

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Significance: Individual differences in smoking reinforcement (i.e., the value of a cigarette compared to a neutral cue) are theorized to influence the ability to quit smoking. Lawson et al. (2021) recently reported that laboratory-assessed smoking reinforcement was attenuated by varenicline (VAR). The present study extends this work by directly evaluating linkages between smoking reinforcement and smoking cessation. Specifically, we tested whether (a) pre-treatment baseline smoking reinforcement and (b) change in smoking reinforcement from baseline to the 3rd week of treatment predicted subsequent bio-verified abstinence. Methods: Participants were 253 adults reporting smoking 5+ cigarettes/day, enrolled in a randomized, double-blind, placebo-controlled cessation trial (NCT03262662). Lab visits occurred 1 week before treatment began (baseline) and after ~3 weeks of treatment with VAR or placebo. Participants were asked to abstain from cigarettes overnight before each lab visit, during which they completed a 36-trial choice paradigm (CBUCC; Gass & Tiffany, 2017). During each trial, participants could spend $0.01-0.25 ($9.00 total) to have a corresponding chance (5%-95%) to sample the cue (cigarette, food choice [not analyzed], or water) presented. All participants received VAR treatment during Weeks 4-15 and were asked to quit smoking at the end of Week 4. Cotinine-bio-verified (<15ng/mL) 7-day point-prevalence abstinence was assessed at Weeks 6, 8, 15, and 29. Relationships between smoking reinforcement (baseline and change between lab visits) and abstinence were examined in logistic regressions for each abstinence timepoint, controlling for treatment group and gender and including all interactions. Results: As predicted, greater baseline smoking reinforcement predicted lower odds of abstinence at Week 29, and earlier time points evidenced trends in the same direction (ORs=.04,.11,.08, and .02, ps=.07,.17,.12, and .04, for Weeks 6, 8, 15, and 29). However, the reduction in smoking reinforcement across pre-quit lab visits did not predict abstinence (ORs=.09 to 11.30, ps>.25, for Weeks 6-29). Conclusions: The present results are generally consistent with the hypothesis that individual differences in pre-treatment smoking reinforcement predict abstinence. However, the lack of a significant relationship between pre-quit change in smoking reinforcement and abstinence suggests that reinforcement may not be the primary mechanism by which VAR preloading works.

FUNDING: Federal; Pharmaceutical Industry; Academic Institution

POS3-14

RACIAL-ETHNIC DISPARITIES IN THE EFFECT OF SMOKING DURING PREGNANCY ON PERCEPTIONS OF FAMILY FUNCTIONING

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Introduction. Despite links between family/relationship functioning and smoking behavior, existing smoking cessation interventions in the general adult population targeting social support show limited integration of family and relational theories. While previous literature has shown differences by racial/ethnic identity in smoking during pregnancy, few studies have examined differences in perceived family functioning. Methods. Participants were pregnant women (N=355, M_{age}=26 years, 57% ethnic/racial minorities) from three prenatal cohorts over-sampled for prenatal smoking. Participants completed the Family Assessment Device (FAD; a self-report assessment of family functioning across seven dimensions: General Functioning, Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, Behavior Control). Smoking during pregnancy was assessed using Timeline Followback and verified with salivary cotinine. Descriptive and multivariate analyses (controlling for sociodemographic factors) were used to investigate the impact of prenatal smoking status (smoking, quit, none) on perceived family functioning (FAD dimensions) overall and by ethnic/racial minority identity. Results. Overall, 30% of participants smoked throughout pregnancy, 22% quit during pregnancy, and 48% did not smoke. There was a significant effect of prenatal smoking status on perceived family functioning (p=.003), specifically relating to General Functioning (p=.001), Roles (how responsibilities are allocated; p<.001), Affective Involvement (comfort in being involved with and showing interest in each other; p=.017), and Behavior Control (how expectations, rules, and consequences are established; p=.006). Stratifying by ethnic/racial minority identity revealed a significant impact of prenatal smoking status among minoritized women (p=.013), specifically relating to General Functioning (p=.003), Roles (p=.001), and Behavior Control (p=.017) - with no significant effect of prenatal smoking status among non-Hispanic, White women (p=.521). Conclusions: Women who smoked at some time during pregnancy reported poorer perceptions of family functioning than those who did not smoke, with the most pronounced impact of smoking in minoritized women. Results highlight the possibility that integration of a family function component could improve the efficacy of smoking cessation interventions during pregnancy. Assessment of family function by obstetric care providers is also warranted.

FUNDING: Federal

POS3-15

ANXIETY SYMPTOMS AND ANXIETY SENSITIVITY IN RELATION TO CIGARETTE DEPENDENCE, PERCEIVED BARRIERS FOR SMOKING CESSATION AND QUIT PROBLEMS AMONG ADULT LATINX SMOKERS

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Significance: Cigarette smoking is associated with adverse physical and mental health among Latinx adults in the United States. The present investigation sought to explore the main and interactive effects of anxiety symptoms and anxiety sensitivity in relation to cigarette dependence, perceived barriers for smoking cessation, and severity of problems experienced when quitting among adult Latinx smokers. Methods: Participants included 338 Latinx adult daily cigarette smokers (Mean age = 35.53 years; SD = 8.65; age range 18-61; 37.3 percent female). Results: Results indicated that anxiety symptoms were associated with greater cigarette dependence, severity of problems when quitting, and perceived barriers for smoking cessation (effect size range: 2 - 3

percent of variance), whereas anxiety sensitivity was related to severity of problems when quitting and perceived barriers for smoking cessation (effect size range: 2 - 3 percent of variance). There was also a statistically significant interaction between anxiety sensitivity and anxiety symptoms for cigarette dependence; anxiety was related to cigarette dependence for Latinx smokers with higher levels of anxiety sensitivity, but not for those with lower levels of anxiety sensitivity. Conclusion: Overall, the present findings indicate that anxiety symptoms and anxiety sensitivity are relevant factors for better understanding cigarette dependence, problems experienced when trying to quit, and perceptions of barriers to quitting among adult Latinx smokers. Funding Sources Research reported in this abstract was supported by the National Institute on Minority Health and Health Disparities (NIMHD) of the National Institutes of Health (NIH) to the University of Houston under Award Number U54MD015946. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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POS3-16

ASSOCIATIONS OF ANXIETY SENSITIVITY WITH E-CIGARETTE DEPENDENCE SEVERITY AND NEGATIVE REINFORCEMENT VAPING MOTIVES: MODERATION BY POSITIVE AND NEGATIVE URGENCY

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SIGNIFICANCE: Anxiety sensitivity (AS; fear of anxiety/arousal-related experiences) and positive and negative urgency (PU and NU; the tendency to act impulsively during positive and negative affect, respectively) have often been investigated in relation to cigarette smoking, but little research has examined AS, PU, and NU in relation to e-cigarette use. In particular, no prior study has investigated if individuals with higher levels of both AS and PU/NU may be more prone to vaping for negative reinforcement (NR) and developing e-cigarette dependence. Given that AS is closely related to negative affect (and not positive affect), we hypothesized that the relationship between AS and e-cigarette use would be strengthened at higher levels of NU, but would not be moderated by PU. METHODS: Young adult e-cigarette users (N = 510; 18-35 years old; 44.3% female) completed self-report measures of AS, PU, NU, e-cigarette dependence severity, and NR vaping motives. Regression analyses were conducted to test PU and NU as potential moderators of AS associations with e-cigarette dependence severity and NR vaping motives (adjusted for cigarette dependence severity, neuroticism, and the other form of urgency). RESULTS: AS associations with e-cigarette dependence severity were significantly moderated by PU and NU (beta = .09-.11, p = .015-.004), such that the relationship between AS and e-cig dependence was stronger at higher versus lower levels of PU and NU (at +/- 1 SD, beta = .27 for both versus beta = .05-.09, respectively). AS associations with NR vaping motives were also significantly moderated by PU and NU (beta = .18 for both, p < .001), such that the relationship between AS and NR vaping motives was stronger at higher versus lower levels of PU and NU (at +/- 1 SD, beta = .55-.58 versus beta = .18-.21, respectively). CONCLUSIONS: Current findings suggest that AS and PU/NU may interact in increasing risk for problematic patterns of e-cigarette use. This was anticipated in regard to AS and NU, as individuals more reactive to anxiety and more impulsive in response to negative affect may have a stronger inclination to use nicotine via e-cigarette in an attempt to alleviate negative affect (e.g., anxiety). In regard to AS and PU, however, this is more difficult to explain, though it is possible that high-AS individuals may also tend to be more reactive to intense positive affective states (e.g., excitement) as part of a general sensitivity to internal bodily sensations.

FUNDING: Academic Institution

POS3-17

REAL-TIME PREDICTORS OF CANNABIS VS. CIGARETTE USE AMONG YOUNG ADULTS WHO ENGAGE IN DUAL USE: AN INVESTIGATION USING ECOLOGICAL MOMENTARY ASSESSMENT (EMA) DATA

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Background: Dual use of cigarettes and cannabis is common. However, situational antecedents of cannabis compared to cigarette use are poorly understood, particularly in naturalistic settings as use occurs. We used Ecological Momentary Assessment data collected from young adults, who regularly used both products, to investigate real-time antecedents of cannabis vs. cigarette use. Methods: This study analyzed 947 cannabis (57%) and cigarette use (43%) observations collected in a 30-day EMA study among 32 diverse young adults (aged 18-30; 34% cisgender female, 9% transgender/non-binary; 66% sexual minority; 44% non-Hispanic White) in California, who regularly used cigarettes and cannabis. Participants were recruited online and instructed to report every time they used cannabis or smoked a cigarette (immediately before using), and a subset of up to 2 of these reports per product per day triggered an EMA survey prompt. Generalized Estimating Equation (GEE) models examined situational antecedents of cannabis vs. cigarette use, including affect, location, activity, and social context, controlling for situational confounders. Results: Compared to cigarette use, cannabis use was more likely when participants reported higher positive affect (aOR=1.2; 95% CI 1.0, 1.4), being at home (aOR=2.2; 95% CI 1.2, 3.9), inactive (aOR=2.1; 95% CI 1.2, 3.6), with family members (aOR=3.6; 95% CI 1.4, 9.5) or with a romantic partner (aOR=2.0; 95% CI 1.3, 3.2), and when reporting higher levels of being intoxicated or drunk (aOR=1.2; 95% CI 1.0, 1.5). In contrast, cannabis use was less likely compared to cigarette use when participants were at the workplace (aOR=0.5; 95% CI 0.3, 0.9), in public transit (aOR=0.5; 95% CI 0.3, 0.9) or walking between places (aOR=0.5; 95% CI 0.3, 1.0), between activities (aOR=0.7; 95% CI 0.5, 1.0), alone (aOR=0.5; 95% CI 0.3, 0.7), or had recently experienced discrimination (aOR=0.6; 95% CI 0.4, 0.9). Conclusions: This study is among the first to investigate real-time antecedents of cannabis compared to cigarette use among young adults who use both products. Results in this sample suggest that cannabis is used in more enjoyable, social, and private contexts, while cigarettes seem to be used to demarcate, fill, and structure time in daily life, and to cope with stressors such as discrimination. Findings can inform development and delivery of mobile health interventions for cannabis and tobacco use among young adults and suggest that tailored intervention content that addresses the unique antecedents for different products may be needed.

FUNDING: Federal; State

POS3-18

MEASURING E-CIGARETTE AND OTHER TOBACCO USE DURING PREGNANCY USING ECOLOGICAL MOMENTARY ASSESSMENT

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Introduction: Electronic nicotine delivery systems (ENDS, e-cigarettes) are the second most prevalent tobacco product used during pregnancy and are often perceived as a harm reduction tool. While the negative neonatal outcomes associated with smoking combustible cigarettes are well-established, no studies have examined ENDS use and dual use of ENDs with other combustible tobacco products longitudinally over the course of pregnancy. Method: This study examined pre-natal ENDS and other tobacco use in 29 currently pregnant women (n = 6 ENDS-only users at baseline; n = 6 dual users of ENDS and another tobacco product at baseline; and n = 17 non-tobacco users) recruited in Oklahoma City. For 3 months, women completed once daily smartphone-based surveys of tobacco, substance use, and other health behaviors. Results: Daily survey compliance rates were 72% for three months of ecological momentary assessment (EMA). Non-users were slightly older than ENDS and dual-users (Mean age 29.3 vs 26.5 and 27.3, respectively). ENDS-only users at baseline reported using an ENDS on 50.7% of EMA days and cigarettes on 23.3% of the EMA days. Dual users reported using an ENDS on 37.3% of the days and cigarettes on 24.2% of the days. Baseline ENDS-only users reported using ENDS within 5 minutes of waking on 78% of the days when ENDS were used, indicating high dependence; whereas dual users reported ENDS use within 5 minutes of waking on 55.7% of the days when ENDS were used. Number of cigarettes smoked per day (3.5 vs 3.2) and number of ENDS puff per days (39.5 vs 37.7) were roughly equal across ENDS-only and Dual users, respectively. Conclusions: This pilot study demonstrates the feasibility of recruiting and retaining pregnant women into a longitudinal EMA study, to assess tobacco use behavior for an extended period of time, and to capture near daily measurements of tobacco use in pregnant women. Data revealed that assessments of tobacco use at baseline are not "fixed", but fluctuate, as our ENDS-only group reported some CC use over the EMA days. ENDS may be used as substitutes for cigarette during pregnancy and their risks and benefits should be addressed during provider visits.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS3-19

ASSOCIATIONS OF HOUSEHOLD SMOKING AND SMOKING INTENSITY ON LONG-TERM ABSTINENCE OF PREGNANT MOTHERS IN A REAL-WORLD SETTING

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Significance: Prior research has demonstrated an adverse effect of household smoking on both maternal and perinatal outcomes; however, the extent to which it affects maternal smoking in a real-world setting needs further investigation to assist pregnant women more effectively in their perinatal quit attempts. This retrospective cohort study uses real-world effectiveness data from a maternal smoking cessation program to examine associations between maternal smoking, household smoking, maternal smoking cessation, and long-term abstinence. Methods: Low-income pregnant smokers were recruited into the Comprehensive Tobacco Treatment Program from 2012 to 2019; offered a multi-component program of knowledge sharing, motivational interviewing, goal setting, weekly testing, and incentives; and followed two to nine months after program end. The 1,396 participants who responded to questions about household smokers were analyzed with one-way ANOVA with Welch test and Pearson Chi-square for differences in maternal characteristics and logistic regression for differences in abstinence at program end and at two to nine months of follow-up by the presence of other household smokers. Results: Over half of participants reported another household smoker. Among the 733 participants who reported another smoker in the household, 440 (60.0%) reported that their partner smoked, 144 (19.6%) reported that at least one non-partner smoked, 7 (1.0%) reported that both a partner and at least one non-partner smoked, and 142 (19.4%) declined to state who else smoked. Younger women, non-Hispanic women, women who enrolled earlier in pregnancy, and women who smoked more at enrollment were more likely to report another household smoker. If there was another household smoker, the odds ratio for abstinence was 0.653 at end of the program (p<.001), 0.639 at two- to four-month follow-up, 0.637 at six-month follow-up, (p<.001), and 0.333 at nine-month follow-up (p<.001). Conclusions: Pregnant smokers in San Bernardino County are likely to live in households with other smokers, a risk factor that significantly decreases the likelihood of quitting during pregnancy or maintaining long-term abstinence. More research is needed to understand how exactly household smoking mediates maternal smoking. The development of household-level programs with demonstrated real-world effectiveness is vital for pregnant women to achieve and maintain long-term abstinence.

FUNDING: Federal; State; Nonprofit grant funding entity

POS3-20

TRAUMATIC INSTRUSIONS AND TRAUMATIC AVOIDANCE ARE DIFFERENTIALLY ASSOCIATED WITH E-CIGARETTE DEPENDENCE SEVERITY AND NEGATIVE REINFORCEMENT VAPING MOTIVES

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SIGNIFICANCE: A substantial literature has evidenced that individuals with post-traumatic stress disorder (PTSD) may be at greater risk of developing tobacco dependence and often report negative reinforcement (NR) motives for cigarette smoking (i.e., smoking to reduce negative affect). Some research has also evidenced that certain PTSD symptom clusters (e.g., intrusions) may be associated with cigarette dependence and NR smoking motives. Despite the popularity of electronic cigarettes (e-cigarettes) among young adults, however, to our knowledge PTSD symptoms thus far have not been investigated in relation to e-cigarette dependence severity and NR vaping motives in this population. Hence, we sought to examine potential associations of traumatic intrusion and avoidance symptoms with e-cigarette dependence severity and NR vaping motives among young adults. METHODS: Young adult e-cigarette users (N = 510; ages 18-35; 44.1% female; 70.4% non-Latinx White, 19.6% Hispanic/Latino) were recruited through Amazon Mechanical Turk and completed self-report measures of PTSD symptoms, e-cigarette dependence severity, and NR vaping motives. Linear regression analyses were conducted to examine whether traumatic intrusions and traumatic avoidance were associated with e-cigarette dependence severity and NR vaping motives (adjusted for sex, Latinx ethnicity, anxiety and depressive symptoms, and combustible cigarette dependence severity). RESULTS: Traumatic intrusions were significantly associated with NR vaping motives (beta = .32, p < .001, semi-partial correlation squared = .041) but were not significantly associated with e-cigarette dependence severity (beta = .09, p = .16). In contrast, traumatic avoidance was significantly associated with both e-cigarette dependence severity (beta = .16, p = .009, semi-partial correlation squared = .012) and NR vaping motives (beta = .40, p < .001, semi-partial correlation squared = .073). CONCLUSIONS: Findings suggest that young adults experiencing PTSD symptoms may be more prone to using nicotine via e-cigarette to cope with negative affect and further may be at higher risk of developing more severe e-cigarette dependence. Notably though, traumatic avoidance was associated with both NR vaping motives and e-cigarette dependence severity, whereas traumatic intrusions were only associated with NR vaping motives. Thus, it is possible that traumatic avoidance symptoms may pose greater vulnerability to unhealthy patterns of e-cigarette use.

FUNDING: Academic Institution

POS3-21

DECLINING TREND IN CIGARETTE SMOKING AMONG U.S. ADULTS OVER 2008-2018: A DECOMPOSITION ANALYSIS

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Introduction: Cigarette smoking prevalence among U.S. adults declined from 20.6% in 2008 to 13.7% in 2018. Decomposition of trend can provide insight into which socio-demographic characteristics contributed most to this decline by partitioning it into two components: reduction in propensity to smoke and changes in population composition. Insight into the former can provide actionable avenues for tobacco control to target efforts at specific population sub-groups. Method: Data were obtained from the nationally representative annual cross-sectional National Health Interview Surveys, 2008 and 2018, of U.S. adults (18+). We applied threefold Oaxaca-Blinder linear decomposition analysis based on linear probability model of individual smoking behavior to quantify specific contributions of socio-demographic characteristics of population (e.g., sex, age, race/ethnicity, education, marital status, employment status, health insurance coverage, family income, and region of residence) to the overall reduction in cigarette smoking prevalence. This method isolates the contribution of the reduction in propensity to smoke in different population sub-groups from the changes in population composition and the interaction of changes in population composition and smoking propensity over time. Further decomposition analysis was applied to identify the contribution of these factors through the pathways of decrease in smoking initiation and increase in successful smoking cessation. Results: Decreases in smoking propensities regardless of the changes in population composition were responsible for 60.3% of the reduction in overall smoking prevalence, 74.3% of the reduction in smoking initiation and 82.8% of the increase in successful smoking cessation. The decrease in smoking prevalence was largely explained by the reduction in smoking propensity among non-Hispanic whites, lower-educated, and young adults (18-24). Most of the decrease in smoking initiation was explained by the reduction in smoking initiation among the lower-educated, non-Hispanic whites, and individuals with family income at 100-200% of the federal poverty line (FPL). The major drivers of the increase in successful smoking cessation included increased cessation among non-Hispanic whites, adults aged 25-44 years, and individuals with family income above 400% of the FPL. Conclusion: Reduction in smoking propensity among non-Hispanic whites, lower-educated, young adults, and lower-income persons played the most important role in reducing cigarette smoking prevalence. Persistence of higher than average smoking propensity and/or slowing down of the decline in smoking propensity among certain population sub-groups can stall or even reverse the progress. Targeted interventions are necessary to accelerate the reduction in smoking propensity in the disadvantaged groups and eliminate smoking disparities.

POS3-22

DEPRESSIVE SYMPTOMS AS A TARGET FOR HEALTH EQUITY IN PRENATAL CIGARETTE USE

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Significance. Although rates of prenatal tobacco use have decreased over time, the rate of decline has been slower among Black people. Prenatal depressive symptoms, cannabis use, socioeconomic hardship and overweight and obesity are all more prevalent in individuals who are Black, compounding their risk for prenatal tobacco use. The goal of this analysis was to examine prenatal depressive symptoms and cannabis use as modifiable factors related to prenatal smoking in a sample of pregnant people with overweight and obesity. Methods. Pregnant people with a body mass index over 25 were recruited early in pregnancy (N = 315, 26% Black) for a sequential multiple assignment randomized trial investigating perinatal lifestyle interventions, the HABIT study (HL132578). At baseline, HABIT participants self-reported sociodemographic factors, prior and current use of tobacco and cannabis, and partner smoking. Depressive symptoms were measured with the Edinburgh Postnatal Depression Scale (using a cutoff of 12 to indicating clinically significant depressive symptoms). A logistic

regression examined associations between depressive symptoms, cannabis use, and prenatal cigarette use, controlling for race, partner smoking, and socioeconomic status. Results. One in ten HABIT participants reported prenatal cigarette use and 7% (n = 22) were daily smokers. In bivariate analysis, prenatal tobacco use was correlated with prenatal cannabis use, depressive scores, Black race, and socioeconomic status. In the final regression model, depressive symptoms remained significantly associated with prenatal tobacco use, even after controlling for the other risk factors. Moreover, there was a significant interaction of depressive symptoms and socioeconomic status such that depressive symptoms predicted prenatal smoking only among those with higher socioeconomic status. Conclusions. The results of this study highlight the complex relations among depressive symptoms and prenatal tobacco use among individuals with overweight and obesity. Black race was not a correlate of prenatal smoking after controlling for indicators of socioeconomic disadvantage and cannabis use. However, Black participants and those with lower socioeconomic status had higher depressive symptoms. Thus, targeting depressive symptoms during pregnancy is likely to result in better long-term smoking cessation outcomes for marginalized people, improved health outcomes, and a reduction in tobacco-related health disparities.

FUNDING: Federal

POS3-23

TEXAS TOBACCO QUITLINE KNOWLEDGE, ATTITUDES, AND PRACTICES WITHIN BEHAVIORAL HEALTHCARE SETTINGS

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Significance: Patients with behavioral health conditions (BHCs; i.e., mental illness and/or substance use disorders) have disproportionately high tobacco use rates (>50%) compared to the general population (~13%). Despite that patients with BHCs have an interest in quitting smoking, they experience significant access barriers to evidence-based tobacco cessation services. Tobacco quitlines, which offer tobacco cessation services over the phone/web, improve access. Quitlines are a simple and effective way for healthcare centers to connect patients with BHCs to cessation services, yet they are underutilized. Here, we identify knowledge of, attitudes toward, and practices regarding use of the Texas Tobacco Quitline (TTQL) within healthcare settings in Texas that see patients with BHC. Methods: Data were pulled from a 2021 statewide tobacco control needs assessment. Respondents (n=125) represented 23 Federally Qualified Health Centers, 29 global local mental health authorities (LMHAs), 12 substance use treatment programs in LMHAs, and 61 standalone substance use treatment centers. Responses were analyzed using descriptive statistics. Results: Knowledge-Over half of respondents (62.4%) were familiar with the TTQL. Almost three-quarters (72.8%) knew that services were offered in English and Spanish, but only half of respondents (49.6%) knew that the TTQL provides nicotine replacement therapy to some callers. Attitudes-Over half of respondents (63.2%) believed that the TTQL is helpful to patients who want to quit. However, only about a quarter of respondents indicated that they have had good experiences with (27.2%), or that patients have had good experiences with (24.8%), the TTQL. Practices-Few respondents (12.0%) indicated that their center had an electronic referral system with direct TTQL referral capacity, about half (52.0%) indicated that their center suggested that they refer tobacco users to the TTQL. Conclusion: These findings have at least three implications: 1) there is significant room for provider education in settings where BHC patients are seen about the TTQL and its services; 2) there is a need to better understand healthcare centers'/patients' negative experiences with the TTQL to identify areas for service improvement; and 3) top-down and systems-level changes are necessary wherein healthcare settings promote the TTQL as a first-line treatment for tobacco use, and invest in electronic health record integration supporting TTQL direct referrals.

FUNDING: State

POS3-24

SMOKING CESSATION INTERVENTIONS AND ABSTINENCE OUTCOMES FOR PEOPLE LIVING IN RURAL, REGIONAL, AND REMOTE AREAS OF THREE HIGH-INCOME COUNTRIES: A SYSTEMATIC REVIEW

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Significance: Tobacco smoking rates in high-income countries are greater in rural, regional, and remote (RRR) areas compared to cities. Yet, there is limited knowledge about interventions targeted to RRR smokers. This review describes the effectiveness of smoking cessation interventions for RRR smokers in supporting smoking abstinence. Methods: Seven academic databases were searched (inception-June 2022) for smoking cessation intervention studies to include if they reported on RRR residents of Australia, Canada, or the United States, and short-term (<6 months) or long-term (=6 months) smoking abstinence outcomes (e.g., biochemically validated). Two researchers assessed study quality, and narratively summarised findings. Results: The 26 included studies were primarily randomised control (12) or pre-post-test (7) designs, from the United States (16) or Australia (8). Interventions all included smoking cessation education or brief advice, and few included nicotine monotherapies, cessation counselling, and very few used motivational interviewing or cognitive behavioural therapy. Interventions generally had limited short-term effect on RRR smoking abstinence, and this decreased markedly beyond 6-months. Short-term abstinence was best supported by contingency, incentive, and online cessation interventions, and long-term abstinence by those incorporating pharmacotherapy. Conclusions: Cessation interventions for RRR smokers should include pharmacotherapy and psychological cessation counselling to establish short-term abstinence, and then identify effective means of supporting abstinence beyond 6-months (e.g., pharmacotherapy). Implications: Smoking disproportionately harms RRR residents, who can encounter access barriers to cessation support. High-quality intervention evidence and outcome standardisation are still required to support long-term RRR smoking abstinence.

FUNDING: Unfunded; Academic Institution

POS3-25

FINANCIAL CHALLENGES AND HARDSHIP DURING THE COVID-19 PANDEMIC AND INCREASED USE OF TOBACCO EXPENDITURE MINIMIZING STRATEGIES AMONG U.S. ADULT COMMERCIAL TOBACCO USERS

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Introduction: People who use commercial tobacco (CT) employ tobacco expenditure minimizing strategies (TEMS) to manage their CT expenditures. We examined how financial challenges and hardships during the COVID-19 pandemic relate to increases in TEMS use. Methods: Data from a nationally representative sample of 1,700 U.S. adults who currently and formerly used CT were collected from an online panel during January-February 2021. Participants reported if they had increased use of seven TEMS (e.g., finding less expensive places to buy products, purchasing products by bulk, buying a cheaper brand of the same product, etc.) to save money on CT since the pandemic, and experienced financial challenges (e.g., losing a job) and hardships (e.g., not having enough money to pay for food). The number of financial hardships experienced was counted (range: 0-6). Weighted multivariable logistic regression models were used to examine the associations between financial challenges and hardship scores and each increased TEMS use, adjusting for demographics. Multiple imputation was used to handle missing data. Results: Since the COVID-19 pandemic, three TEMS showed the largest increase in use by U.S. adults who currently and formerly used CT: cutting back (22.4%), finding less expensive places to purchase (15.6%), and buying by bulk (15.5%). Many of the individual financial challenges and hardships were consistently associated with increased uses of TEMS. Furthermore, every additional count of financial hardships was associated with higher odds of increasing use of each TEMS (AORs ranging between 1.12-1.23). Conclusions: Many adults who used CT increased TEMS use to manage their CT expenditures when facing financial challenges and hardships during the pandemic. This could hinder CT cessation and promote relapse. Prohibiting certain TEMS may promote CT cessation among this financially vulnerable group.

FUNDING: Federal

POS3-26

A QUALITATIVE STUDY OF TOBACCO QUITLINE KNOWLEDGE, ATTITUDES, AND PRACTICES WITHIN HEALTHCARE SETTINGS IN TEXAS THAT TREAT PATIENTS WITH BEHAVIORAL HEALTH CONDITIONS

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Significance: People living with behavioral health conditions (BHCs) have disproportionately high smoking rates, with over 50% of adults with BHCs being active smokers. While these patients are interested in quitting, the success rate of their quit attempts is low, and they experience significant barriers to accessing evidence-based tobacco cessation services. Tobacco quitlines, which offer tobacco cessation services over the phone/web, are an effective way to connect patients to cessation services, yet they remain underutilized. We conducted a qualitative analysis to explore knowledge of, attitudes toward, and practices regarding use of the Texas Tobacco Quitline (TTQL) within healthcare settings in Texas that serve BHC patients. Methods: Qualitative data were collected as a part of a 2021 statewide tobacco control needs assessment. Nineteen employees at BHC healthcare settings participated in interviews, representing 10 public health regions of Texas. Thematic analysis and constant comparison, based on an inductive approach, was conducted to identify themes that were drawn directly from the data. Results: We identified 3 major themes: 1) TTQL knowledge: most respondents were familiar with the TTQL, although there were a few exceptions; 2) Lack of knowledge about patients' experiences with the TTQL: respondents reported overall lack of systematic follow up with patients regarding their use of the TTQL services; 3) Perceived barriers and facilitators to the use of the TTQL: the TTQL was seen as a good solution for the lack of tobacco cessation services offered at their healthcare centers, but respondents were concerned about inconsistency in the services provided, difficulty getting free nicotine replacement therapy, long wait times, and expressed concern that the format of the quitline might not work well for the unique needs of BHC patients. Conclusion: These findings contribute to a more comprehensive understanding of factors affecting how employees at BHC healthcare settings use the TTQL, including their knowledge, practices, and use barriers and facilitators. They also identify the need for 1) further improvement in awareness of the TTQL among health care providers who treat BHC patients; 2) changes wherein healthcare settings provide an electronic health record integration supporting systematic patient follow up on the use of the TTQL services; 3) investigation into changes needed to further improve and tailor services provided to BHC patients though the TTQL.

FUNDING: Federal; State

POS3-27

CONTENT ANALYSIS OF SPANISH-LANGUAGE YOUTUBE VIDEOS ON USE OF E-CIGARETTES FOR SMOKING CESSATION

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SIGNIFICANCE: Social media surveillance can assess the evolution and potentially disproportionate impact of tobacco product promotion on various populations. Despite intensified research on how e-cigarettes are portrayed on YouTube, most studies examine English language content. We examined Spanish language (Spanish) videos focused on the use of e-cigarettes for smoking cessation. Understanding Spanish YouTube videos about using e-cigarettes for cessation may inform tobacco regulatory actions such as correcting health misinformation and harm reduction strategies. METHODS: We used 16 Spanish expressions such as "cómo dejar de fumar vapeando" (how to quit smoking by vaping) and "el vapeo para dejar de fumar" (vape to quit smoking) to search YouTube's API in September 2021. We analyzed the content of 169 videos that featured e-cigarettes for smoking cessation to identify health claims, uploader characteristics, audience appeals (e.g., likes, views), model characteristics, and tobacco promotion (e.g., links to purchase). RESULTS: The majority of videos (71.6%) were posted by an influencer or product enthusiast, presented health claims e.g., benefits of using e-cigarettes for smoking cessation (63.2%), or presented e-cigarettes as an effective substitute for smoking combustible cigarettes (51.6%). Smaller proportions featured visible e-cigarette brands or logos (36.7%) or included links to purchase (22.7%). Researchers observed broad use of testimonials, individual product recommendations and reviews, and appeals to people who liked video games and tinkering with mechanical items. Videos appeared to feature young to middle-aged, adult males (71.6%). CONCLUSION: This study identified themes and contextual factors related to e-cigarette use for cessation available in Spanish YouTube videos. Themes included promotion of e-cigarettes as a healthier alternative to combustible cigarettes, the presence of health claims about e-cigarettes, product advice, and potential appeals targeting gamers and male-identifying subgroups who access Spanish YouTube videos. Findings suggest that media surveillance efforts should focus on accurate health communications about e-cigarettes in languages other than English since 1 in 5 households speak a language other than English at home with many of those households using Spanish.

FUNDING: Unfunded; Federal; Academic Institution

POS3-28

USE OF E-CIGARETTES AND USE OF ANY TOBACCO PRODUCTS AS CORRELATES OF COVID-19 VACCINE UPTAKE AMONG COLLEGE STUDENTS

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Significance. Hesitance concerning COVID-19 vaccination greatly decreased over the course of the pandemic in the U.S. However, some populations have lower vaccination rates, e.g., young adults, than the general population. Prior research that have examined COVID-19 vaccination hesitance and human papillomavirus vaccine uptake suggested possible disparities in future vaccination rates associated with tobacco use. The study was conducted to identify the roles of current use of e-cigarette and use of any tobacco products as potential correlates of being fully vaccinated among college students. Methods. We used the 2022 Spring American College Health Association—National College Health Assessment data collected online in March of 2022 (n=617). The associations of current use of e-cigarettes and current use of any tobacco products to vaccination status were assessed in two separate Firth multiple logistic regression models estimating the odds of being fully vaccinated. Each model controlled for age, sex assigned at birth and food security, and included sexual and gender minority (SGM) status, race/ethnicity and several pandemic-related factors, e.g., an indicator of ever having COVID-19. Results. Almost 86% of students reported being fully vaccinated. About 16.5% of students reported current use of any tobacco product and 13.8% of students reported current use of e-cigarettes. Both, current use of any tobacco product (p=0.0431) and current use of e-cigarettes (p=0.0212) were significantly associated with the vaccination status. The odds of being fully vaccinated were significantly lower for current users of tobacco relative to non-users of tobacco (OR=0.54, 95%CI=0.29:0.98) as well as for current users of e-cigarettes relative to non-users (OR=0.47, 95%CI=0.25:0.89). Additional findings pointed to disparities in being fully vaccinated based on students' race/ethnicity and SGM status among several other characteristics. Conclusion. The study points to a critical need for development and implementation of tailored vaccination campaigns to help tobacco users make informed decisions towards becoming fully vaccinated.

POS3-29

PERCEIVED EFFECTIVENESS OF CIGAR PREVENTION MESSAGING AMONG U.S. BLACK YOUNG ADULTS

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Significance: U.S. Black young adults (YAs) have among the highest cigar smoking prevalence. Public education messages to effectively communicate the health harm and addiction risks of cigar smoking is important to help prevent initiation, and ultimately reduce racial disparities in cigar smoking. However, few studies have examined the effectiveness of public education messaging themes to prevent cigar smoking among Black YAs. We examined Black YAs' perceived message effectiveness (PME) for different messaging themes. Methods: The parent study surveyed a U.S. sample of tobacco-naïve young adults (18-30 years; n=1,329) susceptible to electronic cigarettes through Qualtrics online panel in August 2021-January 2022. We restricted this analytic sample to those who self-identified with Black race and were susceptible to cigar smoking (N=143). Participants viewed eight messages, two per the following themes: (1) internal industry studies (e.g., "Internal industry studies confirmed that cigar companies made cigars in candy-like flavors to attract young people."); (2) Industry targeting of racial minority communities (e.g., "Cigars are at least 3 times more heavily marketed in Black communities than White communities."); (3) health risks contextualized with flavors (e.g., "Cigar flavors mask the taste of toxic cancer-causing chemicals"); and (4) health and addiction risks (e.g., "Cigars contain nicotine. Nicotine is an addictive chemical."). Participants

completed three PME statements per message (e.g., "The message discourages me from wanting to smoke cigars."; 1=strongly disagree to 5=strongly agree). We averaged PME scores per theme. We used repeated measures analysis of variance and pairwise comparisons to examine PME differences by theme. Results: All messaging themes were rated by participants as effective overall (Mean~3.5 to 3.6; standard errors[SE]~0.08). However, messaging about internal industry studies may be perceived as less effective than the other themes tested (mean differences~-0.10 to -0.13; SE range~0.04 to 0.05; *Ps*<.05). Conclusion: In light of the lack of cigar prevention messages, all tested messaging themes were perceived as effective. Future research should evaluate how to optimize cigar prevention messaging and how messaging themes may influence use behaviors. Developing effective, salient cigar prevention messaging for Black YAs may promote equity in tobacco control communication efforts.

FUNDING: Federal

POS3-30

CHANGES IN COMMERCIAL TOBACCO, ALCOHOL, AND CANNABIS USE ACROSS U.S. RACIAL/ETHNIC GROUPS OF COMMERCIAL TOBACCO USERS BEFORE AND DURING THE COVID-19 PANDEMIC

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SIGNIFICANCE. The COVID-19 pandemic may change individuals' substance use behaviors. While they may be motivated to quit commercial tobacco use because of its risks associated with COVID-19 severity, they may also use commercial tobacco and substances as a coping strategy. This study examined associations between race/ethnicity and prevalence of commercial tobacco, alcohol, and cannabis use before and during the pandemic among commercial tobacco users. METHODS. Data were from a nationally representative U.S. sample of current and recent former (<12 months) commercial tobacco users (age=21; N=1,700) collected during January-February 2021. Participants reported current and pre-pandemic substance use for cigarettes, e-cigarettes, cigars, smokeless tobacco, and other combustible products (using at least some days); alcohol (any past-30-day use); and cannabis use (any past-30-day use). Weighted prevalence was estimated and McNemar's tests were used to examine if prevalence of substance use differed between pre- and during the pandemic within each racial ethnic group (Asian, Black, Hispanic, Other, White). RESULTS. White individuals showed a decline in all tobacco product use during the pandemic, including cigarettes (Pre: 69.7%, During: 62.9%; p<0.01), e-cigarettes (Pre: 28.2%, During: 21.2%; p<0.01), cigars (Pre: 15.9%, During: 11.6%; p<0.01), smokeless products (Pre: 12.7%, During: 9.7%; p<0.01), and other combustible products (Pre: 12.2%, After: 9.2%; p<0.01), and also in cannabis use (Pre: 39.0%, During: 37.0%; p=0.01). This was not the case for any other racial/ethnic group. Asian individuals showed a decrease in cigarette use (Pre: 54.7%, During: 42.1%; p=0.02). Hispanic individuals showed a marginal decline in smokeless tobacco use (Pre: 20.2%, During: 15.3%; p=0.06) and cannabis use (Pre: 51.9%, During: 46.3%; p<0.01). Lastly, more Black (Pre: 52.1%, During: 59.0%; p<0.01) than White (Pre: 53.0%, During: 57.0%; p<0.01) individuals reported alcohol use. CONCLUSION. Results suggest that since the pandemic, disparities in commercial tobacco use and cannabis use by race/ethnicity have been worsened. Racial/ethnic minority individuals may be holding onto substances as a coping mechanism. Interventions for commercial tobacco use during the pandemic need to consider such increase in disparities and also other substance use-related problems among racial/ethnic minorities to reduce disparities in commercial tobacco and substance use.

FUNDING: Federal

POS3-31

PREMIUM CIGAR FESTIVALS: A POTENTIAL TARGET FOR MARKETING RESTRICTIONS

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Significance: Compared to other nicotine and commercial tobacco products, marketing strategies for premium cigars have been understudied. One advertising tactic that may be unique to premium cigars is the promotion of such products via 'cigar festivals'. In the U.S., these festivals are not focused on a music concert or some other main event where cigars are sold on the side; instead, the variety and exclusivity of the premium cigars showcased is the main attraction. Cigar festivals remain virtually undocumented in the scientific literature. Commercial tobacco marketing often targets specific populations, including racial/ethnic groups. It is unclear how these same tactics may be employed for premium cigars. Methods: We conducted an exploratory online search for 'cigar festival' and 'cigar event' between April and June 2022. Results: We observed that, with the price of admission, cigar festival attendees may obtain free premium cigar samples from various cigar vendors, as well as cigar- or festival-branded promotional materials (e.g., lighter, t-shirt). Attendees are encouraged to sample cigars, listen to live music, and consume alcoholic beverages. We also found that some cigar festivals explicitly target racial groups, such as *The Black Cigar Festival*, which claims to include only Black-owned premium cigar vendors at its event, and *The Queen City Cigar Fest*, which claims to be about "culture and community". Conclusions: Overall, these observations highlight how cigar festivals may target populations at risk for combustible tobacco use and circumvent traditional marketing restrictions. These targeted marketing techniques need further study and have implications for regulatory marketing restrictions.

FUNDING: Federal; State

POS3-32

NICOTINE POUCH SALES BY VOLUME AND NICOTINE CONCENTRATION LEVELS IN THE UNITED STATES: 2019-2022

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Significance: Nicotine pouches are gaining popularity in the US and are available in a wide range of nicotine concentration levels, which creates the potential for continued or increased nicotine dependency instead of quitting among nicotine users and may cause nicotine initiation or experimentation among nicotine-naïve individuals. The evidence of presence of carcinogenic tobacco-specific nitrosamines in nicotine pouches raises serious health concerns. This study examines recent US nicotine pouch unit sales trends by volume and nicotine concentration levels. Methods: Data comprised of weekly NielsenIQ Retail Scanner point-of-sales data from August 10, 2019, through March 26, 2022, for 2182 Local Trade Areas in the contiguous 48 US states and District of Columbia. Unit sales of four predominant nicotine pouch brands (Zyn, Rogue, On! and Velo) were aggregated by month and year overall, by brand, and nicotine concentration level per unit. Average monthly percentage change (AMPC) in unit sales and 95% CIs were calculated using Joinpoint version 4.9.1.0 (National Cancer Institute). Results: Overall, monthly sales of the four brands increased from 126.06 million units during August - December 2019 to 808.14 million units during January - March 2022 (AMPC, 8.1% [95% CI, 7.4, 8.9]). Zyn led the overall unit share (58.82%), followed by ON! (24.64%), Velo (12.06%) and Rogue (4.84%) during the study period. Nicotine pouches with 6 mg (1365.19 million units), 4 mg (470.36 million units) and 3 mg (449.61 million units) nicotine concentration levels were most commonly sold during the study period. Sales of units with 8 mg nicotine concentration level (AMPC, 17.6% [95% CI, 13.8%-21.6%]), increased more rapidly than products with lower concentration levels (2 mg: AMPC, 12.3 [95% CI, 10.9-13.7]; 3mg: APMC, 7.9 [95% CI, 6.1-9.7]; 4 mg: AMPC, 9.4 [95% CI, 7.3-11.6]; 6 mg: AMPC, 8.6 [95% CI, 6.1-11.1]; 7 mg: AMPC, 9.7 [95% CI, 4.9-14.6]). Conclusion: Findings suggest an increasing trajectory of nicotine pouch sales overall. Increasing sales of the highest (8mg) level of nicotine concentration raises concerns about abuse liability among nicotine users; rising sales of the lowest 2 mg nicotine concentration levels warrants continued surveillance of trends related to uptake or experimentation among nicotine-naïve youth. Health communication campaigns educating nicotine pouch users about the potential adverse health effects of nicotine pouches are urgently needed.

POS3-33

HEALTH-RELATED BENEFITS OF QUITTING AND EX-SMOKER TESTIMONIALS MAY HELP AFRICAN AMERICAN/BLACK MENTHOL SMOKERS QUIT: IMPLICATIONS FOR FLAVOR BANS.

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Significance: FDA proposed product standards that will restrict access to flavored cigarettes and cigars - products used disproportionately by African American/Black (AA/B) smokers. However, little is known about how AA/B menthol cigarette smokers will respond to flavor bans or how communication strategies can amplify their intended public health benefits. This mixed-methods study explored how motivations for quitting smoking predicted responses to hypothetical flavor restriction policies. Methods: We recruited 200 AA/B menthol cigarette smokers, predominately from Richmond, VA (September 2021-August 2022) to complete an online survey. Participants rated 7

motivations for quitting (i.e., information on health hazards, cost of cigarettes, decline in health, physical fitness, social encouragement, smoking restrictions in school/work, smoking restrictions at home) on the following scale: Not a motivation, minor motivation, moderate motivation, major motivation. Using a visual analog scale (0 [Not at all likely] - 100 [Extremely likely]), participants also reported how 13 of their tobacco use behaviors might change if characterizing flavors were banned in cigarettes and cigars (e.g., quitting smoking, switching to electronic cigarettes, buying or importing tobacco products from new sources). Linear regressions characterized the adjusted association between quit motivations and expected behavioral responses to flavor restrictions. At least one month after completing the survey, a subsample of 15 participants were randomly selected to complete semi-structured interviews to further explore anticipated reactions to flavor restriction policies. Results: Linear regressions indicated that smokers who endorsed "information on health hazards" as a major motivation to quit were uniquely likely to reduce/quit smoking, and less likely to switch to electronic cigarettes or purchase banned products from illicit markets, following a flavor ban (ps<0.05). Emerging themes from interviews suggest that testimonials from ex-smokers are a key information source that AA/B menthol cigarette smokers trust regarding how flavor ban policies could help them quit smoking. Conclusions: Public health messaging emphasizing health-related benefits of quitting, particularly those featuring experiences of ex-smokers, may help AA/B smokers quit following flavor bans.

FUNDING: Federal

POS3-34

CHANGES IN SMOKE-FREE COMPLIANCE AFTER THE IMPLEMENTATION OF A 'SMOKE-FREE GOVERNMENT' POLICY: AN OBSERVATIONAL STUDY IN QINGDAO, CHINA

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Significance: China's smoke-free government (SFG) policy offers provincial and local governments a means to "lead by example" and engage government stakeholders to mobilize political support for policy change at all levels. Since 2020, Qingdao city has required government buildings to be 100% smoke-free. Building management staff enforce the policy with specific consequences for violations; further, government officials are educated about the harms of smoking and secondhand smoke. This study examines the changes in smoke-free compliance in government buildings and other venue types before and after SFG implementation. Methods: A mix of urban and suburban districts in Qingdao were selected for observation. Trained data collectors observed 747 public settings of 13 venue types, including 59 government buildings in October-November 2018, and revisited these venues in September-October 2021. Evidence of smoking and the presence and location of no-smoking signage were observed. Wilcoxon signed-rank tests and Mann-Whitney U tests were used to test the longitudinal changes and differences between venue types, respectively. Results: From 2018 to 2021, government buildings became more compliant with the smoke-free policy based on the composite indicator for evidence of smoking (59.3% vs 88.1%, p<0.05), moving up in rank from the 9th to the 3rd among the 13 venue types. Government buildings also became more compliant with displaying no-smoking signs with all the required components (71.2% vs 89.8%, p<0.05) and performed the best regarding this indicator among all venue types in 2018 and 2021. However, compliance with posting no-smoking signs at main entrances of government buildings was low and decreased slightly (25.4% vs 22.0%, p=0.70), moving down in rank from 3rd to 12th among all venue types. Conclusion: The study findings provide evidence of improved compliance according to the composite indicator for evidence of smoking and display of standardized no-smoking signage in government buildings, and highlight the opportunity for Qingdao to further enhance government building compliance by posting no-smoking signs at main entrances. Clear instructions from authorities regarding sign placement, strong enforcement, and sustained commitment for tobacco control from city leadership are needed to achieve the goals of the SFG policy and to be a role model for citizens.

FUNDING: Nonprofit grant funding entity

POS3-35

EXAMINING THE INFLUENCE OF VAPE ADVOCATES ON TOBACCO REGULATORY DISCOURSE ON TWITTER

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Significance: In September 2019 the EVALI outbreak, outrage over JUUL's now infamous marketing campaigns, and high rates of youth vaping elevated the salience of vaping as a public health threat. In response to mounting regulatory momentum, the emergence of #wevapewevote and other activist-oriented hashtags signaled mobilization of vape advocates on Twitter where previous research had already documented an information environment hostile to regulation and prone to exaggerate benefits and dismiss risks. This research examines nearly two years of tobacco policy discussion on Twitter to identify opinion leaders on this platform and characterize their influence. Methods: We developed a classifier to identify policy-related tweets (n = 2,768,824) as a subset of over 93 million tobacco-related tweets collected between 9/1/2019 and 7/31/2021, F1 = .89. User accounts for the 100 top retweets and the 100 most influential users (highest H-index) for each of three time periods (pre-COVID-19 pandemic, pre-vaccine, post-vaccine) were categorized by two raters (kalpha = 1) to assess the concentration of opinion leadership on Twitter among self-described vape advocates. At the same time, we examined the effects of influential accounts on the dissemination of misinformation related to nicotine and COVID-19 and public engagement with the FDA during the PMTA process. Results: Vape advocates comprised 66% of the most influential users and 45.9% of the most retweeted users. Tweets from these users accounted for 25.4% and 55.6% of all retweeted content, respectively, demonstrating substantial concentration of influence among vape advocates. The impact of such influence was evident in the dissemination of misinformation about nicotine preventing COVID-19 where many of the top retweets promoting this claim were retweeted by several of the same top users. Similarly, many of the same users retweeted FDA tweets about the PMTA process along with dissenting rebuttals garnering nearly six times as may retweets as the FDAs original content. Conclusion: Vape advocates dominate tobacco policy discourse on Twitter. Their influence lies in the ability to affect dissemination of pro-vaping content though retweeting, and to mobilize brigades of counter messaging in response to official communications. The effective mobilization of vape advocates on Twitter poses a potential barrier to evidence-based policy as well as an avenue for the dissemination of misinformation.

FUNDING: Other

POS3-36

ADDRESSING CONFLICT, BIAS, AND GROWTH IN EARLY CAREER TOBACCO REGULATORY SCIENCE TRAINING

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Significance: Distinctive challenges exist for Tobacco Regulatory Science (TRS) trainees and early career investigators as they progress through their careers. Such career obstacles include personal perceived biases and polarization surrounding controversial TRS topics (e.g., e-cigarettes and harm reduction), challenges in obtaining funding, and clarifying research scope in an ever-changing tobacco marketplace. Mentorship is one approach helping trainees and early career investigators thrive in the field. However, mentors may not feel adequately prepared to help support mentees with some of these TRS-specific challenges. Methods: Through a series of meetings, the Center for Coordination of Analytics, Science, Enhancement, and Logistics (CASEL 1.0) in TRS and the Tobacco Center of Regulatory Science (TCORS 2.0) identified professional and academic challenges unique to TRS trainees and early career investigators that prompted them to turn to their TRS mentors for support. CASEL previously developed and recently expanded a TRS-specific mentorship training program intended to help provide mentors with the skills needed to support their mentees. This poster describes mentor and mentee perspectives with information on how different approaches can support TRS scientists as their careers progress. Results: Seven common themes of successful TRS mentorship were identified and can be applied to overcome TRS-specific challenges. Themes included, 1) the importance of having a TRS knowledge base, 2) effective communication and accessibility of the mentor, 3) conflict resolution skills, 4) mental health awareness, 5) mutual respect and trust, 6) empathy, and 7) accountability.

Case vignettes were developed to illustrate challenges unique to TRS and to propose potential mentoring approaches to support trainees and early career investigators. Conclusion: Alignment on these seven themes can support trainees and early career investigators in navigating challenges within TRS research, including polarization in the field, and ensure that they feel comfortable seeking help or guidance from mentors throughout their careers. Regulatory science specifically requires objective and rigorous empirical studies to inform and support regulation and strong mentor-mentee relationships are critical to training and retaining scientists across the career span to optimally contribute to that goal.

FUNDING: Federal

POS3-37

RESTRICTIONS OF CIGARETTE AND E-CIGARETTE FLAVOR AND FILTER VENTILATION ON DEMAND AND SUBSTITUTION IN THE EXPERIMENTAL TOBACCO MARKETPLACE

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Significance: The Food and Drug Administration (FDA) has the authority to establish tobacco product standards if those standards are reasonably expected to benefit public health. Tobacco product flavors and cigarette filter ventilation are subject to FDA regulation. This study examined the effect of restrictions on cigarette and e-cigarette flavors and filter ventilation on demand and substitution in the Experimental Tobacco Marketplace (ETM). Methods: In a between-group within-subject repeated measures design, menthol (n= 131) and non-menthol (n = 132) cigarette smokers, recruited using survey firms Ipsos and InnovateMR, completed purchasing trials with increasing cigarette prices in the ETM. Participants were exposed to four conditions in a 2 x 2 factorial design with cigarette flavors restricted or unrestricted and e-cigarette flavors restricted or unrestricted. Cigarette demand (intensity, a measure of amplitude; and Omax, a measure of persistence) and e-cigarette and alternative tobacco product (dip, gum, snus) substitution measures (slope and intercept) were estimated for each participant under each condition. Linear mixed effects models were used to estimate demand and substitution with cigarette and e-cigarette factors and ventilation as fixed effects and a random effect for participants. Model selection was performed using an exhaustive search of the model space and the optimal model identified as the one with the lowest Bayesian Information Criterion. Results: A significant interaction between the cigarette factor and a participant's usual cigarette flavor was observed for both cigarette demand intensity ($p<0.001$) and Omax ($p<0.001$), with participants who smoke menthol cigarettes exhibiting lower intensity and lower Omax values under cigarette flavor restrictions. In contrast, the optimal model for e-cigarette and alternative tobacco product substitution slope and intercept were the empty (null) models. Additionally, the inclusion probability of cigarette filter ventilation was not greater than 1% in any model. Conclusion: Our findings suggest that a) cigarette flavor restrictions may decrease cigarette purchases among menthol cigarette smokers, b) e-cigarette flavor restrictions do not impact cigarette or alternative tobacco purchases, and c) cigarette filter ventilation is a poor predictor of tobacco purchases under cigarette and e-cigarette flavor restrictions.

FUNDING: Federal; Academic Institution

POS3-38

A CONTENT ANALYSIS OF ILLICIT TOBACCO-RELATED CRIMES REPORTED IN AUSTRALIAN MEDIA

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Background: Australia's National Drug Strategy Household Survey shows an increase in illicit tobacco use between 2013 and 2019, which coincides with a period of steeply increasing tobacco taxes. There are concerns that this illicit market may continue growing as Australia implements increasingly stringent tobacco control policies, such as large tobacco tax increases. We aimed to examine trends in reporting of illicit tobacco-related crimes in Australia using a content analysis of news articles. Methods: A content analysis was performed on 121 Australian news articles identified in the Factiva database about crimes related to illicit tobacco between January 2000 and December 2021. Articles were coded for the type of crime, location, product type, dollar value of seized products, methods of distribution or storage, agencies involved, and other crimes involved. Results: There was an increase in the number of illicit-tobacco related crimes reported each year between 2000 and 2021. In total, 163 crime incidents were reported; the most common identified crimes were illegal tobacco smuggling (38.6%) and illicit tobacco possession (23.3%). A median dollar value of $2,310,000 was estimated per seizure of illicit tobacco products, with the estimated value ranging between $5,629 and $84,000,000. Seizure of an estimated 55,523 cartons, 15,010 packs, 177,565,695 cigarette sticks, and 14 boxes of illicit tobacco products were reported between 2000 and 2021. Products were most commonly distributed via shipping containers (26.4%). Other crimes reported (N=25) included possession of the proceeds of crime (3.1%) and expired visas (2.5%). Conclusion: Our findings suggest an increase in the domestic supply of illicit tobacco in Australia, potentially undermining the impact of tobacco control policies. Increased surveillance and enforcement is needed to control this crime.

FUNDING: Federal; Academic Institution

POS3-39

ASSOCIATION BETWEEN AGE OF CIGARETTE INITIATION AND CURRENT MARIJUANA CO-USE AMONG PAST 30-DAY ESTABLISHED CIGARETTE SMOKERS IN NIGERIA

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SIGNIFICANCE: The concurrent use of combustible cigarettes and marijuana has been reported among smokers in select sub-Saharan African countries (SSA) like Nigeria. This relationship might be explained by the common liability and gateway theories where early smoking initiation potentially contributes to longer-term polysubstance use (i.e., marijuana and cigarettes). This study aims to examine the association between the age of cigarette smoking initiation and subsequent co-use with marijuana among current established cigarette smokers in Nigeria. METHODOLOGY: A cross-sectional survey was conducted among adult (18+) current established cigarette smokers (100+ sticks in a lifetime and past 30-day somedays/everyday) in Lagos, Nigeria. The outcomes were current marijuana use (Do you use marijuana now? Response options: Yes/No) and past 30-day (P30D) marijuana use. Independent measures were demographic variables, age of initiation (in years), perception of cigarette harm compared to marijuana, and mental health conditions (MHCs). Logistic regression models were used to investigate the association between dependent and independent variables. RESULTS: Data from 423 adult current established cigarette smokers were analyzed. Of which, 63.6% self-reported current marijuana use. Of the current marijuana users, 11.6%, 79.2% and 9.3% reported no use, non-daily and daily use of marijuana in the P30D, respectively. Among current and P30D marijuana users, the average age of cigarette initiation was 18 years. In the logistic regression analysis, the bivariate model showed an association between age of initiation and current marijuana use (OR: 1.05; 95% CI: 1.01, 1.09). However, after adjusting for socio-demographic variables, MHCs, and harm perceptions, there was no significant association between age of cigarette initiation and current marijuana use (OR: 1.03; 95% CI: 0.99, 1.08). In contrast with current marijuana use, older age of cigarette initiation was associated with reduced odds of P30D marijuana use in both bivariate and multivariable-adjusted models (OR: 0.86; 95% CI: 0.80, 0.92) and (OR: 0.90; 95% CI: 0.82, 0.98), respectively. CONCLUSION: Increasing age of cigarette initiation was associated with a lower likelihood of P30D marijuana use among adult current established cigarette smokers. These findings justify a closer examination of the potential effects of raising the legal age of smoking in SSA countries like Nigeria, as this might curb co-use with marijuana.

POS3-40

HOW MUCH FOR MARLBORO? CHANGE IN PRICE FROM A COHORT OF RETAILERS IN 30 MAJOR US CITIES DURING THE COVID-19 PANDEMIC

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Significance: While the COVID-19 pandemic disrupted/deferred tobacco marketing surveillance in brick-and-mortar stores, we telephoned stores to assess change over time in Marlboro price. With concern for feasibility, we assessed whether Marlboro was out-of-stock and percent of stores that reported price. Analyses examined whether Marlboro price kept pace with inflation and tested whether price increase was significantly greater in cities where state excise tax increased. Methods: We created a sampling frame of stores from tobacco retail licensing data in 27 cities (n=36,186) and commercial data sources in three (n=3230). Marlboro price was obtained at baseline (Apr-Dec, 2020) and follow-up (Mar-Jul, 2022) in a cohort of randomly selected cigarette retailers (target n=1800, 60 per city) with replacement. According to manufacturer's reports, Marlboro wholesale price increased 6 times (total=$0.82) over the study peri-

od. In addition, state excise tax increased in Baltimore by $1.10, Denver by $1.75, and Portland by $2.00. Descriptive statistics assess whether wholesale price increases kept pace with inflation. A three-level GLM (repeated price, nested in stores, nested in cities/states) with a random intercept and slope assessed change in price, and a cross-level interaction whether change amount differed where excise tax increased. Results: We called 5188 stores in 2020 and 3067 in 2022 to reach 1800 (60 per city, per wave) that sold cigarettes; 33.5% of stores were replaced in 2022. Marlboro was out-of-stock in 58 stores in 2020 and 17 in 2022. Price was obtained in 78.6% of eligible stores in 2020 (n=1415) and 82.9% in 2022 (n=1492). In 2020, average price of Marlboro was $9.32 (SD=3.19), ranging from $6.56 in Memphis to $14.97 in Chicago. Excluding excise tax increase, average increase from 2020 to 2022 was $0.86, ranging from $0.43 (Chicago) to $1.29 (Baltimore) with significant city-level variation (p<.01). Across cities, the mean rate of increase in Marlboro price was slightly less than Core inflation (9.8% vs. 10.2%) and ranged from 2.9% in Chicago to 17.6% in Denver. Marlboro price increase was significantly greater in three cities where state excise tax increased. In addition, average increase in Marlboro price was greater than tax in Baltimore and Denver, but not in Portland. Conclusion: When retailer visits were impossible, obtaining cigarette price by telephone was feasible. Results indicate predictive validity in that significantly greater increases for Marlboro price were observed where excise tax increased, and the pattern was consistent with overshifting (price increase higher than tax increase) in two of three cities. However, increase in Marlboro price varied between cities, which raises concern that pricing strategies encourage continued smoking, particularly among those who are economically disadvantaged.

FUNDING: Federal

POS3-41

TOBACCO INDUSTRY INFLUENCE INLOW- AND MIDDLE-INCOME COUNTRIESIN THE ASEAN REGION: QUALITATIVE INTERVIEWS WITH TOBACCO CONTROL EXPERTS

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SignificanceEven though most Association of Southeast Asian Nations (ASEAN) have adopted the Framework Convention on Tobacco Control (FCTC), lack of implementation and enforcement of tobacco control measures are lacking in some low- and middle-income countries (LMICs) in the region. This study aimed to describe how the tobacco industry had undermined tobacco control efforts in LMICs, the political factors that hinder progress, and opportunities to these overcome challenges. Methods: In-depth interviews were conducted with ASEAN tobacco control experts (n=11) to explore their perspectives on tobacco control in the region and recommendations to overcome any barriers and challenges. Results: Five themes emerged from the data. They recalled that the tobacco industry had used sophisticated below-the-line marketing to target youth and lobbying/corporate social responsibility (CSR) to undermine tobacco control efforts. They recollected that cigarette packet branding was a crucial marketing tool to the industry, but there are challenges to introducing restrictions like plain packaging. Political factors were identified as hindering tobacco control implementation and progress, with broader involvement and collaboration in tobacco control recommended to overcome these issues. Conclusion: Tobacco control in LMICs in the ASEAN region is undermined by the tobacco industry and lack of government leadership. Full adoption of the FCTC and increased collaboration among stakeholders are recommended to overcome these issues.

POS3-42

THE IMPACT OF STATE T21, RESTRICTIONS ON FLAVORED E-CIGARETTE PRODUCTS, AND NON-MEDICAL CANNABIS SALES LEGISLATION ON YOUNG ADULT CONSUMER REPORTS OF VAPE SHOP AGE VERIFICATION AND PRODUCT OFFERINGS: A MULTILEVEL ANALYSIS

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Significance: Vape shop practices related to age verification and product offerings may affect young adults' use of nicotine and cannabis-derived products. However, the association of state-level policies (i.e., T21, restrictions on flavored e-cigarettes, legalized non-medical cannabis sales) with vape shop practices are not well understood. Methods: We analyzed data from young adults (18-34 years) in 6 US metropolitan statistical areas (Atlanta, Boston, Minneapolis, Oklahoma City, San Diego, Seattle), focusing on a subset who reported past 6-month e-cigarette use and visiting a vape shop at Wave 1 (W1, fall 2018; n=1,127), W2 (fall 2019, n=702), or W3 (fall 2019, n=549). Three multilevel logistic regression models (controlling for individual sociodemographics) assessed contemporaneous associations between state: 1) T21 and being asked for age verification (among participants <27); 2) restrictions on flavored e-cigarette products and noticing other tobacco and/or cannabis-derived products, separately; and 3) legalized non-medical cannabis sales and noticing these other products. Results: The W1 sample was 24.08 years old on average (74.3% under age 27), 51.9% female, 36.1% sexual minority, 75.9% White, and 14.1% Hispanic. Participants living in states with: 1) T21 represented 14.9%, 33.5%, and 84.7% of the sample at W1-W3, respectively; 2) restrictions on flavored e-cigarettes represented 0%, 16.8%, and 33.5%; and 3) non-medical cannabis sales represented 36.0%, 50.4%, and 50.7%. The majority reported age verification at W1-W3: 69.7%, 78.7%, and 75.8%. However, state T21 legislation was unrelated to age verification (aOR=1.19, 95% CI=0.80-1.79). Over time, greater proportions of participants reported noticing other tobacco products in vape shops (W2: 36.9%; W3: 48.6%, p<.001) and cannabis products in vape shops (W1: 25.8%; W2: 41.3%; W3: 58.3%, p<.001). State restrictions on flavored e-cigarettes were positively associated with noticing other tobacco (aOR=1.96, CI=1.10-3.51) and cannabis products (aOR=2.26, 95%CI=1.57-3.24). Legalized non-medical cannabis sales were associated with noticing cannabis products in vape shops (aOR=2.84, CI=1.78-4.51). Conclusions: It is critical to examine intended and unintended consequences of policies to inform future legislative, surveillance, and enforcement efforts.

FUNDING: Federal

POS3-43

A RANDOMIZED EXPERIMENT EXAMINING THE EFFECTS OF U.S. NATIONALLY TELEVISED TOBACCO ADS ON 18-24 YEAR-OLDS

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Background: TV ad restrictions on combustible tobacco products do not currently apply to vaping and oral nicotine products. As a result, multiple active ad campaigns promote such products on U.S. national television in ways previous research suggests may appeal to young people. Methods: The MINTEL database was used to identify 18 nationally televised tobacco ads airing a combined 12,330 times between January 2021 and March 2022. Seven unique campaigns were identified with 15-second versions of the JUUL *Switch* ad featuring a testimonial from an older ex-smoker, 4 ads from Vuse, including two focused on customization of your device (*XU* and *Express yourself*), a green-washed ad (*Carbon Neutral*), and a more basic advertisement for 1,2,4 pod packs, as well as two ads from Velo (*A modern take on nicotine* and *Find your flavor*) and were employed in a single factor, single exposure, between-subjects experiment. After random assignment to one of seven ads, *N* = 1450 18-24-year-olds (33% current smokers) completed a survey assessing their attitudes towards the ad, brand, and product. We used single-factor ANCOVAs controlling for current tobacco use with planned contrasts to examine within product (Vuse to JUUL), within brand (e.g., Vuse ads to each other), and between product differences (Vuse to Velo). Results: Within brands, participants who saw Vuse's *Carbon Neutral* had significantly more favorable attitudes (p= 0.02) and emotional responses (p=0.04) to the ad than those viewing Vuse's 1, 2, 4 pod pack ad. Exposure to the *Carbon Neutral* ad also led to more favorable brand attitudes than exposure to any of the other three Vuse ads (p<0.05). Finally, Vuse *XU* led to greater perceptions of Vuse as "cool to use" compared to 1,2,4 Pod Pack ad (p= 0.01). Perceptions of who the ad was targeting varied significantly within and between products with Vuse *Express yourself* viewed as more targeted to "people my age" (p= 0.01) and "people similar to me" (p<.05) than JUUL *Switch*. Moreover, those who viewed Vuse *XU* (p= 0.02), *Express Yourself* (p<0.01), and 1,2,4, pod pack (p= 0.02) had greater perceptions of the ad as targeting "people my age" than those who viewed Velo *Find your flavor*, while those who viewed Vuse *Express Yourself* had greater perceptions of the ad as targeting "people similar to me" than those viewing Velo *Modern take*. Discussion: Greenwashing by highlighting a commitment to environmentally sustainable business practices appears effective in making Vuse ads and the Vuse brand more appealing to 18-24 year-olds, regardless of smoking status. Moreover, highlighting the ability to customize your Vuse device demonstrably enhances perceptions of vaping as "cool". That these effects emerge after a single exposure to a 15-second commercial speaks to the need for greater restrictions on these promotional strategies in the real world, where exposure is more frequent.

POS3-44

MOVING IN THE RIGHT DIRECTION: TOBACCO PACKAGING AND LABELING IN THE AMERICAS

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BACKGROUND: The WHO Framework Convention on Tobacco Control Article 11 recommends effective packaging and labeling including pictorial images, rotating health warning label (HWL) messages, and plain packaging to reduce tobacco consumption. Given high tobacco use prevalence in the WHO Region of the Americas (AMRO) and the lack of a regional assessment in 10 years, this study documents the progress of tobacco packaging and labeling in the region. METHODS: We reviewed tobacco control laws in AMRO from the Campaign for Tobacco-Free Kids' Tobacco Control Laws database. We analyzed four sub-policy areas for smoked and smokeless tobacco products: 1) HWLs (e.g. size), 2) constituents and emissions (e.g. message content), 3) misleading information (e.g. brand descriptors), and 4) other requirements (e.g. standardized/plain packaging). RESULTS: Of 35 countries in AMRO, 31 countries had tobacco control laws related to tobacco packaging and labeling. There are 25 AMRO countries require pictorial and textual HWLs, while 23 rotate HWLs within a 12-month period and 18 cover 50-74% of the front and back of products. The most common health-effect depicted in the warnings was cancer while 19 countries require text-only descriptive information of toxic constituents and emissions. There are 24 countries that ban brand descriptors with references to implied harm reduction such as "light", "mild" or "low-tar, while 21 countries require packs with a minimum number of units. Only Canada and Uruguay have adopted standardized/plain packaging for all smoked tobacco products while Uruguay is the only country to require a single brand presentation (one brand variant per brand family. Half of the countries apply the same requirements to all tobacco products (smoked and smokeless). CONCLUSION: While countries in AMRO have made good progress in adopting large pictorial HWLs and banning brand descriptors greater attention is needed on introducing stronger rotations and implementing standardized/plain packaging.

FUNDING: Academic Institution

POS3-45

COMMUNITY CHARACTERISTICS OF US LOCALITIES THAT PASSED T21 POLICIES

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Significance: Prior to the 2019 increase in the federal minimum age for tobacco product sales from 18 to 21, local communities in 25 states had adopted Tobacco 21 (T21) policies. Here, we characterize these T21 local communities in line with the American Communities Project (ACP), which breaks communities into different types for analysis. Methods: Local (US governmental body below the state level) T21 policies passed 2012-2019 were identified from a public listing. For states that had at least one T21 community (n=477), ACP designations were matched to each T21 and non-T21 county within the state. The ACP community types were developed using 40 demographic variables from the 2012 5-year ACS US census, including the percentage of locality population by age, race/ethnicity, education, English speaking at home, below poverty level, employment type and status, family size, housing vacancies, and population density. An ACP cluster analysis identified 15 categories of US counties. ACP county classifications were compared to their aggregate in states with at least one T21 policy. Results: We found differences ($c^2(14)=183.88$, $p<.0001$) between T21 counties relative to their states. For counties with difference of 5% or more, T21 counties were more likely than their states to be Urban Suburbs (by 10%; educated, densely populated communities around metro areas, racially/ethnically diverse), Exurbs (7%; wealthy communities adjacent to metro areas, largely white with lower crime rates), or College Towns (6%; urban and rural communities with campuses and college students), and less likely to be Graying America (-8%; large senior communities, generally rural, less diverse, middle income), Hispanic Centers (-7%; large Hispanic populations in mostly rural communities, younger with lower incomes), Evangelical Hubs (-6%; above-average numbers of evangelicals, largely Southern with fewer college graduates) or Working Class Country (-6%; rural, blue-collar, low income, low college graduation rates). Discussion: This study identified characteristics of communities that passed T21 policies prior to the 2019 federal T21 policy. Future work is needed to better understand if there is differential implementation and enforcement of federal T21 policies in these specific at-risk communities and how enforcement may differ by locality in ways that could widen disparities in youth tobacco initiation and use between local communities.

FUNDING: Academic Institution

POS3-46

IMPACT OF THE "E-CIGARETTE ERA" ON CIGARETTE SMOKING AMONG YOUTH: A POPULATION-LEVEL STUDY

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Objective: To examine and compare trends in past 30-day cigarette smoking among adolescents in the US from 2002 to 2019, before and after the onset of the "e-cigarette era" in 2014. Methods: Using NYTS data from 2002-2019, we modeled the prevalence of past 30-day cigarette smoking over time. A total of n=274,551 (weighted N=340,403,754) middle and high school students were included in this study. Interrupted time series analyses were used to examine changes in cigarette smoking over time and compare trends in cigarette smoking pre- and post-2014. Models were applied to the full sample and stratified by middle (6th-8th grade) and high school (9th-12th grade). The observed number of current adolescent cigarette smokers post-2014 was compared to the predicted number, given trends in cigarette smoking prevalence observed pre-2014. Results: Among all students, past 30-day cigarette smoking declined by approximately 0.75% per year from 2002 to 2013 ($p<0.001$). Following a significant drop in prevalence from 2013 to 2014 (1.64%; $p<0.001$), the decline in past 30-day cigarette smoking slowed significantly to approximately 0.37% per year ($p<0.001$), from 2015 to 2019. We estimate that the onset of the "e-cigarette era" in 2014 corresponded to over 1.66 million (95% CI: 1.57m - 1.75m) more past 30-day cigarette smokers from 2015 to 2019, cumulatively. Conclusions: The rate of decline in past 30-day cigarette smoking prevalence among adolescents observed since 2002 slowed with the onset of the "e-cigarette era" in 2014, providing evidence at a population-level for the "gateway effect."

FUNDING: Other

POS3-47

CHARACTERISTICS AND TOXICANT EMISSIONS FROM THE FDA-AUTHORIZED VUSE ELECTRONIC NICOTINE DELIVERY SYSTEM

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In October 2021, the U.S. Food and Drug Administration (FDA) announced that it had authorized R. J. Reynolds Vapor Company to market the Vuse Solo electronic nicotine delivery system (ENDS), making it the first ENDS ever to be authorized through the Premarket Tobacco Product Application process. To date, limited independent data exist regarding the features and emissions from the Vuse Solo ENDS. In this study we examine the characteristics of the Vuse Solo and the Vuse Alto. Vuse Alto use is prevalent among high-school students and reportedly accounts for nearly 95% of revenues from the Vuse product line, though the FDA has not yet issued a decision regarding its marketing authorization. We analyzed the construction, maximum puff duration, puff draw resistance, electrical characteristics and determined whether the system is temperature controlled. We also measured the liquid composition (nicotine concentration, freebase/protonated nicotine, and PG/VG ratios) and aerosol emissions (carbonyl compounds: CCs, and reactive oxygen species: ROS) of Vuse Solo cartridges (Original, 4.8% nicotine) powered by a Vuse Solo power unit, and Vuse Alto cartridges (Rich Tobacco, 5% nicotine) powered by a Vuse Alto power unit. The average electrical power delivered to the heating coil was 2.1W for Vuse Solo and 3.9W for Vuse Alto; neither system was temperature controlled. Vuse Solo and Alto respectively emitted nicotine at a rate of 38 and 115 ug/s (2.3 and 7 mg in 15 puffs), predominantly in the protonated form (>90%). For comparison, the nicotine flux and yield of a Marlboro Red combustible cigarette are 129 ug/s and 1.8 mg, respectively. ROS in Vuse Solo was one order of magnitude less than Vuse Alto (3.6 vs. 23 nmol H2O2). Total CCs from the Vuse Solo and Alto were similar and approximately two orders of magnitude lower than previously reported combustible cigarette levels. Vuse Alto incorporates a relatively new atomizer design in which the heating element is embedded on the surface of a porous ceramic brick that is saturated with the ENDS liquid. Vuse Solo is a compact, low power ENDS that uses a high concentration nicotine in the protonated form. It emits nicotine, and is capable of matching or exceeding in 15 puffs the nicotine emitted by a typical combustible cigarette, though with considerably lower CC and ROS emissions. With its higher power, Vuse Alto emits nicotine at 2-3 times the rate of Vuse Solo, also in the protonated form, and may present a greater potential for abuse than the lower sales-volume Solo.

FUNDING: Federal

POS3-48

PRENATAL EXPOSURE TO E-HOOKAH INCREASES THE RISK OF OCCLUSIVE CARDIOVASCULAR DISEASE STATES

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Cardiovascular diseases (CVD) is well documented as the leading cause of death, not only in the United States but also globally. Moreover, smoking is the leading preventable cause of CVD and accounts for 33% of CVD-linked diseases. Indeed, most smokers die from thrombotic-based diseases, in which platelets play a major role. To this end, because of the proven harm of cigarette smoking, other novel tobacco products-including e-hookah, have been gaining popularity, including amongst women and women of child-bearing age. Thus, women of women of child-bearing age and/or pregnant women who smoke have been switching to Electronic Nicotine Delivery Systems (ENDS) because they perceive them to be "safe" and/or 'safer' than traditional cigarettes, which is not evidence-based. Amongst ENDS, while most investigators have been focusing on e-cigarettes, virtually nothing is known regarding e-hookah and its effects on platelets and thrombosis, including in the context of prenatal exposure. To address this issue, we employed a whole-body exposure model of e-hookah and exposed female mice one-week before mating and throughout the prenatal (*in utero*) period, and performed experiments on the offspring once they have reached 10-12 weeks of age. Exposures took place seven times a week, according to the well-known Beirut protocol, whereas control mice were exposed to clean air. The Beirut exposure protocol involves the delivery of 171 puffs of 530 ml volume of the e-liquid at 2.6s puff duration and 17s puff interval, with each session lasting around one hour. This protocol has been employed in many tobacco studies with the advantage of mimicking real-life smoking patterns of e-hookah users. Our results showed that prenatal e-hookah exposed mice had shortened bleeding time, when compared to the clean air controls, suggesting a prothrombotic phenotype. Indeed, our $FeCl_3$ thrombosis model revealed decreased occlusion time, which indicates that these mice are at a higher risk of thrombogenesis. Investigation of the mechanism underlying this phenotype, first showed that e-hookah exposed platelets had enhanced agonist-triggered aggregation. Next, flow cytometry analysis of surface proteins showed that integrin IIb-IIIa and P-selectin activation was also enhanced in the e-hookah exposed platelets, indicating hyperactivity. In terms of the impact on inhibitory signaling, interestingly, we found that e-hookah renders platelets resistant to prostaglandin I_2. Importantly, we did not detect any apparent changes in the platelet count, or other hematologic parameters. Based on these results, we document, for the first time, that e-hookah does exert negative health effects in the context of thrombosis-based CVD, in part, via promoting platelet hyperreactivity. Hence, e-hookah should not be considered a safe alternative to traditional cigarette smoking.

FUNDING: Federal; Academic Institution

POS3-49

ASSOCIATION BETWEEN ELECTRONIC CIGARETTE USE AND DEPRESSION AMONG THAI ADOLESCENTS: THE THAILAND NATIONAL HEALTH EXAMINATION SURVEY 2019-2020

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Significance: Depression and e-cigarette use among adolescents are double burdens on health. However, research on e-cigarettes and depression is insufficient. Furthermore, most studies have been conducted in high-income countries. This study examines the association between depression and e-cigarette use among adolescents in Thailand. Methods: Data from the sixth Thai National Health Examination Survey of adolescents aged 10-19?years were analyzed using complex survey multiple logistic regressions to assess whether e-cigarette use was associated with depression. Results: The mean age of the participants was 14.6 years old, 5.3% were ever e-cigarette users, and 2.9% were current e-cigarette users. 37.8% of the participants were categorized as at risk for depression. Among e-cigarette users, 51.6% of ever e-cigarette users and 52.9% of current e-cigarette users were at risk for depression. Multiple logistic regressions revealed that ever e-cigarette users were at higher risk for depression (OR 1.66; 95% CI 1.02-2.71; p 0.042). Current e-cigarette use also yielded an elevated point estimate of higher risk for depression (OR 1.37; 95% CI 0.77-2.45; p 0.263), but it did not reach conventional statistical significance. Conclusions: E-cigarette use and depression among adolescents are global public health concerns. There is also a need for effective screening, prevention, and intervention to reduce adverse outcomes of e-cigarette use and depression. In addition, the government should strengthen current policies and close legal loopholes to prevent the tobacco industry tactics and keep e-cigarettes away from adolescents.

FUNDING: State; Academic Institution

POS3-50

THE MODIFIED E-CIGARETTE EVALUATION QUESTIONNAIRE: PSYCHOMETRIC EVALUATION OF AN ADAPTED VERSION OF THE MODIFIED CIGARETTE QUESTIONNAIRE FOR USE WITH ADULTS WHO USE E-CIGARETTES

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Significance. The subjective experience of positive and negative effects likely contributes to e-cigarette use, and the Modified Cigarette Evaluation Questionnaire (MCEQ) previously has been adapted to assess the reinforcing and aversive effects of vaping. However, the psychometric properties of the MCEQ for use with e-cigarettes have not been established. Methods. We examined the psychometric properties of the Modified E-cigarette Evaluation Questionnaire (MCEQ) among 857 adults who used e-cigarettes in a smoking cessation attempt (52.4% male; 40.84 [12.25] years old; 62.8% non-Hispanic white). Analyses included confirmatory factor analysis of the original structure, exploratory/confirmatory factor analyses to identify alternate latent structure(s), internal consistency, measurement invariance, between-group differences, and test-criterion relationships with vaping-related outcomes. Results. The five-factor structure and a novel four-factor structure were supported. Each was scalar invariant across several participant subgroups (e.g., current smoking status, daily vaping status). All multi-item subscales were internally consistent. Both versions detected several between-groups differences. For example, current smokers reported stronger aversive effects than did exclusive e-cigarette users. Finally, adjusted relationships between both MECEQ versions and vaping-related outcomes provided evidence for concurrent validity. Conclusions. The five-factor and four-factor versions of the MECEQ evidenced good-to-excellent internal consistency, scalar measurement invariance, and concurrent relationships with vaping-related outcomes. Results strengthen the interpretability of previously published work using the five-factor structure and provide an alternative scoring approach to study vaping-specific subjective effects. While both versions could be used to assess subjective vaping effects in adults with histories of cigarette smoking and vaping, additional research is needed to evaluate the applicability of these factor structures to other samples (e.g., e-cigarette users with no smoking history, youth).

FUNDING: Federal

POS3-51

PREDICTORS OF ADOLESCENTS' TRANSITION THROUGH THE STAGES OF CHANGE FOR QUITTING E-CIGARETTES: FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: This study aims to identify predictive factors associated with US adolescents' transition through the stages of change for potentially quitting e-cigarettes using the Trans-theoretical model of behavior change. Methods: We utilized data from adolescents in Wave 3 of the Population Assessment of Tobacco and Health (PATH) study who used e-cigarettes exclusively over the past 30 days (n=177) and were then followed up in Wave 4. For analysis purposes, we classified adolescents into three transition categories: those who remained stagnant, those who progressed, and those who regressed in their stage of quitting e-cigarettes. Weighted adjusted multinomial regression analysis was performed to determine the association of various e-cigarette-related factors with the three transition categories. Results: Overall, from Wave 3 to Wave 4, about 19% of adolescents remained stagnant; 73.3% progressed; and 7.7% regressed. Adolescents were less likely to progress in their stage of change if they perceived nicotine in e-cigarettes to be "not at all/slightly harmful" (P<0.001); reported important people's use of e-cigarettes (P=0.009); and "rarely" noticed e-cigarette health warnings (P=0.054). Adolescents were more likely to regress in their stage of change if they believed that people cause "no harm/little harm" to themselves when they use e-cigarettes (P<0.001) and reported that important people held positive views about using e-cigarettes (P<0.001). Conclusion: Our findings suggest that e-cigarette harm perception, important people's use of e-cigarettes as well as their positive views about these products, and e-cigarette health warnings are important predictors of adolescent

transitions across different stages of change for quitting e-cigarettes. There is a need for public health professionals and policy makers to design effective intervention programs targeting specific predictive factors that may help adolescents in quitting e-cigarette.

POS3-52

THE EFFECTS OF MOOD ON RESPONSES TO SMOKING CESSATION MESSAGES IN ADULT CIGARETTE SMOKERS

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Introduction: Evidence suggests that smokers' moods at the time of a smoking cessation message may influence message effectiveness. In this study, we tested the impact of mood on adult smokers' responses to smoking cessation messages. Methods: U.S. adults (18 years and older) who currently smoked cigarettes (N=617) were recruited via the crowdsourcing platform, Prolific. Participants were randomized to one of three mood induction conditions (positive, neutral, or negative) and viewed 30 mood-inducing images. Next, participants viewed 30 random-ordered smoking cessation messages in five theme categories (motivation to quit, challenges of quitting, quality of life (i.e., aesthetics, pleasant scents), health (i.e., physical ailments and health harms), and financial costs/rewards). Participants completed self-report measures on message receptivity, message relevance, and motivation to quit after viewing each message. Each theme received an average score on the outcome variables and was ranked based on the scores using a Multi-Attribute Decision-Making Model (MADM), a decision analytic technique that allows for prioritization of specific message outcomes across multiple messages tested to determine optimal message content. Results: Within each mood, we computed summary scores of each message and ranked them based on the scores to identify the highest and lowest ranked message theme categories. For positive and negative moods, health themed messages received the overall highest rankings. For neutral moods, quality of life themed messages received the highest overall ranking. For all three mood conditions, challenges in quitting themed messages received the lowest overall ranking. Within the positive and negative mood conditions, health themed messages were ranked highest for motivation to quit and perceived relevance, and quality of life themed messages were ranked highest for message receptivity. For neutral moods, quality of life themed messages received the highest ranking in motivation to quit, perceived relevance, and message receptivity. Conclusions: Results suggest that there were variations in preference for smoking cessation messages based on mood. Adults in positive and negative moods reported a similar preference for health themed messages, but adults in neutral moods reported a preference for quality of life themed messages Findings provide preliminary evidence for effective themes based on mood for smoking cessation interventions.

FUNDING: Federal; Academic Institution

POS3-53

WHAT ARE THE DEVICE AND LIQUID CHARACTERISTICS USED WITH SWEET, MENTHOL/MINT, AND TOBACCO ENDS LIQUID FLAVORS: RESULTS FROM THE POPULATION-BASED VAPER STUDY

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Significance: Electronic nicotine delivery system (ENDS) device and liquid characteristics (e.g., wattage, nicotine concentration, flavor) are diverse and important in determining product appeal, aerosol volume/nicotine levels, dependence, and toxicity. ENDS liquids are commonly flavored as sweet, menthol/mint, or tobacco. Understanding how device and liquid characteristics vary by most used flavor has regulatory implications. Methods: Data are from a longitudinal cohort study (Wave 2; December 2020-April 2021) of adult (=21 years) U.S. ENDS users (=5 days of use/week). Participants (N=1218) self-reported on and submitted photos of their most used device and liquid; photo data were prioritized. When possible, participants (n=1023) were grouped based on their primary ENDS flavor: sweet, menthol/mint, or tobacco. Participants using liquids without nicotine (n=31) or flavors other than sweet, menthol/mint, or tobacco (n=164) were excluded. Post-stratification survey weights for gender/age/race were implemented. Chi-square tests and linear regression were used to examine device and liquid characteristics by flavor. Results: Sweet flavors were most common (n=762; 74.5%), followed by menthol/mint (n=154, 15.1%) and tobacco (n=107, 10.5%). Sweet flavors were less common among participants using reusable devices with disposable pods/cartridges than those using other device types (7.9% vs. 85-93%; p<0.001) and those continuing to use ENDS primarily for non-flavor reasons vs. for the flavor (72% vs. 94%; (p<0.001). Compared to tobacco flavors, sweet flavors were correlated with lower nicotine concentrations, higher wattages, lower voltages, lower resistances, and lower ages of ENDS first use (p<0.001); these relationships varied by device type and nicotine formulation. Conclusion: ENDS device and liquid characteristics used vary with flavor. Regulatory agencies must consider how regulations on device and liquid characteristics may affect ENDS users' behaviors (e.g., limiting the availability of sweet flavors may encourage use of non-sweet flavors and lower wattages). Future research should examine the health implications of device/liquid combinations (including flavor) and how specific flavor regulations may affect user behavior and health.

FUNDING: Federal

POS3-54

E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS SINCE THE FDA'S MISSED DEADLINE TO REGULATE E-CIGARETTES: AN EXPLORATION OF RISK FACTORS

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Introduction: The United States Food and Drug Administration (FDA) was ordered to evaluate electronic nicotine delivery systems (ENDS) products by September 9, 2021. However, the FDA missed the deadline and conveyed to a federal court that it would not be able to review the most common tobacco/nicotine delivery devices until 2023. Since the missed deadline, >750,000 youth have started using e-cigarettes. Objective: To identify potential risk factors for e-cigarette use among youth and young adults since the FDA's missed deadline. Methods: Data were obtained from the Truth Longitudinal Cohort (TLC), a probability-based, nationally representative, longitudinal sample of youth and young adults between 15 and 24 (*n*=2037). Respondents included individuals who had not previously used any e-cigarette products and were surveyed at baseline (July to October 2021) and at follow-up (January to June 2022). Data on sociodemographic characteristics (age, sex, gender identity, race/ethnicity, financial situation), e-cigarette device type (e.g., pod-base or tank style), measures of mental health status, sensation-seeking, and e-cigarette use were used for analyses. Logistic regression models, predicting e-cigarette use, were conducted using STATA. Results: Older age (18-20 years, OR = 2.2, 95% CI: 1.7, 2.8; 21-24 years, OR: 2.8, 95% CI: 2.2, 3.6), indicators of mental health status (prior mental health disease diagnosis: OR = 1.3, 95% CI: 1.0, 1.6), e-cigarette use by peers (OR: 5.2, 95% CI: 4.4, 6.1) and family members (OR = 3.9, 95% CI: 2.8, 5.6), and higher levels of sensation seeking (searching for stimulating experiences or activities) (OR: 2.0, 95% CI: 1.7, 2.3) were associated with e-cigarette use initiation. Discussion: Results provide information on potential risk factors for e-cigarette initiation. This information could be used to provide further insight into reducing e-cigarette use in youth and young adults.

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POS3-55

THE IMPACT OF DENOMINATOR DEFINITIONS ON MEASURES OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USE AMONG YOUTH IN THE U.S. ACROSS NATIONALLY REPRESENTATIVE SURVEYS

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SIGNIFICANCE: Prevalence of electronic nicotine delivery system (ENDS) use is important for characterizing impacts on public health. Nationally representative surveys are one of the primary data sources to evaluate ENDS use. METHODS: An analysis was conducted to determine how different denominator definitions influenced the prevalence of ENDS use among US youth (less than 18 years) between 2011 and 2020 across the following surveys: Monitoring the Future (MTF), National Youth Tobacco Survey (NYTS), Population Assessment of Tobacco Health (PATH), and Youth Risk Behavior Surveillance System (YRBSS). RESULTS: While there was variation between surveys and years, the prevalence of ever use and current use (i.e., past 30-day use) of ENDS increased over time. Predictably, higher measures of current use were observed when the denominator was restricted to ever users, compared to all survey respondents. For example, current use among ever users in NYTS ranged from 30.5% in 2011 to 48.9% in 2020, while current use among all respondents ranged from 1.1% to 13.0%. The overall highest prevalence of current use was observed in YRBSS, ranging from 52.3% in 2015 to 67.4% in 2019 among ever users, and 24.1% to 32.8% among all respondents. Regardless of the denominator used, prevalence was consistently higher for infrequent measures of ENDS

use (i.e., less than 20 days), although frequent use (i.e., 20 days or more) increased over time. Frequency of use estimates were higher when the denominator was restricted to current users, rather than including all respondents. For example, frequent ENDS use among current users was 35.3% in the 2020 MTF, 35.9% in the 2020 NYTS, 27.3% in Wave 5 (i.e., December 2018 to November 2019) of PATH, and 32.6% in the 2019 YRBSS. Comparatively, when all respondents were used as the denominator, frequent use was 5.6% in the 2020 MTF, 4.7% in the 2020 NYTS, 2.3% in PATH Wave 5, and 10.7% in the 2019 YRBSS. CONCLUSIONS: The current analysis demonstrates that differences in how denominators are defined are a source of variation in ENDS prevalence estimates within and between surveys. The highest prevalence estimates of use were observed using the more restrictive denominator (e.g., subpopulations of tobacco users). These results raise questions as to whether ENDS prevalence estimates reported in the literature are comparable based on the denominator used and whether there should be a consistent denominator definition in studies of ENDS prevalence.

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POS3-56

EXAMINING THE EFFECTIVENESS OF THE TRUTH ANTI-VAPING CAMPAIGN: PATHWAYS TO PREVENTION AMONG YOUTH AND YOUNG ADULTS

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Significance: In recent years, mass media campaigns have focused on prevention of e-cigarette use by youth and young adults in an effort to counter the increased normalization of e-cigarette use. While studies have provided evidence for causal pathways of anti-cigarette campaigns from ad awareness to decreased use, there have not been any such studies for anti-e-cigarette campaigns. This study examines the pathways through which awareness of the truth® anti-vaping campaign affects the progression of e-cigarette use and initiation among youth and young adults. Methods: The sample (N=4,769) consisted of 15-24-year-olds from the Truth Longitudinal Cohort (TLC), a probability-based, nationally representative survey. We used three waves of the TLC in our analysis: Wave 1: September 2020 - March 2021; Wave 2: July - October 2021; Wave 3: January - May 2022. All participants were nicotine naïve at baseline. We used latent growth structural equation modeling to examine the pathway starting from cumulative ad awareness to campaign-targeted attitudes, including perceived risk of harm, anti-e-cigarette industry sentiment, desire for independence from addiction, affinity for groups that reject vaping, and perceived social norms. The hypothesized pathway continued from attitudes to frequency of e-cigarette use. Results: There was no significant effect seen in the direct pathway from ad awareness to e-cigarette use frequency. However, the overall indirect pathway showed that greater ad awareness leads to lower frequency of e-cigarette use (B = -.02, P < 0.001). Ad awareness was significantly associated with stronger campaign-aligned attitudes, and each attitude was significantly associated with increased perceptions of social disapproval of e-cigarette use. Finally, increased perceptions of social norm disapproval resulted in a slower progression toward e-cigarette use (B = -.32, P < 0.001). Conclusion: Findings support that the causal pathway follows awareness of the truth® anti-vaping campaign to campaign-targeted attitudes, where perceived social norms were found to be a standalone step. The result is slowed progression of e-cigarette use. This novel study has implications for future anti-e-cigarette campaigns, which when coupled with comprehensive e-cigarette policies, can help reduce the risk of nicotine addiction among youth and young adults.

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POS3-57

EXPOSURE TO METALS AMONG ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) USERS IN THE PATH STUDY: A LONGITUDINAL ANALYSIS

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Significance: Evaluating the safety of Electronic Nicotine Delivery Systems (ENDS) requires comprehensive measures of toxic chemicals. ENDS are engineered products containing and emitting metals. Few studies have evaluated ENDS as a potential source of toxic metal exposure in human populations. This study evaluated metal body burden by ENDS use status in a longitudinal population-based national survey.Method: We used the Population Assessment of Tobacco and Health (PATH) Study wave 1 (2013-2014), wave 2 (2014-2015), and wave 3 (2015-2016) adult data to assess urinary metal concentrations of beryllium (Be), cadmium (Cd), cobalt (Co), manganese (Mn), lead (Pb), strontium (Sr), thallium (Tl), and uranium (U) among (1) ENDS only users (n=454), and (2) Never users (n=1501) of any tobacco product. We further dichotomized ENDS only users as: a) ENDS only users who were former users of any nonelectronic tobacco products (ENDS F) (n=268), b) ENDS only users who never used any nonelectronic tobacco products (ENDS N) (n=186). Combining former combustible and former noncombustible users in the ENDS F group provides a conservative estimate of the exposure of ENDS users to metals, because noncombustible users would likely have lower metal levels than former cigarette smokers. We used weighted linear regression models on log-transformed urinary metal concentrations by tobacco use status. Results: Among all ENDS only users in wave 1 (n=454) who remained ENDS only users in waves 2 and 3, the geometric mean ratios (GMRs) of urine Cd and Pb were 1.19 (95%CI: 1.08-1.31) and 1.17 (95%CI: 1.07-1.30), respectively, compared to never users of any tobacco product after adjustment for former tobacco use, PATH Study wave, age, sex, race/ethnicity, secondhand smoke exposure, cannabis use, and other substance use. The corresponding GMRs were 1.58 (95%CI: 1.48-1.68) and 1.25 (95%CI: 1.17-1.34) for ENDS only users who were former users of any nonelectronic tobacco products (n=268), and 1.17 (95%CI: 1.07-1.28) and 1.14 (95%CI: 1.05-1.25) for ENDS only users who never used any other tobacco product (n=186) after similar adjustment. No difference in urinary concentrations of other metals comparing ENDS users to never users of any tobacco products was observed. Conclusion: Data from the PATH study waves 1, 2, and 3 suggest that ENDS are potentially contributing to the body burden of several metals among its users. Other studies are needed to assess metal exposure and related health effects from longer-term ENDS use, including metals commonly found in ENDS emissions such as nickel and chromium, which are currently not measured in PATH.

FUNDING: Federal

POS3-58

YOUNG ADULTS ATTEMPTING TO QUIT USING E-CIGARETTES: A MIXED METHODS ANALYSIS

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Purpose. The purpose of this study was to explore young adult e-cigarette users' experiences with trying to quit using e-cigarettes. To do this, we examined associations between dependence on e-cigarettes and attempts to quit using e-cigarettes. Qualitative narratives about quit attempt experiences were also examined. Methods. An online sample of young adult e-cigarette users (n=593) was collected in October 2021. Participants reported demographic information, dependence on e-cigarettes (using the Penn State E-Cigarette Dependence Index), and information about past attempts to quitting cigarettes and e-cigarettes. Logistic regression was used to examine the association between attempting to quit vaping and covariates. One-way ANOVAs were used to examine the relationship between e-cigarette dependence and number of quit attempts, time since last quit attempt, and length of e-cigarette abstinence. Next, a subsample of participants (n=25) was recruited to participate in a follow-up interview via Zoom, where participants were asked questions about their past attempts to quit vaping and reasons why someone might try to quit using e-cigarettes. All interviews were transcribed verbatim, and data were coded using Nvivo. Following coding, the research team conducted a thematic analysis and examined findings juxtaposed with the quantitative results. Results. The majority of the sample (73.5%) had attempted to quit using e-cigarettes at some point. Variables associated with quit attempts included being female (aOR=1.69), higher educational attainment, increased dependence on e-cigarettes, and decreased use during the COVID-19 pandemic (aOR=2.33). Those who had completed some college (aOR=1.95) or a bachelor's degree or higher (aOR=2.12) had greater odds of trying to quit than those with a high school diploma or less. Those with low (aOR=1.99), moderate (aOR=3.63), and high (aOR = 4.05) dependence on e-cigarettes had greater odds of attempting to quit than those with no dependence. Those who had tried to quit 3+ times were more dependent on e-cigarettes than those who had only tried once (p<.001), and those who resumed use less than one week after quitting had higher dependence scores than those who resumed one week, 1 week to 1 month, and more than 1 month later (p<.001 for all groups). During interviews, participants described the challenges of quitting, including alcohol and social atmospheres on the weekends. Participants also described withdrawal symptoms, including headaches and shaking, that they had experienced when trying to quit vaping. Discussion. Although many young adults want to quit or cut back on their use of e-cigarettes, many are finding themselves dependent to these tobacco products. This presentation will discuss young adults' experiences with quitting e-cigarettes and provide recommendations for future cessation options.

FUNDING: Academic Institution

POS3-59

RELATIONSHIPS BETWEEN ELECTRONIC NICOTINE DELIVERY SYSTEM DEVICE CHARACTERISTICS, PUFFING BEHAVIOR, AND DEPENDENCE

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Significance: Electronic nicotine delivery systems (ENDS) are heterogeneous products, with considerable variability in device power, liquid nicotine concentration, and other characteristics. ENDS characteristics may be related to user puffing behavior, subjective effects, and nicotine dependence. Methods: Fifty-seven ENDS users (25 men, 26 women, 6 other gender identities; 39 white, 11 Black/African American, 7 other racial identities) 18-59 years old attended one laboratory session in 2021-2022 that involved documenting detailed ENDS device and liquid information, measuring puffing behavior during a 25-minute ad libitum use period, and measuring subjective effects following use. For devices with modifiable settings, participants chose settings before device documentation and maintained these settings throughout the use period. Results: Participants used a variety of ENDS devices, including tank-style and pod-style (89% rechargeable, 51% closed system). Device power, obtained via photographs, participant self-report, multimeter measurement, or online reports, ranged from 3.3W to 200W. Liquid nicotine concentration ranged from 0 to 50 mg/ml (mean=29.71, SD=20.72). Positive correlations were observed between device power and average and total puff volumes (r=0.38, r=0.47), and between liquid nicotine concentration and perceived ENDS harshness (r =0.42; all ps<0.05). Negative correlations were observed between liquid nicotine concentration and average and total puff volumes (r=-0.46, r=-0.56) and device power (r=-0.67; all ps<0.05). Contrasting some literature, participants also reporting past 30-day cigarette use had higher ENDS dependence scores than participants who did not. No differences were observed between these groups for device power, liquid nicotine concentration, puff duration, or puff volume. Conclusion: Few data evaluate relationships between user puffing behavior and ENDS device and liquid characteristics. In this study, participants with lower puff volumes tended to use lower power ENDS and higher nicotine concentrations. Nicotine concentration and power may influence puffing behavior. Relationships between ENDS characteristics and user behaviors should be considered when determining regulations addressing nicotine and other toxicant delivery.

FUNDING: Federal; Nonprofit grant funding entity

POS3-60

CHANGE IN TOBACCO PRODUCT USE AMONG STUDENTS AGED 13-15 YEARS IN 34 COUNTRIES—GLOBAL YOUTH TOBACCO SURVEY, 2012-2020

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Background: Evidence shows that most adults who currently use tobacco start before 21 years old. Comprehensive, cost-effective strategies and interventions to prevent initiation and encourage tobacco use cessation among youth are critical aspects of protecting youth from the harms of commercial tobacco. This study uses data from the Global Youth Tobacco Survey (GYTS) to describe changes in the prevalence of current tobacco product use among youth in 34 countries. Methods: Data from 34 countries with a minimum of two rounds of GYTS between 2012 and 2020 were included. Overall crude prevalence of current use of tobacco products (i.e., past 30-day), and adjusted prevalence difference (aPD) between rounds were assessed for each country. The analysis included cigarettes, other tobacco not including cigarettes, smokeless tobacco, use of any tobacco product, and electronic cigarettes (e-cigarettes). Marginal effects in multivariate logistic regression models, controlling for covariates, were used to estimate aPD between rounds. The aPD was considered statistically significant if the P-value was <0.05. Results: The aPD for current product use among youth remained unchanged in >60% of the included countries, including cigarettes (29/34), other smoked tobacco (20/33), smokeless tobacco (22/33), and any tobacco use (26/33). For any tobacco use, statistically significant decreases were reported for Bhutan (aPD = -8.1 percentage points [pct pts]; 95% CI = -12.9, -3.4), Micronesia (aPD = -7.2 pct pts; 95% CI =-9.7, -4.7), San Marino (aPD = -7.0 pct pts; 95% CI = -11.2, -2.7), Togo (aPD = -2.7 pct pts; 95% CI = -4.6, -0.7), and Panama (aPD = -2.2 pct pts; 95% CI = -4.1, -0.4); whereas, significant increases were reported for Moldova (aPD = 4.7 pct pts; 95% CI = 4.5, 7.8), Albania (aPD = 4.6 pct pts; 95% CI = 2.1, 7.2), and Paraguay (aPD = 1.8 pct pts; 95% CI = 0.1, 3.6). The aPD for current e-cigarette use increased significantly in 7 of 10 countries. Conclusion: Progress toward reducing tobacco use among youth stalled during 2012-2020 in most countries that implemented GYTS, while e-cigarette use increased in most of the countries that asked about e-cigarette use. Additional evidence regarding e-cigarettes and emerging tobacco products might be needed to better understand if youth globally are shifting from smoking cigarettes to using e-cigarettes and other emerging tobacco products.

FUNDING: Unfunded

POS3-61

INCIDENCE OF CHRONIC DISEASE FOLLOWING SMOKING CESSATION TREATMENT: A MATCHED COHORT STUDY USING LINKED ROUTINELY COLLECTED HEALTHCARE DATA IN ONTARIO, CANADA

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Significance: Scarce evidence is available on the impact of providing smoking cessation treatment on subsequent health outcomes such as incidence of chronic disease. This study compared the incidence of cancer, chronic obstructive pulmonary disease (COPD), hypertension, diabetes, and major cardiovascular events (MCE) during a 5-year follow-up period among a cohort of smokers who had enrolled in a smoking cessation treatment program and a matched cohort of control smokers who had not accessed the program. Methods: In a parent study, we previously derived a treatment cohort of patients who had enrolled in a publicly-funded smoking cessation treatment program in 2011-2012 and a 1:1 matched control cohort of smokers who had not accessed the program. For the current study, we selected 5 matched sub-cohorts consisting of parent study matched treatment-control pairs in which both individuals were at risk of the following chronic diseases: (1) cancer (n=9134 per cohort), (2) COPD (n=5905 per cohort)), (3) diabetes (n=7543 per cohort), (4) hypertension (n=5577 per cohort), and (5) MCE (n=9279 per cohort). Incident chronic disease from index date until 31December2017, or death if it occurred first, was determined through linkage with routinely collected healthcare data. The cumulative incidence (CI) of each chronic disease was estimated using the cumulative incidence function with death as a competing risk; Gray's?test?was?used to test for a difference between matched treatment and control sub-cohorts in the chronic disease-specific cumulative incidence function over follow-up.?Analyses were stratified by sex.? Results: Among females, the cumulative incidence of diabetes was significantly higher over follow-up for the treated versus controls (5-yr CI: 5.8% vs 4.2%, p = 0.004), but the cumulative incidence of cancer, COPD, hypertension and MCE did not differ. Among males, the cumulative incidence of COPD (5-yr CI: 12.2% vs 9.1%, p < 0.001) and diabetes (5-yr CI: 6.7% vs 4.8%, p < 0.001) were significantly higher over follow-up for the treated versus controls, but the cumulative incidence of cancer, hypertension and MCE did not differ. Conclusion: Accessing primary-care based smoking cessation treatment is associated with increased incidence of diabetes for both sexes, and COPD for males, within 5 years of treatment.

FUNDING: Federal

POS3-62

E-CIGARETTE AND POLY SUBSTANCE USE AND MENTAL HEALTH AMONG COLLEGE STUDENTS IN THE UNITED STATES BEFORE AND DURING COVID-19

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Background: In March 2020, World Health Organization (WHO) declared the novel coronavirus disease (COVID-19) a global pandemic. COVID-19 has had drastic impacts on students' mental health. This study aims to understand the relationship of e-cigarette use with serious psychological distress (SPD), anxiety, and depression among college students in the United States before and during COVID-19. Methods: This cross-sectional study included 179,616 college students from the Fall 2019 to Spring 2021 American College Health Association-National College Health Assessment. Pearson's Chi-square tests were used to examine the differences in the prevalence of SPD, anxiety, and depression across different subgroups. Multiple logistic regression models were applied to examine the associations between e-cigarette use and poly substance use (other tobacco products and cannabis) with SPD, anxiety, and depression, adjusting for covariates. Results: From pre-COVID-19 (Fall 2019) to during-COVID-19 (Spring 2021) The

prevalence of SPD (18.1% to 23.9%), anxiety (23.7% to 29.1%), and depression (19.4% to 23.4%) significantly increased. However, the prevalence of e-cigarette, cigarette, and cannabis use did not significantly change. Current tobacco (i.e., e-cigarettes and cigarettes) and cannabis users had significantly higher odds of mental health conditions than students not reporting current use. The highest odds ratios were among poly substance users, those using three or more substances (SPD: 2.09, anxiety: 2.61, depression: 3.21). Conclusions: In U.S. college students, mental illness substantially increased during COVID-19. As tobacco and cannabis use were risk factors for mental illness, college substance use (tobacco and marijuana) prevention and cessation programs may improve the mental health of college students.

FUNDING: Federal

POS3-63

ASSESSING AND CLASSIFYING TOBACCO WASTE IN URBAN OUTDOOR ENVIRONMENTS IN KOLKATA, INDIA

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Background: In India, numerous forms of tobacco are used, including smokeless (SLT), cigarettes and bidis, as well as e-cigarettes and heated tobacco products (HTPs). Each product can contribute to litter, including discarded packaging, butts, and e-waste. We conducted an observational study to assess and classify the presence of tobacco litter in different urban outdoor environments in Kolkata, India. Methods: Tobacco litter observation routes were predetermined in three regions of the city (South, Central and North). In each region, routes were identified in different neighbourhoods including a business district, a government office district, a commercial district in a low socio-economic (SES) area, and a transit hub, for a total of 12 observation routes. Each route was near a tobacco retailer and was between 500-700m in traversed distance, generally along a pedestrian area. Each route was observed twice for a total of 24 observation events. Data collectors used a mobile app to record the location and type of tobacco litter identified (cigarette or bidi butts, cigarette or bidi or SLT packaging, e-cigarette or HTP waste). Data collection took place during June and July 2022. Results: The study identified N=2,227 pieces of tobacco litter over 12,934 meters. Tobacco litter was identified during each observation event (range: 39-217 pieces of litter). SLT packaging represented the largest proportion of the sample (45%, n=1010), followed by cigarette butts (33%, n=738), bidi butts (12%, n=268), cigarette packaging (7%, n=147) and bidi packaging (3%, n=64). The study did not observe any e-cigarette/HTP waste. Government office districts had the greatest proportion of litter (31%, n=696), followed by business districts (24%, n=534), commercial areas in lower SES areas (23%, n=507), and transit hubs (22%, n=490). Conclusion: Tobacco litter was present in each of the routes included in this study, and there was no meaningful difference in the number of pieces of litter by type of neighborhood. No litter from e-cigarettes or HTPs was observed, which may be credited to the national ban prohibiting these products since 2019. Notable was the high proportion of litter that was SLT packaging and cigarette butts; these are typically made of plastic that can stay in the environment in perpetuity. Cities like Kolkata are working to reduce single-use plastics and may expand their focus to include tobacco products as they have high environmental and health burdens.

FUNDING: Nonprofit grant funding entity

POS3-64

EXAMINING REASONS FOR USING E-CIGARETTES TO QUIT SMOKING AND SOURCES OF INFORMATION AMONG US ADULTS

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Significance: Cigarette smoking remains the leading cause of preventable death in the US. E-cigarette use has shown promise in helping people quit smoking. Identifying e-cigarette-related information that is most relevant for adults during a cessation attempt and where they receive that information is important for the potential for e-cigarettes to reduce smoking and smoking-related harm. Methods: Online survey data were collected in summer 2021 from 857 adults (who reported using e-cigarettes in a recent smoking cessation attempt. Survey items assessed reasons for using e-cigarettes to quit, where people received advice on how to use e-cigarettes, what advice they received, and what information they want in a program when using e-cigarettes to quit smoking. Results: The most common reasons for using e-cigarettes to quit smoking included thinking that vaping would be helpful for quitting (53.6%), is safer than smoking (50.5%), and is a good substitute for cigarettes because of nicotine content (44.7%). Most people received information about using e-cigarettes to quit smoking from informal sources including friends (43.9%) and internet searches (35.2%). Only 14.0% received information from a healthcare provider. People received information on what kind of device (48.5%), flavor (46.3%) and nicotine concentration to use (43.6%). More people were advised to gradually switch from smoking to vaping (46.7%) rather than to make an abrupt switch (30.2%). The top response for desired additional information was advice on how to gradually reduce nicotine over time to become nicotine-free (46.3%). Conclusions: Study findings provide information about reasons for using e-cigarettes to quit smoking and the kind of information adults seek when using e-cigarettes to quit smoking.

FUNDING: Federal

POS3-65

OHIO APPALACHIA SMOKERS' AND SMOKELESS TOBACCO USERS' PERCEPTIONS OF NOVEL ORAL NICOTINE POUCH MARKETING

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Significance: Oral nicotine pouches (ONPs) are novel products, gaining popularity and marketed as tobacco-free alternatives to cigarettes and smokeless tobacco (SLT). ONPs may carry a lower toxicant burden than cigarettes or SLT and consequently a reduced harm potential, but their public health impact is unknown. We qualitatively examined responses to ONP marketing in cigarette smokers and SLT users from Ohio Appalachia, a region disproportionately burdened by tobacco use, to understand how marketing shapes perceptions of and interest in using ONPs. Methods: In 2022, we conducted 10 virtual focus groups with Ohio Appalachia smokers (n=19, 5 focus groups) and smokeless tobacco users (n=18, 5 focus groups) aged 21 and older. Focus groups used a structured guide to explore participants' perceptions of 3 examples of ONP marketing reflecting current industry marketing tactics. We transcribed focus groups verbatim and used an iterative coding process applying simultaneous inductive and deductive analysis. We double-coded transcripts (kappas for themes > 0.70) and analyzed coded data for prominent themes. Results: Participants drew from their knowledge and experience with cigarettes/SLT to formulate ONP marketing perceptions. Marketing content that drew attention included colors, flavors, nicotine strength, packaging displayed, and "tobacco-free" claims. Despite some appealing features, overall participants expressed they would "overlook" ONP ads and that "Unless you are in the market for it, you're not even looking at it." Participants also indicated ads were "soft and clean," lacked brand-recognition, and appeared like "chewing gum" or a "tin of mints." While more information about ONPs was appealing, ads with too much information led to disinterest and were negatively perceived as similar to medical information. Participants surmised ONP ads would appeal to youth, new users, tobacco users seeking to cut down/quit, or to "high class," "white-collar" demographics. Conclusion: ONP marketing elicited limited appeal among smokers and SLT users from Ohio Appalachia. Features like colors, flavors, nicotine concentration, and "tobacco-free" claims may contribute to their perceived appeal and could lead to switching to reduced harm products. Research is needed to study the appeal of ONPs and their marketing among youth and non-users to inform policy and regulatory approaches to these novel nicotine products.

FUNDING: Academic Institution

POS3-66

DAILY DISCRIMINATION AND URGE TO SMOKE IN SEXUAL MINORITY INDIVIDUALS

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SIGNIFICANCE: Higher tobacco use prevalences in sexual minority individuals may be attributable to minority and discrimination stress and attempts to relieve negative affect. While some studies have examined experiences of discrimination stress on smoking prevalence, a longitudinal study has yet to examine the impact of daily experiences of discrimination on the intensity of urges to smoke in sexual minorities. METHODS: Sexual minority individuals (N=76, 60.8% Female Identifying, 72.5% Gay or Lesbian, Mean age= 37.1 (SD=9.7)) completed up to 35 days of surveys at bedtime in which they indicated if 10 discrimination practices had occurred to them over the past day and their level of agreement to the statement "Today, I had frequent urges to smoke" (0=Not at All; 1=A Little; 2=Moderately; 3=Quite a Bit; 4= Extremely). RESULTS: A total of 1661 surveys were

completed. The average number of daily discrimination events experienced was 0.72 (SD= 1.76). The average urge to smoke was 1.80 (SD=1.26). Mixed effects multilevel regression showed that greater within-subject experiences of discrimination were associated with a higher daily urge to smoke (B=.06, p>.001). However, an increase in experiences compared to others (between-subjects) showed no significant association. CONCLUSIONS: Discrimination stress has been associated with several health-related disparities, including increased risk for cigarette smoking initiation, maintenance, and relapse following cessation attempts in sexual minority individuals. The data indicate that within-person experiences of discrimination were associated with a higher urge to smoke on the day level. Further understanding of how sexual minority individuals experience stress processes that may contribute to lapses and relapses during cessation will be critical in developing tailored treatments for this population.

FUNDING: State

POS3-67

HOW TO QUIT SMOKING: TIPS FROM UNITED STATES VIETNAMESE HEALTHCARE PROVIDERS, COMMUNITY LEADERS, AND PAST TOBACCO USERS

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Significance: Among Asian populations in the United States (US), the Vietnamese ranks second highest in smoking prevalence. Smoking prevalence is even higher among US Vietnamese with limited English proficiency (LEP) because they cannot fully utilize smoking-cessation resources in English. This qualitative analysis of perspectives from US Vietnamese healthcare professionals, community leaders, and past tobacco users aims to explore advice and applicable techniques to help US Vietnamese smokers quit smoking. Methods: We conducted 16 in-depth interviews with 6 US Vietnamese healthcare providers, 5 community leaders, 3 past smokers, and 2 participants who were both healthcare providers and past smokers. The interviewees were diverse in age, sex, profession, and specialty. Interviews were recorded and transcribed verbatim. Data were analyzed using the MAXQDA program. Codes and themes are based on constructs and phases of the Phase-Based Model of smoking cessation which includes Motivation, Preparation, Cessation, and Maintenance phases. Results: Some prominent advice that arose for the motivation theme was the need to have a firm determination to quit or a reason why smoking cessation is necessary (e.g., protecting the family from the harms of smoke, serving as a role model for others in the family, or avoiding negative heath consequences). Salient advice for the preparation and cessation phases included healthy approaches to coping with stress (e.g., meditation or going for a walk), physically avoiding smoking triggers, changing unmindful habits, and engaging in activities that distracted one from craving (e.g., playing chess or chewing a candy or gum). Gradually reducing the number of cigarettes smoked per day was also indicated as a helpful strategy. In the maintenance phase, participants shared potentially helpful strategies for avoiding relapse, including exercising regularly, being prepared to cope with the potential peer pressure for smoking at social gatherings (e.g., setting respectful boundaries around other smokers), staying firm about the decision to quit as an important promise (e.g., to their children) to keep, and continuing to avoid craving triggers. A prominent strategy that is related to all 4 phases is to create an environment with repeated/continuous support from loved ones. Conclusion: This qualitative study identified several individual and external factors that serve as useful strategies for US Vietnamese smokers with LEP to quit smoking.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS3-68

GEMS: A RANDOMIZED PILOT STUDY OF FEASIBILITY, ACCEPTABILITY, AND POTENTIAL IMPACT OF A NOVEL MHEALTH APP FOR SMOKERS AMBIVALENT ABOUT QUITTING

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Background: Most smokers are ambivalent about quitting—they want to someday, but not now. mHealth apps offer great potential to intervene, but research is needed to inform the acceptability, feasibility, and potential effectiveness of apps designed for smokers not yet ready to quit. Almost no research has addressed this topic. Methods: Participants (n=57) were daily smokers who wanted to quit someday, but not in the near term. Each was randomly assigned to one of two versions of the GEMS® app: standard care (SC) or enhanced care (EC). Both contained evidence-based, best-practice smoking cessation advice, gamification, and other resources including treatment access. The EC app also included a series of exercises (aka, Experiments) designed to help people clarify their goals, strengthen motivation and self-efficacy, and teach critical skills for changing smoking behavior. The design was informed by formative research with ambivalent smokers. Indices of utilization, satisfaction, and smoking behavior change were collected with automated data and self-report surveys at one and 3-months. Results: Participants were largely low-SES, White women with high/very high nicotine dependence. App satisfaction was identical in both arms (mean 4.1 on 5-point scale) and 95.3% (41/43) of respondents would recommend it to others. EC and SC participants had similar use of features common to both apps, but fewer EC participants read the smoking Quit Guide. EC participants completed an average of 7 of 9 Experiments. Median helpfulness ratings ranged from 3 to 4 (out of 5) and were highest for Experiments focused on identifying smoking triggers, reducing smoking, and making a practice quit attempt. EC participants used the app more than SC participants (mean sessions = 19.9 vs. 7.3, $P< .01$). Among participants earning a free trial of NRT (based on earning 6 app utilization badges), 36.4% (8/22) of EC and 11.1% (2/18) of SC participants requested the free treatment ($P =.11$). People in both arms were equally likely to report making a quit attempt at 3-months, but 14.7% (4/28) of EC and 6.9% (2/29) of SC participants reported 7-day point prevalent abstinence ($P=.35$). Conclusions: Smokers ambivalent about quitting are receptive to using a mHealth app to change behavior. Combining best-practice cessation advice with self-paced exercises to help people clarify goals, build motivation for quitting, and learn critical skills for resisting the urge to smoke may enhance program engagement and impact.

FUNDING: Federal; Other

POS3-69

ASSOCIATION OF SMOKING WHILE DRINKING WITH ALCOHOL MISUSE IN UNIVERSITY STUDENTS DURING THE COVID-19 IN HONG KONG

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Significance: Co-use of tobacco products and alcohol was common. We examined the association of smoking while drinking with alcohol misuse in Hong Kong Chinese university students during the COVID-19. Methods: Data were derived from the 2020-2022 randomized controlled trial on high-risk university student drinkers with Alcohol Use Disorder Identification Test scores (AUDITs) = 8 in Hong Kong. Eligible students were recruited from 10 local universities using the "foot-in-the-door" approach and online platforms. Alcohol misuse was measured by binge drinking (4 or more standard drinks for women or 5 or more for men on an occasion), heavy drinking (8 or more standard drinks for women or 15 or more for men per week) in the past 30-day, and weekly alcohol unit consumption. Socio-demographic characteristics and smoking behaviors were also measured. Multivariable logistic regression (adjusted odds ratio, OR for binge and heavy drinking) and linear regression (adjusted unstandardized coefficient, b for weekly alcohol unit consumption) were used for assessing the association of smoking while drinking with alcohol misuse, adjusting for socio-demographic characteristics. Results: Of 773 participants (52% female, mean age 21.1), the mean AUDITs was 12.8 (SD 5.1) and weekly alcohol unit consumption was 8.7 (SD 3.7). 69% binged drink, 29% had heavy drinking, 24% were current smokers, and 21% smoked while drinking. The most used tobacco product was conventional cigarettes (45%). Smokers who smoked every time while drinking were more likely to binge drink (AOR, 95% CI: 3.51, 1.20-10.31), have heavy drinking (AOR 5.14, 2.36-11.19), and have higher weekly alcohol unit consumption (adjusted b, 95% CI: 4.81, 2.17-7.45). A higher frequency of smoking while drinking was associated with more binge drinking (AOR ranged from 1.89-3.51, P for trend < 0.01), heavy drinking (AOR ranged from 1.49-5.14, P for trend < 0.001), and weekly alcohol unit consumption (adjusted b ranged from 2.49-4.81, P for trend < 0.001). Conclusion: Co-use of tobacco products and alcohol was common in Hong Kong Chinese university students. Smokers who smoke while drinking during the COVID-19 were associated with more alcohol misuse problems.

FUNDING: Academic Institution

POS3-70

DEPRESSION AND THE AGE OF INITIATION OF TOBACCO AND MARIJUANA USE IN TEXAS YOUTH POPULATION

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Significance: Studies have demonstrated important associations between depression and tobacco and marijuana use. No studies have prospectively examined the impact of depressive symptoms on the age of initiation of tobacco and marijuana use in youth and emerging adults. *Method*: Secondary analysis of 6 waves of data from the Texas Adolescent Tobacco and Marketing Surveillance System (TATAMS) was conducted. Participants were in 10th grade, 12th grade, and two years post-high school in Wave 9 (Spring 2019) and were followed through wave 14 (Fall 2021). Study sample participants (n =1562) provided complete data on socio-demographic covariates, and were never cigarette, e-cigarette, or marijuana users at wave nine. Interval-censoring Cox proportional hazards models with time-dependent covariates were fit to examine the differences in the estimated age of initiation of cigarettes, e-cigarettes, and marijuana by depression symptoms while adjusting for age at baseline, gender, race/ethnicity and SES. *Results*: At baseline, participants were 15-23 years of age (mean age: 17.94, SD: 1.56); 55.9% female; 35.8% Hispanic, 32.7% non-Hispanic white, 14.5% non-Hispanic black, 16.9% other race/ethnicity, and 67.70 % were classified as middle SES. Youth/emerging adults with major depression symptoms had increased risk of an earlier age of ever cigarette and ever e-cigarette initiation compared to those without major depression symptoms (HR = 1.90; 95% CI:1.24- 2.91, HR= 1.67; 95% CI:1.17- 2.39), respectively. Similarly, youth/emerging adults with major depression symptoms had increased risk of an earlier age of ever marijuana initiation compared to those without major depression symptoms (HR=1.88; 95CI: 1.31- 2.71). *Conclusion*: Findings indicate increased risk of tobacco and marijuana initiation at an early age among youth with depressive symptoms, which may also be an indication of self-medication. Youth-focused providers should integrate interventions for managing depressive symptoms and teach alternate coping mechanisms to vulnerable youth, which may delay or prevent initiation of tobacco and marijuana use among youth/emerging adults.

FUNDING: Federal

POS3-71

FACTORS ASSOCIATED WITH COVID-19 RELATED QUIT ATTEMPTS AMONG ADULT SMOKERS IN VIETNAM

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Background: Cigarette smoking rates in Vietnam are high, especially among men. Smoking has been associated with increased susceptibility to severe COVID-19 related outcomes, which could increase motivation to quit. In this study, we examined the relationship between COVID-19 related quit attempts and key demographic characteristics and nicotine dependence level to better understand what factors might contribute to pandemic-related quit-readiness in Vietnam. Methods: Data were from a phone survey of 1500 Vietnamese adults who currently smoke, equally distributed by nicotine dependence (low, medium, high). Participants were asked about their demographics and quit attempts. Our two main outcomes were (1) whether health concerns related to COVID-19 (yes/no) and (2) financial concerns related to COVID-19 (yes/no) were a reason why a participant attempted to quit smoking in the past 12 months. We ran two separate adjusted logistic regression to assess the relationship between each outcome and gender (male (ref), female), age (18-24, 25-34, 35-44, 45+ (ref)), household income (<10,499,999 Vietnamese dong (VND) (low), 10,500,000-20,000,000 VND (middle), >20,000,000 VND (high, ref)), and nicotine dependence level (ref=low). Results: In our sample, a sizable proportion of participants who made a past-year quit attempt indicated health-related COVID-19 concerns (44.8%) or financial-related COVID-19 concerns (29.8%) as a reason to quit. Gender, age, income, and nicotine dependence level were not significantly associated with COVID-19 health-related reasons for quitting. However, females (OR=2.52, 95%CI:1.41-4.51) and low-income individuals (OR=1.79, 95%CI:1.12-2.85) had significantly higher odds of indicating COVID-19 financial concerns was a reason to quit compared to males and high-income individuals, respectively. Conclusion: Findings suggest COVID-19 related concerns play a role in reasons for quitting among certain groups. These results highlight opportunities to increase information available on both the health and financial risks related to smoking during a respiratory illness-based pandemic to enhance quit attempts, particularly for low-income and female Vietnamese adults who smoke.

FUNDING: Nonprofit grant funding entity

POS3-72

THE ROLE OF FLAVORED ELECTRONIC NICOTINE DELIVERY SYSTEMS IN SMOKING CESSATION: A SYSTEMATIC REVIEW

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Background: The proliferation of electronic nicotine delivery systems (ENDS) has been accompanied by dueling claims that the devices aid smokers who are trying to quit and are sold in a variety of flavors that appeal to cigarette-naïve groups like youth. This systematic review gathers studies that examine whether users of different flavors of ENDS have different smoking cessation outcomes. Methods: We searched EMBASE OVID, PsychInfo, and Medline databases for studies that examined tobacco cessation behavior (attempts, intent, and success) among cigarette smokers using different flavors of ENDS. We extracted crude and adjusted odds ratios for the associations between cessation outcomes and flavors used (nontobacco vs. tobacco/unflavored; and nontobacco and nonmenthol vs. tobacco/unflavored and menthol) and assessed each study's potential risk of bias. GRADE quality of the evidence assessments was made by reviewers focusing on understanding the consistency of the findings. Results: 29 studies met the criteria for inclusion, producing 36 observations. Four observations described cessation attempts, three described cessation intent, and 29 (17 cross-sectional, 12 cohort) described cessation success. Studies were nearly all observational and predominantly at unclear risk of bias. We reached low levels of certainty that different ENDS flavor use is not associated with the likelihood of making a cessation attempt or in cessation intent. We reached very low levels of certainty that nontobacco ENDS users had a higher likelihood of cessation success than tobacco/unflavored ENDS users, and similar findings for nonmenthol and nontobacco flavors compared to tobacco and menthol flavored ENDS. Conclusion: The availability of different flavors of ENDS products may impact the likelihood that ENDS users are able to quit smoking, but more evidence, particularly derived from interventional trials is required to better understand the effects of ENDS flavors on cessation.

FUNDING: Federal

POS3-73

E-CIGARETTE USE AND PERCEPTION OF CIGARETTE HARM AS PREDICTORS OF COMBUSTIBLE CIGARETTE USE: A TEST OF THE RENORMALIZATION THEORY

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SIGNIFICANCE: Use of e-cigarettes (e-cigs) has increased in popularity among young adults, prompting concern about the potential risks of use, including initiation of combustible cigarette use and later nicotine addiction. Renormalization models predict that e-cig use may facilitate combustible cigarette use through changing attitudes and harm perceptions, but data linking e-cig use and cigarette perceptions are sparse. This study tested the renormalization theory concurrently and over time in young adulthood, and assessed whether these associations differ by cigarette smoking history. METHODS: Data were drawn from the Community Youth Development Study (CYDS), a community-randomized trial of the Communities That Care prevention framework that has followed 4,407 individuals from 24 communities nationwide since 2003. Youth have been surveyed since Grade 5 and most recently at ages 21, 23, 26, and 28. Combustible cigarette use frequency (past year) and use perceptions (favorable community attitudes, favorable individual attitudes, harm perception), as well as e-cig use frequency and harm perceptions, were measured at every wave from age 21. Smoking history at age 21 was measured via a trichotomous variable: never smoked, concurrently smoking, or formerly smoking. Separate regression models assessed whether e-cig use frequency and e-cig harm perceptions were associated with combustible cigarette use and perceptions, concurrently and over time. Models tested for moderation by smoking history. RESULTS: At age 21, e-cig use frequency was related to greater cigarette use frequency, more favorable community and individual attitudes, and lower harm perception. Lower e-cig harm perception predicted greater cigarette use frequency, more favorable community and individual attitudes, and lower cigarette use harm perception. Increase in e-cig use

from age 21 to age 28 was associated with increased cigarette use frequency, increased favorable individual attitudes, and - among formerly smoking adults only - an increase in harm perception. A decrease in e-cig harm perception was associated with increases in cigarette use frequency and favorable individual attitudes, and a decrease in cigarette use harm perception. CONCLUSION: E-cig use/e-cig harm perceptions and combustible cigarette harm perceptions are key correlates of cigarette use - likely through renormalization - and they are important targets in preventing nicotine addiction in young adults.

FUNDING: Federal

POS3-74

ACADEMIC COMMUNITY PARTNERSHIP TO IMPROVE ENGAGEMENT IN TOBACCO TREATMENT AT A FQHC IN CALIFORNIA

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Significance: Despite persistent tobacco control efforts, low-income Californians are 1.8 (RR) times more likely to be current smokers, and 21% less likely to quit successfully than other smokers. At Family Health Centers of San Diego (FHCSD), one of the ten largest Federally Qualified Health Centers (FQHCs) in the nation, we developed an academic-community partnership to better understand utilization of evidence-based cessation services to optimize point of service contacts for tobacco cessation. Methods: Community-partnered prioritizations and refinements guided updates to the primary care tobacco treatment workflow in the electronic health record (EHR). We examined the demographic; sexual orientation and gender identity (SOGI); and co-morbid medical and psychiatric statuses associated with changes in referral patterns to Kick It California (KIC) or FHCSD-based behavioral counseling and/or pharmacotherapy prior to and following updates to the EHR (from 1/1/2019-5/31/2022). Mixed-effects logistic models quantified associations with changes in tobacco-referral and engaged tobacco treatments. Results: Among smokers (n=33,579), 92% live below 200% of the federal poverty level, 8% were =65 years, 36% Hispanic, 14% Black, and 37% White. EHR passive referral was common, with 93% advised to quit and informed about KIC. After EHR updates, increases in passive referrals (OR=1.9,95% CI=1.7-2.1) were strongest for those identifying as SOGI minority, Hispanic, or multiple races. Acceptance of active electronic referral to KIC increased (OR=1.5,95% CI=1.3-1.8), particularly among those with SOGI minority status (OR=1.8,95% CI=1.2-2.9) or in older age groups (OR_{range}=1.4-1.7). After EHR updates, acceptance of tobacco cessation medications was higher for Hispanic (OR = 1.3, 95% CI=1.1-1.4) and multiple race (OR=1.4, 95% CI=1.1-1.7) patients compared to White patients. Conclusion: Improved systems of care are needed to overcome the significant tobacco related disparities in low-income communities. Academic-Community partnerships can facilitate engaged and effective delivery of targeted interventions. Improvement in engagement will be a key focus for intervention efforts.

FUNDING: State

POS3-75

WHAT SMOKERS WOULD DO IF CIGARETTE PRICES INCREASED IN THE FUTURE? FINDINGS FROM THE ITC VIETNAM SURVEYS

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Significance: Given that a higher cigarette price strongly motivates smokers to quit smoking, this study aimed to assess how smokers would change their behaviors if cigarette prices increased in the future. Methods: The cross-sectional data among 1,545 male adult cigarette smokers came from Wave 3 (2020) of the International Tobacco Control (ITC) Vietnam Project. The outcome was assessed by asking: "What would you do if cigarette price increased in the next year?" Six non-mutually exclusive options were proposed: (1) continue to smoke as before, (2) try to quit smoking, (3) smoke fewer cigarettes, (4) look for a cheaper source for their current cigarette brand, (5) buy a smaller number of cigarettes at a time, or (6) buy cigarettes in bulk. Herein, (4), (5), and (6) responses were defined as price-minimization strategies. Logistic regression analysis was used to identify the factors associated with 'smoke fewer cigarettes' and 'try to quit smoking'. Results: The weighted mean of the current price of a cigarette pack was VND 13,260 (US$ 0.57). If the cigarette price increased in the next year, 56.53% and 53.81% of smokers reported that they would continue to smoke and smoke fewer cigarettes respectively, whereas 49.60% would try to quit smoking. A small proportion of smokers would apply price-minimization strategies when confronted with a price increase, accounting for less than 10%. The current cigarette price of the preferred brand of cigarettes was not significantly associated with future smoking cessation behaviors. Having the intention to quit, and a past quit attempt were the most important factors positively associated with a higher likelihood of trying to quit smoking. Conclusions: The current price of cigarettes is still low in Vietnam; therefore, the continuous rise in cigarette prices is required to motivate smokers to quit smoking. Additionally, non-tax policies that motivate quitting intentions (like smoke-free regulations or communication campaigns about the risks of using tobacco products) can enhance the effects of higher cigarette prices to encourage quitting behaviors.

FUNDING: Other

POS3-76

SMOKING STATUS AND COVID-19 HOSPITALIZATION IN THE CONTEXT OF MARIJUANA USE

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SIGNIFICANCE: The association between smoking and COVID-19 outcomes in the context of marijuana use has been understudied. This study examined the association between smoking status, marijuana use and COVID-19 hospitalization. METHODS: We used electronic health record data from adult patients with a positive COVID-19 PCR test or antigen lab test or ICD 10 diagnosis between 2/1/2020 and 1/31/2022 at the UCSF Health System. The primary outcome was hospitalization within 14 days of the first positive COVID-19 test and/or ICD-10 COVID-19 diagnosis at admission within 45 days of the first positive COVID-19 test. We used three multivariable regression models to examine the relationship between smoking status and COVID-19 hospitalization with demographics, comorbidity and vaccination status as covariates. Model 1 did not include marijuana use status; Model 2 added marijuana status; Model 3 added marijuana and smoking status interaction term. RESULTS: Of the 15,404 patients included in the cohort, 739 (4.8%) were hospitalized with COVID-19. The study cohort had 4.6% current and 25.0% former smokers; 9.1% reported using marijuana, 35.4% no use and 55.5% had unknown marijuana use status. In Model 1, both current (adjusted odds ratio [AOR]=1.45, 95% confidence interval [CI]=1.05, 2.01) and former smokers (AOR=1.39; 95% CI=1.67, 3.04) had higher odds for hospitalization than never smokers. In Model 2, former smokers had higher odds for hospitalization (p<.001), yet the association between current smoking and hospitalization attenuated (p=0.06). In Model 3, when compared with never smokers with no marijuana use, higher odds of hospitalization were observed in current smokers who used marijuana (AOR=1.73; 95% CI=1.01,3.13), former smokers with no marijuana use (AOR=1.69; 95% CI=1.33,2.16) and never smokers with marijuana use (AOR=1.74; 95% CI=1.22,2.48). Other significant covariates for increased odds of hospitalization were being Hispanics or racial minorities, being male, non-English speakers, having comorbidities, public health insurance, testing positive after May 2021, and being unvaccinated. CONCLUSION: The association between smoking status and COVID-19 hospitalization varied with marijuana use, which might explain some of the mixed associations between smoking and COVID-19 outcomes reported in the literature. Future research on smoking and COVID-19 outcomes should consider marijuana use and the potential pathways underlying the interaction effects.

FUNDING: Federal

POS3-77

CHANGES TO SECOND HAND SMOKE EXPOSURE DURING PREGNANCY

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Significance: Second hand smoke (SHS) exposure is a significant preventable cause of negative health effects during pregnancy. An important source of SHS exposure during pregnancy is due to partners smoking near the pregnant women. Reducing SHS exposure during pregnancy could have a significant impact on both maternal and infant morbidity and mortality, contributing also to reduced health inequalities. This study aimed to assess changes to SHS exposure during pregnancy in Israeli women. Methods: Secondary data analysis from an online cross-sectional survey. Inclusion criteria: a) gave birth in the last 12 months; b) age 18 or above. Participants were asked two questions to assess partner's smoking behavior in their presence - one in regard

to before the pregnancy, and the second during pregnancy; computed to assess the change during pregnancy - either 'reduced SHS exposure' (e.g. stopped smoking in her presence) or 'did not reduce SHS exposure'. Additional co-variates included socio-demographic characteristics, pregnancy related factors, smoking behaviors, and knowledge of smoking and SHS harms. Multivariate logistic regression was conducted to explore factors associated with reporting reduced SHS exposure during pregnancy. Results: Out of 3295 participants, 1309 (39.7%) women were exposed before pregnancy to SHS from their partners. Of these, slightly less than half (47.9%; n=627) reporting reduced SHS exposure during pregnancy - 72 (10.6%) reported that their partners had quit smoking during pregnancy, 306 (44.9%) reported that their partners stopped smoking in their presence, and the remaining 304 (44.6%) reported reductions to the frequency that their partner smoked in their presence. In the multivariate logistic regression, a higher level of education was significantly associated with reduced SHS exposure during pregnancy (aOR: 1.601, 95% CI: 1.17-2.186). Being Arab (aOR: 0.34, 95% CI: 0.23-0.48), already having other children (aOR: 0.69, 95% CI: 0.52-0.91), and not attending antenatal class (aOR: 0.55, 95% CI: 0.30-0.99) were significantly associated with not reducing SHS exposure during pregnancy. Conclusion: Pregnancy is a 'teachable moment' where pregnant women's partners are receptive to changing their smoking behavior, and to reducing their spouse's SHS exposure. Targeted interventions are needed to support specific high-risk population groups in reducing SHS exposure during pregnancy.

FUNDING: Academic Institution

POS3-78

A SHIFT IN TOBACCO USE INITIATION FROM ADOLESCENCE TO ADULTHOOD: EXPERIENCES FROM LIFEFIRST WORKPLACE TOBACCO CESSATION PROGRAM

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Significance: Globally, 1.3 billon people use tobacco and 80% of them live in low and middle income countries. Preventing initiation of tobacco use is key to reducing this huge burden. According to Global Adult Tobacco Survey-2, India, the average age of initiation among adults is 19 years and hence most of the prevention interventions and campaigns are designed for adolescents and youth. While workplaces are considered an ideal setting to influence tobacco use behavior, especially for quitting tobacco, the setting can also lead to initiation of tobacco use among adults. Identifying age of initiation is crucial in designing effective prevention strategies and is an important factor in reducing the tobacco use prevalence. The objective of this study was to identify age of initiation and its association with cessation outcomes among the employees working in different workplaces of India. Methods: LifeFirst tobacco cessation programme was implemented in 16 workplaces including corporate offices and factory settings in different parts of India from 2014-2022. Awareness talks about tobacco, its ill-effects and benefits of quitting were conducted for all employees. Individual counselling sessions were conducted for current tobacco users who voluntarily enrolled into the programme. Periodic follow-up sessions were conducted either face-to-face or telephonically for six months. During the counselling sessions, demographic details, patterns of tobacco use, age of initiation, nicotine dependence and tobacco use status at each follow up was recorded. Results: A total of 2104 employees enrolled for the LifeFirst program. All were males. Among these, 1575(75%) consumed smokeless tobacco, 377(18%) smoked and 151(7%) were dual users. The average age of initiation was 25 years (higher than national average). 62% of the enrolled employees had initiated tobacco use between 20-34 years and 15% had initiated after 34 years of age. The 7-day point prevalence abstinence at six months was 45% among those who initiated during age of 20-34 years as compared to 52% among those who initiated before 15 years of age. Conclusion: A shift in age of initiation was observed from adolescence to adults in the workplace setting. Therefore, workplaces should be considered as a setting for prevention interventions. In addition, tobacco free workplace policies should be promoted to prevent initiation and also support those who are already using by implementing tobacco cessation services.

FUNDING: Other

POS3-79

ASSOCIATION OF SMOKERS' ENGAGEMENT IN A MOBILE CHAT-BASED INSTANT MESSAGING INTERVENTION WITH SMOKING ABSTINENCE: SECONDARY ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL

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Background: A substantial proportion of users of mobile health interventions for smoking cessation drop out or stop using the intervention prematurely. More research is needed to understand the pattern of engagement to improve cessation outcomes. We examined the associations of smokers' engagement in a mobile chat-based instant messaging intervention with smoking abstinence. Methods: In a community-based cluster-randomised controlled trial under Hong Kong Council on Smoking and Health Quit to Win 2017 (ClinicalTrials.gov: NCT03182790), 624 daily cigarette smokers (76.8% male, mean age 42.1) were randomized to receive the chat-based intervention, in which a counsellor interacted with the smoker in real time via WhatsApp and provided personalized cessation support for 3 months. Cessation outcomes were biochemically validated abstinence (confirmed by exhaled carbon monoxide concentrations < 4ppm and salivary cotinine concentrations < 10 ng/mL) at 3 months (end of treatment) and 6 months post-treatment initiation. Group-based trajectory modelling was used to identify the engagement patterns using the participants' weekly responses to the messages from the counsellor over the 3-month intervention period. Modified Poisson regression was used to calculate the relative risk (RR) of validated abstinence by the engagement patterns, adjusting for sex, age, education, nicotine dependence, intention to quit and past quit attempts at baseline, and use of cessation services by 3 months. Results: We identified 4 distinct engagement patterns. Most participants (N=447; 71.6%) maintained a very low to no engagement throughout the 3-month period (non-engagement group); 13.8% (N=86) began with moderate engagement which declined rapidly and stayed at a low level (rapid-declining group); 9.3% (N=58) had high initial engagement which gradually declined to a moderate level (gradual-declining group); and 5.3% (N=58) maintained high engagement throughout (high engagement group). Non-engagement group had fewer participants with motivation to quit in 30 days and lower perceived importance and confidence to quit than other groups (all P=0.001). Compared with non-engagement group, the 6-month validated abstinence rate were significantly higher in the rapid-declining group (RR=2.92, 95%CI 1.20-7.09), gradual-declining group (RR=4.52, 95%CI 1.88-10.91) and high engagement group (RR=4.21, 95%CI:1.49-11.93). The corresponding RRs (95% CI) of 3-month validated abstinence were 3.34 (1.23-9.03), 4.30 (1.57-11.77), and 7.22 (2.47-21.11). Conclusion: Higher level of engagement with the chat-based intervention was associated with greater smoking abstinence.

FUNDING: Other

POS3-80

ADAPTIVE INTERVENTIONS TO OPTIMIZING THE PERSONALISED INSTANT MESSAGING-BASED SMOKING CESSATION SUPPORT: A SEQUENTIAL, MULTIPLE ASSIGNMENT, RANDOMIZED TRIAL (SMART)

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Significance: Mobile health offers a conducive platform for deploying adaptive smoking cessation interventions, in which smokers not responding to initial treatment are given more intensive support to quit smoking. We tested an adaptive intervention that stepped chat-based personalized instant messaging (PIM) with optional combined interventions (OCI) versus stepped regular instant messaging (RIM) with PIM on abstinence. Methods: Under Hong Kong Council on Smoking and Health's Quit to Win campaign in 2019, this two-arm, parallel, adaptive trial proactively recruited adult daily cigarette smokers from 70 community sites. At baseline (phase 1), participants received brief cessation advice plus active referral to cessation services and were individually randomized to receive interactive PIM or unidirectional RIM. At 1 month (phase 2), PIM non-responders (self-reported continuing smokers) were randomized (3:1) to receive either OCI [any combination of the multi-media messages, nicotine replacement therapy sampling, incentivized cessation service use (HK$100, ~ US$ 12.8), phone counseling, and family/peer group chat] or continued PIM. RIM non-responders were randomized

(1:3) to receive PIM or continued RIM. Responders (self-reported quitters) in either group continued to receive their initial interventions. We measured 7-day point prevalence abstinence (PPA) at 6 months, analyzed by intention-to-treat (ITT). Results: From June to October 2019, 844 participants (82.3% men, 86.7% aged 18-59) were randomized (422 in each group). At 1-month follow-up (77.1% retained), 370 (87.7%) and 373 (88.4%) participants were non-responders in the PIM and RIM group (by ITT, missing treated as non-responders), and 273 (73.8%) and 91 (24.4%) were re-randomized to receive further OCI or PIM, respectively. At 6 months (79.5% retained), participants in the PIM and RIM groups reported similar 7-day PPAs (20.4% vs. 21.6%, P=.67). Receiving further OCI (vs. continued RIM: 13.2% vs. 18.1%, P=.12) did not increase quitting in non-responders. Engagement in the PIM (33.0% vs. 13.7%, P<.001) and those who ever read the RIM (29.8% vs. 12.2%, P<.001) at 3-month predicted higher abstinence at 6-month. Conclusions: More intensive adaptive personalized interventions did not increase abstinence in community smokers. A longer follow-up period is warranted to assess the long-term effect of adaptive interventions. Improving engagement in mHealth interventions may improve the effectiveness on smoking abstinence. Trial registration: ClinicalTrials.gov, NCT03992742.

FUNDING: Nonprofit grant funding entity

POS3-81

ASSOCIATION OF CHILDHOOD AND CURRENT EXPOSURE TO SECONDHAND SMOKE AT HOME WITH CURRENT SECONDHAND SMOKE EXPOSURE AT WORK

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Background: Secondhand smoke exposure (SHSe) adversely impacts human health, and childhood SHSe is associated with positive attitudes towards tobacco. However, relationships between SHSe in various temporal and physical settings are not fully studied, especially in multi-ethnic Asian populations. We investigate the associations of past (i.e., childhood) and current home SHSe with current workplace SHSe; and their variation across the identities of childhood and current daily smokers at home in Singapore. Methods: Cross-sectional study based on the Singapore Multi-Ethnic Cohort identified 925 employed adults who were healthy, never-smokers. Multivariable logistic regression models were developed to estimate the associations with identities of daily smokers entering the final model via model building. Results: Current home SHSe is positively associated with current workplace SHSe (adjusted odds ratio [AOR]=2.05; 95%CI: 1.28, 3.29). It remained significant (AOR=1.78; 95%CI: 1.08, 2.95) with child being the only identity of current daily smokers at home in the final model (AOR=3.56; 95%CI: 1.19, 10.64). When compared with no current home SHSe, those currently living with at least one child who smokes daily at home (AOR=6.35; 95%CI: 2.19, 18.40) had higher odds ratio than those currently living with no child who smokes daily at home (AOR=1.78; 95%CI: 1.08, 2.95). Similarly, childhood home SHSe had a positive association with current workplace SHSe (AOR=1.43; 95%CI: 0.93, 2.19), although borderline significant. It became non-significant with father (AOR= 2.30; 95%CI: 0.94, 5.64) and sibling (AOR= 2.97; 95%CI: 1.55, 5.68) being the identities of childhood daily smokers that entered into the final model. Only when both father and at least one sibling smoked daily at home, the odds increased significantly compared to those with no childhood home SHSe (AOR=3.70; 95%CI: 1.88, 7.30). The effect of childhood home SHSe and current home SHSe on current workplace SHSe is independent. Conclusion: Denormalising smoking should consider the interpersonal dynamics of daily smokers with their family members exposed to secondhand smoke at home in different temporal settings of their life-course. This could reduce workplace SHSe among healthy adult never-smokers.

FUNDING: Academic Institution

POS3-82

EFFECT OF ADDING PERSONALIZED INSTANT MESSAGING APPLICATIONS TO BRIEF SMOKING CESSATION MODEL IN COMMUNITY SMOKERS: A PRAGMATIC RANDOMIZED CLINICAL TRIAL

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Significance: Smoking is a leading cause of death and effective smoking cessation (SC) methods, e.g. text-messaging, can effectively ease the burden. More interactive and adaptive instant messaging (IM) apps on a smartphone that allows personalization and chatting with SC advisors, may provide better support which could further increase SC. We assessed whether IM apps to provide personalized psychosocial support and assistance for using SC services in addition to brief SC advice and referral to SC services increase smoking abstinence. Methods: This is a parallel, 2-arm, outcome assessors-blinded, randomized controlled trial in Hong Kong (ClinicalTrials.gov: NCT03800719). Smokers were proactively recruited in communities from December 2018 to November 2019 and the 12-month follow-up ended in November 2020. Of 731 adult Chinese daily cigarette users screened, 700 consented and were 1:1 randomized into 2 groups. All participants received face-to-face brief advice on SC, active referral (AR) to SC services at baseline. The intervention group received personalized regular messages and chatting through IM apps, and the control group received text messages on general health for 3 months. The primary outcomes were smoking abstinence validated by carbon monoxide <4 parts per million at 6 and 12 months after intervention initiation. Secondary outcomes included self-reported 7-day point prevalence abstinence (PPA), smoking reduction (=50% of baseline level), 24-week continuous abstinence, quit attempt (since intervention initiation) and SC service use. Results: 72.1% were male, 69.4% were aged 40 or above. At 6- and 12-month follow-up (retention rate: 65.1% and 63.7%), by intention to treat, validated quit rates were similar between the intervention (4.0% and 5.4%) and control (3.1% and 6.0%) groups. Self-reported 7-day PPA (9.1% vs 8.3%, 13.1% vs 14.3%), smoking reduction (28.6% vs 23.1%, 31.7%vs 34.9%), quit attempt (14.0% vs 10.3%, 20.6% vs 18.0%) at both follow-ups, and 24-week continuous abstinence at 12-month (6.3% vs 6.0%) were similar. The intervention group reported more SC service use at 12-month (35.1%) than the control group (28.0%): adjusted risk ratio=1.26 (95% confidence interval 1.01-1.57). Conclusion: An IM-based intervention providing support and assistance on top of brief SC advice and AR did not further increase quitting but promoted SC service use. Further studies can examine if increased SC service use results in better SC in the longer term.

FUNDING: Nonprofit grant funding entity

POS3-83

EXAMINING THE ROLE OF METACOGNITIVE FACTORS IN PREDICTING PAST 30-DAY E-CIGARETTE USE

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Significance: Metacognition can be understood as 'cognition of cognition' or 'thinking about thinking'. Several studies have documented associations between metacognitive factors and psychological disorders such as depression, anxiety, personality disorders and addictive behaviors. Metacognition research has primarily focused on cigarette smoking, while e-cigarette use has been relatively unexplored. The study sought to examine the ability of Metacognition about Smoking Questionnaire (MSQ), adapted for e-cigarette use, to predict past 30-day e-cigarette use among adolescent and young adult e-cigarette users. Methods: The study analyzed data collected by the Texas Adolescent Tobacco and Marketing Surveillance System (TATAMS) in Spring 2020. Another study was conducted to examine the properties of MSQ for e-cigarette users, which yielded three unique factors, 'positive metacognitions about cognitive regulation'(PMCR), 'positive metacognitions about emotional regulation'(PMER), and 'negative metacognitions'(NM). A binomial generalized linear model was run to examine the association between the metacognitive factors and past 30-day e-cigarette use cross-sectionally. Further, each of the three metacognitive factors were used to predict past 30-day e-cigarette use frequency in the most frequent group, using conditional effects, holding the most frequent category of categorical covariates, mean of continuous covariates and the other two metacognitive factors as reference levels. Past 30-day e-cigarette use was measured as the number of days of use in the past 30-days. Each metacognitive factor was computed as the summary score of outcome expectancies and ranged from 5-20 (PMCR, PMER) and 10-40 (NM) with higher scores denoting higher levels of outcome expectancies. Results: Participants were past 30-day e-cigarette users and had complete response on MSQ items (n=244). Participants were in 10th grade (n=46), 12th grade (n=92) and two years beyond high school (n=106). When adjusted for race/ethnicity, gender, SES, and grade, each of the three factors showed significant association with past 30-day e-cigarette use. Lowest and highest score on PMCR was associated with 15 and 20.4 days of e-cigarette use in the past 30-days, respectively. Similarly, lowest and highest score on PMER and NM were associated with 13.2 and 21 days, and 14.7 and 24.6 days, respectively. The results indicate that participants who reported highest outcome expectancies for cognitive regulation, emotional regulation, and negative outcomes, used e-cigarettes on average 5, 8 and 10 days more than those

who reported lowest outcome expectancies for these factors. Conclusion: The findings can have implications for understanding the role of cognition in e-cigarette use behavior and can help develop targeted interventions.

FUNDING: Federal

POS3-84

A NOVEL SELF-ASSESSMENT FOR BEHAVIORAL HEALTH FACILITY IMPLEMENTATION OF EVIDENCE-BASED TOBACCO SERVICES

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Background: In 2021, The state of Kansas mandated Community Mental Health Centers (CMHCs) to complete annual self-assessments regarding screening and treatment of tobacco dependence. The self-assessment evaluates implementation of 12 strategies recommended by the Kansas Tobacco Guideline for Behavioral Health. Strategies focus on integrating tobacco treatment into care, building staff capacity to treat, adopting a tobacco-free campus, and prevention/treatment among youth. The self-assessment has been adapted for use nationally by the American Lung Association. It has 13 items, with response categories ranging from 0 (not yet implemented) to 5 (90% or more clients receive service). Methods: The self-assessment was administered in paper and online 2019 and 2020 as a pre-and post-assessment for 11 CMHCs receiving mini-grants for tobacco treatment implementation. It was used as part of a goal-setting process for mini-grantees. Most (20/26) CMHCs in Kansas, including mini-grant awardees, completed the self-assessment in 2022 following the state mandate. Results: Of the 20 CMHCs completing the 2022 assessment, total scores ranged from 8-49 (mean=31.3). Across facilities, items with the mean highest scores were related to smoking policy for clients (4.2) and staff (4.4). The guideline least implemented by facilities was billing for tobacco treatment (mean=0.7); most facilities reported no billing or billing for care for 10% or fewer of their clients. Facilities also reported low implementation of tobacco counseling (mean=1.2) and prescribing cessation medications (mean 1.3). Among the 11 CMHCs that participated in the mini-grant program, the average score was 24.5, 33.7, and 38 for 2019, 2020, and 2022. In general, most facilities increased their scores across most domains over time. Conclusion: Although it is a self-report measure, the assessment appears sensitive to changes in practices over time and discriminates across strategies. It may prove a useful tool for research or evaluation, especially if it is paired with medical records or billing data as a form of verification.

FUNDING: State; Academic Institution

POS3-85

THE ROLE OF NITRATE IN FREE RADICAL YIELDS FROM POPULAR US CIGARETTE BRANDS

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Significance: Recent work from our group revealed a 12-fold variation in gas phase (GP) radical production per cigarette in the smoke of popular US cigarette brands, which is largely driven by wide variation (greater than 20-fold) in cigarette filter tip ventilation. We also discovered that the nitrate content in individual tobacco types is directly correlated with the levels of GP radicals formed in the smoke of cigarettes produced with the corresponding tobacco types (with all other variables held constant). Both cigarette ventilation and tobacco nitrate levels are characteristics that may be important for regulatory purposes. Methods: We investigated whether our previous conclusion that tobacco nitrate content is a major contributor to GP Radical formation during smoking is applicable to commercially available US cigarettes. Different brands of unmodified US cigarettes (n=19) were smoked according to the Canadian Intense (CI T-115:1999) smoking regimen (with the ventilation unblocked) and the resulting mainstream smoke was analyzed by EPR for GP radicals. Tobacco filler nitrate content was quantified colorimetrically via enzymatic reduction. Results: We found no correlation between the nitrate content in the cigarette filler and the levels of GP radicals produced in the corresponding smoke. We then measured the production of GP radicals with the filter tip ventilation blocked to ensure that the large brand-to-brand variation in filter tip ventilation was controlled. Consequently, we found a positive correlation between the cigarette filler nitrate content and the levels GP radicals produced. Conclusions: These results corroborate our conclusion that tobacco nitrate is a major contributor to the production of GP radicals. They also suggest that filter tip ventilation reduces the formation of GP radicals that originate from nitrate, and supports the consideration of ventilation and nitrate levels in tobacco regulatory policies.

POS3-86

CHARACTERISTICS OF YOUTH DUAL USERS IN POLAND - RESULTS OF THE POLNICOYOUTH SURVEY

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Previous studies showed an increasing prevalence of dual use of traditional and electronic cigarettes among Polish youth. The aim of the study was to analyze the characteristics of Polish teenage dual users.The cross-sectional study was carried out in 2020 on a representative sample of Polish secondary school students aged 15-18 (N = 16712). To collect data CAWI method was used. In order to estimate the relationship between the independent variables and the outcome variables, the Bayesian multivariate logistic regression was utilized with help of the R program using the brms library.In the analyzed population, 18.3% of respondents admitted that they had smoked cigarettes in the last 30 days and used e-cigarettes at the same time. It was observed that dual use is very significantly related to age (InBF=36.46) and vocational school attendance (InBF=5). Surprisingly, no correlation was found between dual use and the level of education of the parents of the adolescents, but very significant (InBF=42.14) was observed with the use of tobacco products by both parents or mother and father independently. Dual users, significantly more often than other users tried other products such as heated tobacco (InBF=632.51, 51.4%), snuff (InBF=963.88, 61.4%), hookah (InBF=634.39, 52.1%), hand-rolled cigarettes (InBF=1477.08, 78.9%), Juul (InBF=449.58, 47.7%) or cigarillos (InBF=1032.12, 64.4%). In the past 12 months, dual users have made significantly (InBF=23.26) fewer quitting attempts than e-cigarette users (30% vs. 43.4%). This group also significantly (InBF=17.22) more often than e-cigarette users use tobacco products in places where it is prohibited (58.1% vs.44.9%).Teenage dual users in Poland seem to be a hard to reach group for prevention compared to single products users. They come from houses where parents use tobacco and go to school where tobacco use is generally more prevalent. This group is more open for experimentation with other tobacco products. Results suggest that they are also more addicted than single product users.

FUNDING: Federal

POS3-87

CIGARETTE SMOKING, WEIGHT STATUS, AND MORTALITY AMONG US ADULTS

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Background: Cigarette smoking is associated with all-cause mortality and weight status. Whereas being underweight is directly associated with cigarette smoking among those with non-heavy smoking, obesity is directly associated with cigarette smoking among those with heavy smoking. Weight status, when approximated by BMI (Body Mass Index), has a nonlinear relationship with mortality. Individuals who are underweight or with obesity have a higher mortality risk than those with a normal weight. The objective of this study was to determine if weight status was a mediator for the association between cigarette smoking and mortality. Methods: We harnessed the 2017-2018 National Health and Nutrition Examination Survey cross-sectional data and the 2017-2018 National Health Interview Survey Linkage mortality files (LMF) and included adult participants who smoked ≥100 lifetime cigarettes (n=588). BMI was modeled as the mediator of cigarettes smoked per day on age of death. The mediation analysis was performed using Accelerated Failure Time (AFT) models with a logistic distribution for mortality and a Weibull distribution for weight status, adjusting for age of first cigarette, sex, race/ethnicity, household income, alcohol use, and total cholesterol. Results: Overall, the mean BMI was 28.8 kg/m^2. An increase of 0.94 cigarettes/day was associated with increased mortality from 2017-2018 (Hazard Ratio=1.07, 95% CI: 0.91, 1.20; p<0.001), with an average direct effect of -0.63, an indirect effect of -0.32, and a total effect of -0.95. Weight status accounted for 34% of the indirect effect for the pathway between cigarette smoking and mortality. The average direct effect, total effect, and weighted indirect effect proportion were not statistically significant. Conclusions: Weight status was not a mediator for the association between cigarette smoking and mortality, although there was a significant association between cigarette smoking and mortality. Future research should examine how this association has changed over time. Findings support public health efforts to reduce mortality due to cigarette smoking focused on reducing the number of cigarettes smoked per day.

FUNDING: Nonprofit grant funding entity

POS3-88

EVALUATION OF STATEWIDE RESTRICTIONS ON E-CIGARETTE NICOTINE STRENGTH, 2017-2022

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Significance: There are currently no regulations in United States that restrict nicotine strength in e-cigarettes. Some states have implemented policies to restrict nicotine strength. On December 2019, during the time when Massachusetts restricted the sale of non-tobacco flavored e-cigarettes, the state also limited the permissible level of nicotine strength to a maximum of 35 mg/mL (3.5 percent). Similar regulations limiting maximum nicotine strength went into effect in Utah (36 mg/mL=3.6 percent) on September 9, 2021. This study assessed changes in e-cigarette weighted mean nicotine strength and e-cigarettes sold in Massachusetts and Utah compared to states without such restrictions. The impact of restricting non-tobacco flavored e-cigarette sales in Rhode Island, New York and Washington were also assessed to ascertain the impact of nicotine restriction in the context of policies that restrict flavored e-cigarettes. *Methods:* E-cigarette retail sales data during January 2017-March 2022 were licensed from IRi. A difference-in-difference analysis of unit sales was used to compare states with varying policies restricting e-cigarette nicotine strength with states with no restrictions. Models controlled for tobacco control policies, price, COVID-19, state demographics, time and state fixed effects. *Results:* Restricting both nicotine strength and flavors (Massachusetts) was associated with a 2.04 percentage point (pp) reduction in mean nicotine strength and an 86.76 unit reduction in monthly unit sales per 1,000 persons compared to states with no restrictions. Restricting nicotine strength only (Utah) was associated with a 1.77 pp reduction in mean nicotine strength but did not impact unit sales. Restricting non-tobacco flavor sales only (Rhode Island, New York and Washington) slightly reduced mean nicotine strength (0.21, 0.62, and 0.19 pp, respectively) and sales (36.66, 34.51, and 16.37 units, respectively) (all p<0.01). *Conclusions:* Statewide policies restricting nicotine strength are associated with reductions in average nicotine strength; when implemented along with flavor restrictions; greater reductions in average nicotine strength occur in addition to reduced unit sales.

FUNDING: Nonprofit grant funding entity

POS3-89

HOW SELF-RATINGS OF RISK-TAKING, SELF-CONTROL, AND LEADERSHIP RELATE TO YOUTH VAPING ONSET

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Adolescence is a time of increased risk-taking, from comparatively benign risks like curfew breaking to more serious risks like sexual behavior, alcohol, and drug use. As pressure from peers and social media increases, most youth are exposed to vapes more often, which may strain susceptible youths' vape refusal. Youth qualities such as self-control, leadership skills, and views on risk-taking are logically associated with degree of vape use, so it is crucial to empirically explore if these variables are protective factors against vape usage. This study, conducted in May 2020, evaluated responses to a 181-question survey completed by 1,100 youth aged 13 to 17 from across the United States. Age and gender were equally distributed, and percentages of race mirrored national averages. Participants were categorized into four groups based on vape usage: 1) never-users, never vaped before and reportedly will not vape; 2) susceptible-users, never vaped before and may vape in the future; 3) light-users, vaped 9 or fewer days over previous month; and 4) regular-users, vaped at least 10 over previous month. Two-sample t-tests assessed risk-taking, leadership, and self-control traits using a subjective scale from 0-10 across the different degrees of vape usage. The sample included 651 (60.4%) never-users, 144 (13.4%) susceptible-users, 221 (20.5%) light-users, and 62 (5.8%) regular-users. Regular-users reported significantly higher self-reported leadership status, compared to never-users (p<0.001), susceptible-users (p<0.002), and light-users (p<0.01). However, view of self as a leader has no significant relationship with reported likelihood of using ENDS. Additionally, never-users reported a significantly higher perception of control over their own behaviors and activities than susceptible-users (p<0.001) and light-users (p=0.04). Never-users also reported lower perceptions of self-reported risk-taking with near zero p-values when compared to all other groups. Both self-control and risk-taking variables were significantly associated with likelihood of ENDS initiation. Adolescents repeatedly demonstrate poor impulse-control and high risk-taking behaviors; however, never-users of vapes had the highest self-control and lowest risk-taking ratings. It is imperative to explore further the reasons for these characteristics and how to instill such qualities as a protective prevention objective.

FUNDING: Federal

POS3-90

HOME TOBACCO SMOKE EXPOSURE AND ROUTINE HEALTHCARE UTILIZATION AMONG U.S. CHILDREN

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Significance: Child secondhand smoke exposure has been associated with negative health outcomes and higher healthcare utilization, but less is known about thirdhand smoke exposure. This study examined the association between tobacco smoke exposure and routine healthcare utilization patterns among U.S. children ages 0-17 years. Methods: We performed a secondary analysis of National Health and Nutrition Examination Survey 2013-2016 data (N=4,035). Children were categorized into one of three home tobacco smoke exposure groups: nonexposed group (NEG) who did not live with smokers; thirdhand smoke exposed group (TEG) who lived with at least one smoker who did not smoke inside the home; and mixed exposed group (i.e., secondhand and thirdhand smoke, MEG) who lived with at least one smoker who smoked inside the home. Routine healthcare utilization patterns assessed whether children had a place they usually go when they were sick or needed health advice (no, yes). If yes, then they were asked to specify the type of place they usually go to for routine care: primary care, clinic, hospital emergency department, hospital outpatient department, or other. Weighted adjusted logistic regression models were conducted while controlling for child age, sex, race, household income level, and household factors (e.g., home ownership status). Results: Concerning home exposure, 15% of children were in the TEG and 8% were in the MEG. When compared to the NEG, the TEG (adjusted OR [AOR]=1.91, 95%CI=1.90-1.92) and MEG (AOR=1.65, 95%CI=1.64-1.66) were at increased odds to have worse health now compared with 12 months ago. Children in the TEG (AOR=0.46, 95%CI=0.46-0.47) and MEG (AOR=0.59, 95%CI=0.58-0.60) were less likely to have a routine place for healthcare compared to the NEG. However, compared to the NEG, when children in the TEG and MEG had a routine place for healthcare, they were more likely to be treated at a hospital emergency department (AOR=2.49, 95%CI=2.47-2.50; AOR=1.56, 95%CI=1.55-1.57) or outpatient department (AOR=1.35, 95%CI=1.33-1.36; AOR=1.25, 95%CI=1.23-1.27), respectively. Conclusion: Children exposed to home tobacco smoke were less likely to have a routine place for healthcare. Acute healthcare settings were identified as potentially having higher interactions with children exposed to tobacco smoke. These settings can be opportune to screen for tobacco smoke exposure and educate families about the potential dangers of exposure, including thirdhand smoke.

FUNDING: Federal

POS3-91

DEPRESSION AND ANXIETY AMONG U.S. COLLEGE DUAL AND POLYSUBSTANCE E-CIGARETTE USERS

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Significance: E-cigarette use is associated with depression and anxiety symptoms among U.S. young adults. As e-cigarette and cannabis use both increase among young adults, uncovering the relationship between depression and anxiety with e-cigarette single, dual, and polysubstance use is needed. This study assessed the association between multiple substance use patterns and mental health outcomes (anxiety and depression) among U.S. college students. Methods: Secondary data analysis of undergraduate participants of the 2020-21 Health Minds Survey was conducted (n=117,996, college N=140). In web-based surveys, participants reported past-month e-cigarette and cannabis use, and past 2-week heavy alcohol use, anxiety (GAD) and depression (PHQ-9). Risk (stressors) and protective factors (social connections) were also examined. Controlling for demographics and confounders, sex-stratified linear regression models examined effects of single/dual/polysubstance use on anxiety and depression. Results: Overall, any combination of e-cigarette use with cannabis and/or alcohol resulted in significantly higher depression and anxiety scores than non-substance users for women and men. Female poly-users (e-cigarette, cannabis, and alcohol) had higher depression scores by 2.12 compared to non-users, followed by e-cigarette and cannabis dual users (ß=2.11). Compared to non-users, female poly-users (ß=1.20) and e-cigarette and cannabis dual users (ß=1.19) have the largest increase in anxiety scores, followed by alcohol and cannabis dual users (ß=0.95) and e-cigarette only users (ß=0.93). Among men, depression scores were higher by 2.48 for e-cigarette and cannabis dual users and by 2.17 for polyusers versus non-users. Similarly, anxiety scores increased for male e-cigarette and cannabis dual users by 1.82 compared to non-users, and by 1.75 for poly-users, 1.25 for cannabis only users, and 1.09 for e-cigarette only users. Higher parental education and greater childhood and current financial stress were associated with higher depression and anxiety. Feeling a part of the campus community, higher

GPAs, and having supportive relationships were associated with lower depression and anxiety. Conclusion: E-cigarette dual and polysubstance use with cannabis and alcohol are associated with worse mental health status than no substance use and e-cigarette use alone.

FUNDING: Federal; State

POS3-92

VAPING AMONG YOUTH INCREASES RISK OF DEVELOPING RESPIRATORY SYMPTOMS OVER 1 YEAR: A LONGITUDINAL COHORT STUDY

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There is limited longitudinal research on the effects of electronic cigarettes on respiratory health among youth. Further research is required to gain a better understanding of the long-term effects that e-cigarette use has on the respiratory health of youth and young adults.The Vaping Dependence Cohort includes 3402 youth and young adults (16-25) living in Canada recruited August 2020-March 2021 who were followed up every 3 months for up to 1 year. Respiratory symptoms were self-reported using the Canadian Lung Health Test, and exposure to vaping was calculated as cigarette-per-day-equivalents frequency of use in the past month using number of puffs per session (divided by 10), number of sessions per day, and number of days vaped in the past month (divided by 30). The effect of e-cigarette use on count of respiratory symptoms at the subsequent survey was assessed using negative binomial regression modelling, controlling for exposure time, repeated measures, use of other tobacco products, history of asthma, use of alcohol and cannabis, and demographic characteristics. Individuals could contribute between 1 and 4 sets of observations (average 3.1). Interactions between number of cigarettes smoked per day and vaping were assessed. To assess the effect of stopping vaping, a subgroup analysis among those who were vaping at the baseline waves was conducted. The mean age of participants was 19.5 years (SD = 2.5), and the majority of subjects were female (72.0%) and white (81.8%). Non smoking non-vapers reported an average of 0.5 respiratory symptoms per wave compared to 2.1 respiratory symptoms among non smoking participants who reported vaping 4 cigarettes-per-day equivalents. Those who smoked more than 5 cigarettes per day and did not vape reported 1.7 respiratory symptoms compared to 1.8 symptoms among those who smoked more than 5 cigarettes per day and vaped 4 cigarette per day equivalents a month. Vaping frequency was associated with a 15% increase in risk (Incidence rate ratio (IRR) 1.15 95% CI: 1.13, 1.18) with each vaping cigarette per day equivalent unit increase among non-smokers and a 6% increase in risk (IRR 1.06 (95% CI: 1.08, 1.12) among smokers. Interaction between vaping and smoking was statistically significant indicating that the effect of combined increased vaping and smoking on respiratory health was lower in magnitude than would be expected from a multiplicative model. Stopping vaping was associated with a lower risk of incident respiratory symptoms (IRR: 0.87; 95% CI: 0.77, 0.98) comparing to continuing to vape. In this cohort of youth and young adults, vaping frequency was associated with increases in risk of reporting respiratory symptoms and stopping vaping was associated with a lower risk of onset of respiratory symptoms. There is an interaction between vaping and smoking where the large effects of smoking on respiratory health may outweigh the impacts of vaping.

FUNDING: Federal

POS3-93

FLAVORING CONTENT IN EMERGING TOBACCO-FREE ORAL NICOTINE PRODUCTS AND OTHER CONSUMABLE COMMERCIAL PRODUCTS

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Significance: Emerging tobacco-free flavored oral nicotine products (ONPs), including lozenges, pouches, and gums comprise of flavoring chemicals in addition to nicotine and food-grade filler materials. The content of flavorings in these products and their amounts relative to other orally consumed commercial products are unknown. This study aimed to measure and compare 26 common flavoring chemicals among ONPs and various tobacco and non-tobacco commercial products for oral use. Methods: A convenient sample of nicotine pouches (n=30), lozenges (n=10) and gum (n=1) were purchased from online vendors in a variety of flavors. For comparator products, tobacco pouches (n=10), herbal nicotine pouches (n=1), herbal flavored tea (n=12), nicotine replacement therapy (NRT) lozenges (n=4), cough relief lozenges (n=3), NRT gums (n=3), and chewing gums (n=3) were purchased from various sources. Concentrations of 26 flavoring chemicals were measured using GCMS techniques and results were reported as the content in one consumable unit per product type. Results: The herbal nicotine pouch contained the highest average flavoring content (25.0±26.8 mg/product), followed by nicotine gum (5.4± 4.0 mg/product) while nicotine pouches and lozenges contained lower average content (0.6±0.6 and 0.4±0.6 mg/product, respectively). Comparator products ranged from 0.5±0.8 to 3.9±7.2 mg/product (NRT lozenge to chewing gum, respectively). Nicotine pouches and lozenges contained lower content of benzyl alcohol, limonene, and menthol compared to other products. Alternatively, nicotine gum contained higher amounts of limonene and menthol (5.8 and 5.5 mg/product, respectively) compared to most products. Among product types containing synthetic coolant WS-3, tobacco pouches had the highest content (0.9±0.5 mg/product) compared to nicotine pouches, nicotine lozenges, and relief lozenges (0.2 mg/product each). Benzaldehyde, measured in only two product types, was half the content in nicotine lozenges as compared to herbal flavored tea (0.3 and 0.6±0.5 mg/product, respectively). Conclusions: This study revealed that nicotine lozenges and pouches contain lower amounts of flavorings than nicotine gum or other widely consumed non-nicotine products, such as relief lozenges, chewing gum, and flavored tea. Further work is needed to understand flavoring release from each product type, which might influence consumption habits and oral health among users.

FUNDING: Federal

POS3-94

REASONS FOR CIGARILLO USE AMONG YOUNG ADULT ESTABLISHED AND EXPERIMENTAL USERS: FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Young adults (YA) are at highest risk for cigar initiation, progression and long-term addiction. Use of mass-marketed cigarillo products is most prevalent among this group, as is polysubstance use with cigarettes and marijuana. Despite extensive surveillance research on product use patterns among YA cigarillo users, there is surprisingly limited data on reasons for cigarillo use. Understanding reasons for product use is critical for targeting and tailoring messages to prevent and reduce use among young cigarillo users. This study aimed to examine sociodemographic and substance use factors associated with reasons for use among YA cigarillo smokers. We used Wave 4 data (2016-17) from the Population Assessment for Tobacco and Health (PATH) Study with established or experimental cigarillo users aged 18-24 (n=1,221). Reasons for cigarillo use were grouped into four categories - product attributes (e.g., flavors or cost), cigarillos as alternatives to cigarettes (e.g., use where cigarettes are not allowed, feels like smoking a cigarette), cigarillos as a reduced harm product vs. cigarettes (e.g., less harmful for self and others) and social reasons (e.g., smoke with others, feel more confident). We conducted regressions for each outcome to examine sociodemographic (demographics, mental health) and other substance use (cigarettes, blunts, intensity of cigarillo use, flavor use) as covariates. The most commonly endorsed reason for use was related to product attributes such as affordability or flavors. Yet the only factor associated with this reason for using cigarillos was past 30-day use of flavored cigarillos (OR=3.57, p<.001). Hispanics were 2-3 times more likely than non-Hispanic (NH) Whites to use cigarillos for all reasons except for those related to product attributes (all p<.001). NH Blacks were twice as likely as NH Whites to use cigarillos primarily as a harm reduction tool relative to cigarettes (OR=2.01, p<.01). Past 30-day cigarette smokers were more likely to smoke cigarillos as an alternative to cigarettes (OR=2.98, p<.001) but less likely to endorse using cigarillos as a way to reduce the harm of cigarettes (OR=0.43, p<.001). Finally, established cigarillo users and those with greater intensity of cigarillo use in the past month were more likely to endorse social reasons for use. There were no differences in reasons for use by gender, LGBT or mental health status, or recent blunt use. Our findings indicate that correcting cigarillo harm perceptions may be needed for Hispanic and NH Black cigarillo users while de-normalizing cigarillo use as a social activity is important to reduce use for Hispanics as well as heavier and more established cigarillo users. Interventions to reduce the appeal of cigarillos as an alternative to cigarettes may be needed for users who also smoke cigarettes. These findings can inform messaging and related interventions to reduce cigarillo use among YAs.

POS3-95

NORTH AMERICAN QUITLINE CONSORTIUM WEBSITE INFORMATION AND RESOURCES IN RELATION TO ORAL HEALTH CONCERNS FROM SMOKING AND VAPING

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Significance: Since the passage of the Affordable Care Act (ACA), the Department of Health and Human Services reports that at least 21 million people gained medical insurance coverage. However, Medicaid does not guarantee coverage for dental services. Preventive approaches to protect oral health remain essential, particularly for those with limited access to dentists. One evidence-based preventive strategy is cessation of smoking and vaping. Tobacco product use is a major risk factor for many oral health concerns, including periodontitis and oral cancer. Vaping flavors are associated with oral health issues such as oxidative stress and periodontitis. Although use of traditional cigarettes is decreasing in the US, vaping is increasingly popular. Education on the oral health risks associated with smoking and vaping is essential to motivate current users to quit. Identification of evidence-based information and cessation resources for dental, medical and self-referral is needed. Methods: North American Quitline Consortium (NAQC) quitsites provide evidence-based information on many health concerns associated with smoking and vaping, and resources for quitting. An observational "audit checklist" was used with each NAQC state quitsite to assess the presence, amount, and quality of information about the oral health risks associated with smoking and vaping, including vaping flavors. Results: Of the 47 state quitline sites audited, 22 conveyed that tobacco use is associated with oral health concerns. Only one site (Louisiana) associated such concerns with vaping. Twelve sites noted that vaping flavors can be hazardous to users, but none indicated specific oral health concerns. Most (n=35) sites provided links to outside sources containing more detailed information about tobacco use, which included oral health concerns. Conclusion: State quitsites in NAQC currently offer little information on the oral health risks of smoking and vaping. Although 24 states did indicate that smoking can increase the chance of developing oral cancers or other diseases in the mouth, such descriptions were brief. As information on the hazards of vaping increasingly becomes available, states are encouraged to update their quitlines to provide more information on the risks to one's oral health associated with vaping, and to accordingly tailor their cessation materials and resources. Funding: Supported by The National Cancer Institute (NCI) and the FDA (TCORS Grant U54CA228110).

FUNDING: Federal

POS3-96

DUAL USE MESSAGING TO YOUTH THROUGH "THE REAL COST" PREVENTION CAMPAIGN

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This presentation will discuss shifting trends and perceptions among teens who are at-risk for cigarette use and also open to using other tobacco products. Background: FDA's national youth tobacco prevention campaign, "The Real Cost," launched in 2014 and aims to prevent tobacco use among teens aged 12-17. Traditionally, "The Real Cost" campaign has had three discrete prevention efforts for cigarettes, e-cigarettes, and smokeless tobacco - operating under the belief that the target audiences for each product had a different psychosocial risk profile. As the tobacco landscape changes and teen tobacco use patterns evolve, "The Real Cost" has responded by strategically adjusting campaign messaging to meet teens where they are. "The Real Cost" combined quantitative and qualitative data to explore themes around dual use. Methods: According to the 2021 National Youth Tobacco Survey (NYTS), 14.6% of high school students reported current use of two or more tobacco products in the past 30 days[1]. These data align with publications about the risk of dual use being higher among those with an elevated psychosocial risk profile[2]. "The Real Cost" conducted qualitative research to better understand perceptions of harm and patterns of use for teens who are at-risk for dual use, including stakeholder interviews in Spring 2021, focus groups with at-risk teens in September 2021, and in-depth interviews in August 2022. Results will be shared with session participants, including at-risk teens' perceptions of both cigarettes and e-cigarettes, their patterns of use, terminology used to describe each product, and the contexts for where each product is used or where dual use occurs. Conclusions: Participants will understand how "The Real Cost" supplemented quantitative data by using qualitative data to better understand shifting trends and perceptions among teens who are at-risk for cigarette use and also open to using other tobacco products. Learnings from "The Real Cost" can provide advice and practical tips for others who design and implement media campaigns on how to incorporate multiple products into youth tobacco prevention work.

POS3-97

COMPARISON OF ELECTRONIC CIGARETTE-RELATED TERMINOLOGY AND USE BEHAVIORS BETWEEN POD AND MOD USERS

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Background: Electronic cigarette (ECIG) technology has evolved to include a wide array of product styles and product terminology that is not well-defined. ECIG users' language to describe product characteristics was examined and compared as a function of preferred device type. Methods: Participants (53% male; 83% white; 11.1% current smokers) were users of a pod- (including modern disposables; n=19) or mod-style (n=10) ECIG [>4 days/week]. Semi-structured interviews involved presenting users with pictures of devices (cigalike; vape pen; mod; JUUL pod; NJOY Ace pod; modern disposable) and liquid storage containers (cartridge; pen-style tank; mod-style tank; pod). Closed-ended questions evaluated terms used to describe these pictures and other ECIG-related behaviors (qualitative data not presented here). Responses were compared between pod and mod users (Pearson chi-square; p<.05). Results: User groups agreed on some terms for device types (e.g. 'cigalike', 'vape pen', 'box mod'). Still, JUUL pods were more commonly described as a 'pod' by pod users (p<.05; 73.7% vs 30% mod users). More mod users considered the mod device to be a 'mod' (100% vs 47.4% pod users), the vape pen device to be a 'tank' (50% vs 10.5% pod users) or 'mod' (50% vs 0% pod users), and the modern disposable device to be a 'vape pen' (40% vs 0% pod users) (p's<.05). As for individual characteristics, more mod users considered vape pens to be 'refillable' (60% vs 21.1% pod users) and more pod users considered NJOY pods to be 'rechargeable' (84.2% vs 20% mod users) (p's<.05). Regarding the liquid storage container, more mod users considered a pen-style tank container to be a 'tank' (40% vs 0% pod users) and a pod-style container to be a 'cartridge' (50% vs 10.5% pod users) (p's<.05). Both pod and mod users were split on how they preferred to describe their use patterns, with 50-52.6% referring to uses/puffs per day and 40-42.1% referring to the frequency of refilling/replacing their devices/containers. When asked if their nicotine is salt based, few mod users agreed (10% versus 31.6% pod users) and over half of pod users (52.6%) did not know (p<.05). Finally, 50% of mod users had tried synthetic nicotine while 84% of pod users did not know if they've tried it (p<.05). Conclusions: Some terminology used to describe device/liquid characteristics is dependent on users' preferred device type. Such differences may negatively impact consumer behaviors and surveillance efforts.

FUNDING: Academic Institution

POS3-98

PRE-MARKET MESSAGE TESTING AND IN-MARKET PERFORMANCE

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Message testing is completed prior to a mass media public education campaign launching, to assess the effectiveness of creative executions among the target audience. In addition to being likable and resonating with the audience, messages need to change attitudes to change intentions and ultimately behaviors. An understanding of the relationship between pre-market message testing and in-market performance is essential. The purpose of this study was to examine if deltas in forced exposure message testing for attitude shifts correspond with population level in-market attitude shifts. Pre-market survey data were drawn from a forced exposure survey that fielded in August 2021 to test a national truth® campaign, including youth and young adults (N=600; 15-24 years). In-market survey data were drawn from the Truth Continuous Tracking Online, a nationally representative, cross-sectional survey, which includes youth and young adults (N=7,782;15-24 years). In-market data included attitudes prior to the campaign launching (July-September 2021) and after the campaign had been in-market (April-June 2022). Four campaign-targeted attitudes were included. Perceived risk of harm included 4 items (e.g., I would feel bad physically because of vaping). Anti-industry included 3 items (e.g., tobacco companies make me angry). Independence included 4 items (e.g., not vaping is a way to show independence;). Non-vaping identity included 3 items (e.g., I want to be part of a community that rejects vaping;). Findings from forced exposure message testing revealed significant changes in attitude item deltas from pre to post exposure. Means from delta change among the 3 ads was calculated (perceived risk of harm: mean increase = 9.4 points; anti-industry: mean increase = 7.9 points; independence: mean increase = 6.5 points; non-vaping identity: mean increase = 10.1 points). Increases in attitude agreement were also seen at the population level among those campaign aware when comparing attitudes before and after the campaign aired (perceived risk of harm: 57% to 61%; anti-industry: 43% to 46%; independence: 39% to 40%; affinity for non-vaping groups: 43% to 44%). Public health campaigns are usually

limited in funds and unable to test ads by putting them on air and noting which perform best. Thus, message testing for potential attitude change can be a cost-effective way to increase the likelihood of in-market success.

FUNDING: Other

POS3-99

JUUL PUFF TOPOGRAPHY FROM REAL-WORLD AMBULATORY MEASUREMENT

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Introduction: This study presents ambulatory natural environment (NE) topography for the Juul electronic cigarette (ecig). Few NE studies have been done to date, and no NE studies have been done for the Juul. Methods: Current pod-style users were assigned Virginia tobacco Juul pods with nicotine strength approximating their current product. The wPUM™ Juul monitor was used to capture puffing in a 29 hour period in the users' own environment. Results: Thirteen participants were recruited and all successfully completed the 3-day study; 12 current everyday users and 1 current someday user. Participants reported their ecig dependence (54% moderate), current withdrawal symptoms (M = 1.64, SD = 0.59) and mean craving for ecigs (M = 3.86, SD = 1.53). Participant mean parameters were found for puff flow rate (M = 30.8 ml/s, SD = 8.7 ml/s), puff duration (M = 3.3, SD = 0.9), puff volume (M = 97.4, SD = 44.0), and Interpuff interval (M = 456 s, SD = 283 s). NE topography enabled the introduction of new consumption parameters, namely; aerosol consumption rate (M = 1088 ml/hr, SD = 879 ml/hr) and percent of hours inhaling eliquid (M = 1.1%, SD 1.0%). Conclusions: Consumption rate varied as much as 10x across the cohort. Study results indicate the current topography standards, including FTC/ISO, Health Canada, Massachusetts Department of Health and the electronic cigarette CORESTA standard, are insufficient to describe the actual use topography for the Juul.

FUNDING: Federal

POS3-100

MUSIC-THEMED PROMOTION OF CIGARS, LITTLE CIGARS AND CIGARILLOS ON TWITTER

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Significance: The urban African American population is surrounded by intense and integrated levels of tobacco marketing and consequently is one of the few markets where tobacco sales are growing despite declines elsewhere in the US. Youth and African Americans use social media at higher rates than the general public and often post music-related content about tobacco. Music plays a large role in teen and young adult lifestyle, norms and identity formation and helps establish emotional connections with brands and products. This study aimed to assess the prevalence and themes of music-themed promotion of cigars, little cigars and cigarillos (LCCs) on Twitter. Method: Keyword rules were used to collect tweets related to LCCs from the Twitter Historical PowerTrack posted from August 2016 to October 2021. Tweets were coded for promotional content, brand references, co-use with marijuana, sub-culture references (e.g., celebrity endorsements), positive/negative/neutral sentiment using a combination of machine learning methods, keyword algorithms, and human coding. Metadata associated with each tweet were used to categorize users as influencers and regular users. Phonetic fuzzy search was used to identify rap/hip hop lyrics references. Non-English tweets were excluded from analyses. Results: Keyword filters captured over 31,183,114 tweets. Analyses revealed that approximately 1% of accounts were overtly commercial. The sentiment associated with tobacco use mentions was almost uniformly positive or neutral. Accounts by rap musicians frequently posted LCC use-related content. A substantial proportion of tweets contained lyrical references. These tweets also included brand mentions, marijuana references, urban lifestyle cues (partying, street life). Over 122,200 tweets featured references to Youtube.com; 35,892 posts included Soundcloud.com links, and Mashable.com was referenced in 3,485 tweets. Conclusion: Little cigars and cigarillos have become part of hip hop and popular culture. New strategies are needed to protect youth and address the transformation of tobacco advertising into transcendental 'branding,' where the boundaries between marketing and entertainment are blurred.

FUNDING: Federal

POS3-101

QUANTIFYING EXPOSURE TO TOBACCO SMOKE: A REVIEW OF EXPOSURE UNITS REPORTED IN RISK ASSESSMENT STUDIES

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Significance: Exposure to tobacco smoke continues to be an area of public health concern as it contributes to an array of adverse effects on health. Accurate quantification of the risk to health posed by tobacco exposure must rely on valid exposure measurements. However, there has been no established standard method for measuring secondhand smoke exposure (SHS). This study provides a comprehensive overview of tobacco exposure measurements reported in risk assessment studies. Methods: We conducted a systematic review according to PRISMA guidelines. We searched for observational studies published between Jan 1, 1970, to Dec 31, 2021, and indexed in PubMed that quantified the association between SHS and nine health outcomes: ischemic heart disease (IHD), stroke, chronic obstructive pulmonary disease (COPD), lower respiratory infection (LRI), asthma, lung cancer (LC), breast cancer (BC), type 2 diabetes (T2DM), and otitis media (OM). Cohort and case-control studies published in English with a reported effect size of SHS on the selected health outcomes were eligible for inclusion, regardless of the reported unit of exposure. We grouped similar units of measurement for reporting purposes. Results: We identified 407 unique studies that were eligible for inclusion, 184 (45%) of which were prospective cohorts. We found 190 studies reporting on Asthma, 90 on LC, 50 on BC, 39 on LRI, 37 on IHD, 24 on Stroke, 20 on COPD, 17 on OM, and 9 on T2DM. We identified 30 different exposure measurements. Several studies (n = 221) used multiple exposure units. The vast majority of the studies (n = 365) reported the risk associated with a binary exposure classification. Cigarettes per day or equivalent quantity-frequency combination was the most common continuous unit of exposure, followed by hours per week or equivalent, number of smokers, and number of years exposed. Only 14 studies measured the concentration of components of smoke in the environment or through biomarkers. Reported cumulative exposure measurements represented varied combinations of magnitude, duration, and frequency of exposure. Conclusion: We found great variation in ascertaining exposure to SHS in observational studies. To allow for comprehensive quantification of dose-response relationships between SHS and health outcomes, there is a need to define and validate an exposure unit that combines quantity and frequency of exposure to tobacco smoke.

FUNDING: Nonprofit grant funding entity

POS3-102

E-CIGARETTE DEVICE AND E-LIQUID PRODUCT CHARACTERISTICS THAT DIFFERENTIALLY APPEAL TO YOUNG ADULT NEVER, FORMER, AND CURRENT CIGARETTE SMOKERS

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Significance: Many e-cigarette product characteristics are subject to regulation in the U.S., and specific characteristics are known to influence appeal among young adults. E-cigarette characteristics that differentially appeal to cigarette users vs. never cigarette users may be a key target to develop effective tobacco control policies. Yet, little is known about how product characteristic preferences may differ across these populations. Methods: Anonymous, self-report data were collected from young adults (18-30 years; n=298; 55% White, 62% Male) online via Prolific from September-October 2019. Using a visual analogue scale (range: 0-100), participants rated the importance of ten e-cigarette device and nine e-liquid characteristics. Linear regression models were used to evaluate the association of smoking status (never, former, current) with mean rating scores for each characteristic, adjusting for key sociodemographic characteristics. Results: The most important e-cigarette device characteristics overall were price (M=81.1; SD= [17.9]), size (M=75.5; SD= [20.9]), and hit strength (M=73.8; SD= [20.4]). The most important e-liquid characteristics were flavor (M=85.1; SD[16.3]), price (M=80.9; SD[18.4]), and nicotine level (M=77.8; SD[18.9]). In adjusted linear regression models, current smokers (vs. former smokers) rated device brand (coef: 8.70; p=0.03), device popularity (coef: 9.02; p=0.016), device color (coef: 11.26; p=0.005), and temperature/voltage of device (coef: 8.06; p=0.028) as more important. Compared to never smokers, current smokers rated device customizability (coef: 11.28; p=0.008), device temperature/voltage (coef: 10.9, p=0.008), and e-liquid bottle material (coef: 9.39; p=0.05) as more important, and rated e-liquid flavor as less important (coef: -5.01; p=0.05). Conclusion: The self-rated importance of e-cigarette device and e-liquid attributes varies by cigarette smoking status among young adults. Dual users are more interested in customization of devices, while e-liquid flavor was more important to never smokers. Thus, limiting the availability of e-liquid flavors may decrease appeal among never smokers without

compromising appeal among current cigarette smokers. Further investigation is needed to better understand the timing of dual use (cigarettes or e-cigarettes first) to pinpoint characteristics that may encourage positive vs. negative product use transition patterns.

FUNDING: Federal

POS3-103

DIFFERENCE IN CHOICE OF ENDS DEVICE TYPES AMONG RECENT AND NEW CONCURRENT USERS OF CIGARETTES AND ENDS

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Background: There is limited recent data on electronic nicotine delivery systems (ENDS) device type preferences among adult smokers who recently initiated ENDS use. This study examines the associations between ENDS type preference and use patterns and perceptions among recent and new concurrent users of cigarettes and ENDS. Methods: The current study used national data from a survey of 303 US adults who were recent or current smokers who had initiated ENDS use within the past 30 days at the time of the screener survey (December 2020 to October 2021). Participants were asked which ENDS type they used most often with the following response options: 'Cig-A-Likes', 'Vape Pens/eGo', 'Rebuildable/Mechanical Mod or Box Mod', 'Rechargeable Pod Systems', 'Disposable Pod Systems', and 'Other'. At the Baseline Survey (7-11 days after Screener), the current study computed five distinct use groups describing patterns of use for both cigarettes and ENDS: 1) stopped vaping/continued smoking (Rejectors), 2) Mostly smoking (Concurrent-Smoker), 3) Equal use (Dual user), 4) Mostly vaping (Concurrent-Vaper) and 5) stopped smoking/continued vaping (Switchers). Exact Fisher's tests were conducted to evaluate the associations between ENDS type preference and use groups, vaping satisfaction, craving reduction for cigarettes, relative perceived harm of ENDS, ENDS product taste, and reduction in hunger from ENDS product. Results: The ENDS type most commonly used was rechargeable pod systems (23.31%) followed by disposable pod systems (21.05%), rebuildable/mechanical mods or box mods (19.17%), cig-a-likes (14.29%), vape pens/eGos (13.16%), and other (9.02%). Significant bivariate associations ($p < 0.05$) were found between ENDS type and the following: the five distinct use groups, perceived harm of ENDS vs. cigarettes, ENDS product taste, and reduction in hunger from ENDS product. The current study did not find significant associations between ENDS type and the following: vaping satisfaction and craving reduction for cigarettes among ENDS type used. Conclusion: Differences in perceived harm and product benefits by ENDS type appear important to consider when examining use groups and selection of ENDS product type most commonly used. The lack of significant differences between ENDS types most commonly used in vaping satisfaction and craving reduction for cigarettes suggests that previous generations of ENDS types may be improving and becoming more competitive.

FUNDING: Federal; Nonprofit grant funding entity

POS3-104

REPLICATION OF LINGUISTICALLY AND CULTURALLY TAILORED SMOKING CESSATION TOOL FOR ARAB AMERICANS

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Significance: Over a third of Arab American (ArA) teens and adults use tobacco - a much higher rate than that of the overall population of the United States (U.S.). Currently, there is limited smoking cessation help for ArAs. And there are many barriers to help that do exist (e.g., language, level of acculturation, access to healthcare, available time, social pressures). The goal of this study was to test culturally and linguistically tailored smoking cessation booklets on ArA men and women. This was a replication study based on the success of a prior similar study, which only focused on ArA men. Methods: Two ArA investigators recruited ArA men and women, who received a four-week supply of booklets and nicotine replacement therapy. Exhaled carbon monoxide (eCO) was measured during the baseline, during weekly follow-ups, and three months after the recruitment. Subjects also received motivational interviewing sessions over the phone during the four weeks of the follow-ups. Results: During the two years of the pandemic, it was challenging to recruit the intended 30 subjects. The eight recruited smokers were aged 28-65 with equal division of light and heavy tobacco dependence. The majority of subjects had low to no interest in quitting at baseline. By the end of the study, subjects had varied success, reducing their smoking to 10-140 (SD = 32.88) cigarettes per week. However, the majority were successful in reducing their eCO to 3-12 ppm (SD = 2.08 ppm). Conclusions: The current study was useful in assessing ArA's interest in smoking cessation and their receptivity to the culturally and linguistically tailored intervention. While there were challenges in recruitment, those who did participate in the study did have a variable success rate in reducing smoking. The pandemic-related factors (e.g., closure of community and faith centers, social distancing, tobacco dependence from increased stress) may have contributed to the rate of recruitment, which differed from the success of a prior similar study. The current intervention can benefit from further research. However, in absence of other linguistically and culturally tailored smoking cessation interventions for ArAs, the set of the four booklets is the only resource that can be offered to ArAs who seek help.

FUNDING: Academic Institution

POS3-105

FACTORS ASSOCIATED WITH RELAPSE BASED ON A REAL-TIME ASSESSMENT AMONG USERS OF AN APP-BASED INTERVENTION FOR YOUTH VAPING CESSATION

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Significance: Emerging evidence suggests many young people are making attempts to quit vaping and are seeking vaping cessation support. The Stop Vaping Challenge is a youth-focused intervention for supporting vaping cessation based on the concept of an "abstinence challenge" where one tries to stop vaping for a limited period of time and if the challenge proves to be more difficult than expected, it can be a revealing experience. With the help of the Stop Vaping Challenge timer, app users complete vaping abstinence challenges. Each time a user starts vaping again (defined as a 'relapse'), they are prompted to complete a survey assessing factors associated with relapse. Thus, the study research question was, "Among youth making attempts to quit vaping, what factors are associated with relapse?" Methods: Eligible individuals were youth ages 16-18 and young adults 19-29 recruited from users of a free app-based intervention for supporting youth vaping cessation. Data were collected between November 2021 and May 2022. Factors associated with relapse were captured using a survey that assessed participants' basic internal (affect, craving, stress) and external (location, social setting) environments at the time they reported a relapse. The survey also asked about use of other substances during the challenge. Five optional open-ended questions were included in the follow-up survey to help contextualise participant responses. Ethics protocol for the study was obtained from the University of Toronto Office of Research Ethics. Results: As of May 10, 2022, the app has 1,289 users. Of this, 453 agreed to participate in the study. The survey was completed 334 times by 163 unique participants. Results showed that 71% of the survey responses were logged within 5 minutes of the relapse with 57% being logged right at the moment of relapse. 76.4% of the recorded relapse happened when participants were alone and 71.9% happened when participants were at home. 66% reported feeling a strong urge to vape several times a day, while 62% described their craving to be a bit intense to extremely intense. Participants also reported feeling tired (18.3%), stressed (16.8%), and relaxed (15.4%) moments prior to relapse; and using other substances during their abstinence challenge (15%). Qualitative responses (n=125) suggest that being around friends and romantic partners who vape; feeling anxious; being at work, in the car, and away from home were also factors contributing to relapse. Conclusions: Participant responses provided right insight into factors associated with relapse to vaping among youth using the Stop Vaping Challenge app to aid in quitting vaping. These findings have implications for the development of guidelines and interventions for supporting youth vaping cessation.

POS3-106

ADOLESCENT HARM PERCEPTION TOWARDS CIGARETTES AND ALTERNATIVE TOBACCO PRODUCTS, AND ITS ASSOCIATIONS WITH TOBACCO USE, SUSCEPTIBILITY, AND CESSATION

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Background: E-cigarettes (EC) and heated tobacco products (HTP) are touted less harmful and waterpipe (WP) is believed to filter out toxic substances in tobacco smoke. We investigated adolescent harm perception towards combustible cigarettes (CC), EC, HTP and WP, and its associations with ever use, susceptibility to use and cessation of respective tobacco products. Methods: This was a territory wide cross-sectional school-based survey conducted from October 2018 to July 2019. We separately assessed harm perceptions of the 4 tobacco products with the item "Do you think the use of

the following products will harm your health?" with 4 options analysed as "definitely harmful" vs "probably harmful / probably not harmful / definitely not harmful". For each tobacco product, the susceptibility to use (yes vs no) and cessation (former use among ever use) were also assessed. Proportions of perceiving the specific tobacco as definitely harmful were calculated, weighted by sex, age, and grade distribution of the underlying population. Poisson regression models with robust standard errors were fitted to determine the associations. Results: The study included 32,355 students with a mean (SD) age of 14.2 (1.8) years, and 54.1% were boys. More students perceived CC as definitely harmful (62.1%) than EC (46.0%), HTP (47.9%) and WP (46.1%). The percentages perceiving EC and WP as definitely harmful were lowest in ever EC users (49.2% vs 53.3%-81.2%) and ever WP users (39.6% vs 46.5%-69.7%), respectively, than other users. Perceiving a tobacco product as definitely harmful was negatively associated with (i) ever use (adjusted prevalence ratio [APR]: CC 0.44, EC 0.31, HTP 0.34, WP 0.25) in the whole sample, and (ii) susceptibility to use among never users (APR: CC 0.22, EC 0.27, HTP 0.29, WP 0.26). Perceiving CC, EC and HTP as definitely harmful was associated with cessation (APR: 1.52, 1.14, 1.61, respectively), whereas the association was non-significant for WP. Conclusions: E-cigarettes, heated tobacco products and waterpipe were considered less harmful than cigarettes by Hong Kong adolescents. Perceiving the tobacco products as definitely harmful was generally negatively associated with ever use and susceptibility to use but positively associated with cessation of respective tobacco products.

FUNDING: Federal; State; Academic Institution

POS3-107

ENDS USE AMONG HISPANIC YOUTH AND ITS ASSOCIATION WITH SOCIODEMOGRAPHIC VARIABLES AND AN ACCULTURATION PROXY: RESULTS FROM THE NATIONAL YOUTH TOBACCO SURVEY 2020

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Significance: The prevalence of Electronic Nicotine Delivery Systems (ENDS) has been increasing in the last decade. In 2021, 2.06 million U.S middle and high school students reported using ENDS in the past 30 days. Previous data from the 2014-2019 National Youth Tobacco Survey (NYTS) showed that Hispanic youth tended to initiate ENDS earlier in life than other counterparts. Hispanic youth reported higher ENDS use and higher chances of transitioning from cigarette to ENDS when compared to non-Hispanic Black youth. Data on disparities related to ENDS use among Hispanic youth is still limited. This study aimed to provide updated estimates of ever and current use of ENDS among Hispanic minors and examine its associations with age, self-reported sex, sexual orientation, and an acculturation proxy. Method: The 2020 NYTS dataset was used. Cases included Hispanics from 11 to 17 years old (N= 4289). Independent variables (IV) were age, self-reported sex, sexual orientation, and language spoken at home. The dependent variables were self-reported ENDS use (ever and past 30 days). Descriptive analysis and Chi-Square tests were performed. Results: Most participants were women (50.6%), ranging from 11 to 14 years old (59.9%), heterosexual (77.3 %), and speaking a language other than English at home (65.8%). Also, 24.5% of youth reported using ENDS before, and 11% declared current using ENDS. Ever use was significantly related with age [X^2 (1, N=4273) = 322.8, p< 0.01], and sexual orientation [X^2 (2, N=4040) = 49.5, p< 0.0], but not with self-reported sex and language. Use of ENDS in the past 30 days was significantly related to age [X^2 (2, N=1045) = 10.4, p< 0.05], self-reported sex [X^2 (2, N=1042) = 9.6, p< 0.05], and language spoken at home [X^2 (2, N=987) = 6.9, p< 0.05], but not with sexual orientation. Specifically, we found a higher number of ever and/or current users among 15-17 years old, males, those who self-identified as gay, lesbian, and bisexual, and those who spoke only English at home than would be expected if the IV and DV were not associated. Conclusion: Among Hispanic youth, age range and sexual orientation seemed to play a significant role in ENDS ever and current use. The associations of self-reported sex, sexual orientation, and language spoken at home varied by ever and current use. In-depth exploration of subgroup comparison is warranted. Implications and future research will be discussed.

POS3-108

EXPOSURE TO E-CIGARETTE MARKETING AND SUSCEPTIBILITY TO FUTURE VAPING AMONG BLACK AND LATINO ADOLESCENTS IN THE UNITED STATES

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Introduction: Evidence suggests the association between e-cigarette marketing exposure, and e-cigarette use (vaping) among adolescents. However, there is limited literature on e-cigarette marketing exposure and susceptibility to future vaping use associations among Black and Latino adolescents. Objective: Examine associations between e-cigarette marketing exposure and susceptibility to future vaping among Black and Latino adolescents in the United States. Methods: The present study includes data from vaping prevention randomized controlled trial among Black and Latino adolescents (N=362; equal representation between the two groups). Participants completed a baseline assessment in their language of preference (available in English and Spanish) that included sociodemographic characteristics (e.g., ., race, ethnicity, age, gender, sexual orientation, state of residence, and education grade), susceptibility to future vaping, and exposure to e-cigarette marketing. Data analyses included descriptive and Chi-square tests that compared sociodemographic characteristics and e-cigarette marketing exposure based on e-cigarette use susceptibility. Results: Participants' mean age was 15.0 (SD=1.49) years, 235 (64.9%) identified as male, and 91 (25.1%) completed eleventh grade. Half of the participants (54.7%) were susceptible to future vaping. There were no significant associations between susceptibility to future vaping and age, race, gender, and school level (p>.05). Susceptibility to future vaping was significantly associated with more frequent internet (X^2 = 4.99, p = .03), social media (X^2 = 7.73, p = .005), and convenience stores (X^2 = 7.56, p = .006) e-cigarette marketing exposure. Conclusions: Participants who reported being more susceptible to future vaping reported higher frequencies of exposure to e-cigarette marketing on the internet, social media, and in convenience stores. Prevention efforts are needed to include developing and testing counter-marketing campaigns and reducing e-cigarette marketing exposure among Black and Latino adolescents.

FUNDING: Federal; Academic Institution

POS3-109

LONGITUDINAL ASSOCIATION BETWEEN FLAVORED ENDS USE AND CIGARETTE SMOKING IN US YOUTH FROM 2015-16 TO 2018-19

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SIGNIFICANCE: Studies appear mixed about whether flavored ENDS (electronic nicotine delivery systems) use increases cigarette smoking initiation in youth. METHODS: We used Waves 3-5 (2015-2019) of the Population Assessment of Tobacco and Health Study data for Wave 3 youth who never smoked cigarettes (n=9376). Current flavored ENDS use was measured as past 30-day use (no ENDS use, tobacco flavor only ENDS use, non-tobacco flavor ENDS use). Current established cigarette smoking was measured as past 30-day use and lifetime smoking of 100 or more cigarettes. Accounting for complex survey design, we used discrete-time survival analysis with a complementary log-log link to estimate the associations between previous-wave current flavored ENDS use and current established cigarette smoking in the subsequent wave while controlling for demographic factors, school grades, ever alcohol or marijuana use, sensation seeking, cigarette smoking susceptibility (smoking intention, curiosity and likelihood when offered by friend), parental smoking, and friends smoking. RESULTS: Wave 3 prevalence of current ENDS use was 3.7% (n=314) with 0.1% (n=8) reporting using tobacco flavor only ENDS and 3.5% (n=295) reporting using non-tobacco flavor ENDS. Over Waves 3-5, 3.4% (n=315) of participants reported current established cigarette smoking. Compared to no ENDS use, tobacco flavor only ENDS use was not associated with current established cigarette smoking (HR=2.34, 95%CI=0.30, 18.35), while non-tobacco flavor ENDS use was (HR=2.34, 95%CI=1.68, 3.26). CONCLUSIONS: The results suggest that non-tobacco flavor ENDS use increased youth cigarette smoking initiation, but results are inconclusive about the role of exclusively using tobacco flavored ENDS due to the limited sample size. Restricting youth access to flavored ENDS would likely reduce ENDS use and possibly ENDS-mediated smoking initiation.

FUNDING: Federal

POSTER SESSION 4

POS4-1

PREGNANT AND NEWLY POSTPARTUM WOMEN: FACTORS PREDICTING ENROLLMENT IN A CLINICAL TRIAL

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Introduction: Participant recruitment and enrollment are key challenges for many studies. Understanding participant characteristics that lead to enrollment may help to achieve study goals, and also provide better insight into the study population and generalizability of findings. We used a data-driven method to explore predictors of enrollment in our study of bupropion and tobacco use in pregnant and newly postpartum women. Methods: We used Causal Discovery Analysis (CDA) with data from a study recruiting pregnant and newly postpartum women to participate in a randomized clinical trial using bupropion for smoking cessation/relapse prevention. We included data collected by phone prior to study enrollment that is primarily used to assess initial study eligibility. The information collected and used for this project includes smoking history and current smoking status, breastfeeding or intent to breastfeed status, motivation to quit or stay quit, health and pregnancy status and medication use. The data driven CDA algorithm (Greedy Fast Causal Inference) generated an integrated model relating all of these factors. Results: The model produced by CDA found that an individual's use of psychotropic medications was predictive of their enrollment in the study. To further explore this result a Chi Square test of independence was performed to assess the relationship between the use of psychotropic medications and study enrollment, X^2 (2, N=170) = 11.7, p = 0.002. Individuals who were not currently using psychotropic medications were more likely to enroll in the study. Further, Cramer's V = 0.26 indicating a moderate relationship between use of psychotropic medications and study enrollment. Our CDA model also found that individuals with more health and pregnancy related issues had higher motivation to want to quit smoking or remain quit but this did not translate to study enrollment. We also found that current smoking status (looking to quit or maintain abstinence) and smoking history (total years of smoking) did not influence study enrollment. Conclusion: We found that participants who were not currently taking a psychotropic medication were more likely to be enrolled. Other factors collected by phone screening were not found to influence study enrollment. The reason for this finding is unclear but illustrates the need to have a greater understanding of the population targeted for enrollment. Future analysis should investigate social determinants of health and enrollment.

FUNDING: Federal

POS4-2

AN EXAMINATION OF OBJECTIVE AND SELF-REPORT MEASURES OF AD LIBITUM ELECTRONIC CIGARETTE USE: IDENTIFYING PATTERNS OF PUFFING BEHAVIOR AND EVALUATING SELF-REPORT ITEMS

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Introduction/Significance: There has been little research objectively examining puff patterns in people who use electronic cigarettes (e-cigarettes). The primary aim of this study was to identify patterns of e-cigarette use and categorize distinct use-groups by analyzing patterns of puff topography variables over time. The secondary aim was to identify the extent to which self-report questions about use accurately assessed e-cigarette use-behavior. Methods: Fifty-seven adult daily e-cigarette-only users completed a 4-hour ad libitum puffing session with unrestricted access to their e-cigarette in a simulated naturalistic setting. Self-reports of use were collected both before and after the session, and participants were video recorded during the session. Video recordings were coded for the number, timing, and duration of individual puffs. Results: All participants engaged in puffing during the session with an average of 64 total puffs (SD = 39.2; range = 8 - 167). In this research, puff clusters were defined as puffs occurring within 59 seconds of each other. Three distinct use-groups emerged from exploratory and confirmatory cluster analyses of puffs distributed over time. The first was labelled the "Graze" use-group (29.8% of participants), in which the majority of puffs were unclustered (i.e., puffs were greater than 60 seconds apart) with a small minority in short clusters (2-5 puffs). The second was labelled the "Clumped" use-group (12.3%), in which the majority of puffs were within clusters (short , medium [6-10 puffs], and/or long [more than 10 puffs]) and a small minority of puffs were unclustered. The third was labelled the "Hybrid" use-group (57.9%), in which most puffs were either within short clusters or were unclustered. Across the groups, those in the Graze group took the fewest number of puffs but also had the longest average puff duration. They also reported the greatest level of e-cigarette dependence. Significant differences emerged between observed and self-reported use-behaviors with a general tendency for participants to over-report use. Further, commonly utilized assessments demonstrated limited accuracy in capturing use-behaviors observed in this sample. Conclusions: This research addressed several limitations previously identified in the e-cigarette literature and collected novel data that provided substantial information about e-cigarette puff topography and its relationship with self-report measures and use-type categorization.

FUNDING: Academic Institution

POS4-3

EFFECT OF EARLY VARENICLINE TREATMENT ADHERENCE ON BEHAVIORAL TREATMENT COMPLETION AND SMOKING CESSATION AMONG PERSONS WITH CURRENT OR PAST MAJOR DEPRESSIVE DISORDER

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Significance: The mechanisms by which varenicline promote smoking cessation among adults with MDD and varied motivation to quit have not been explored. We tested the hypothesis that early adherence to varenicline among such persons increases cessation by raising behavioral treatment utilization. Methods: Data were from a trial in which 300 adult smokers with current/past MDD were treated with 12 weeks of behavioral activation or standard behavioral treatment (ST) and varenicline or placebo (NCT02378714). Only ST+varenicline (n=81) and ST+placebo (n=68) arms were included to enable comparisons with varenicline studies. ST consisted of eight 45-minute sessions delivered weeks 1-12. Varenicline and placebo were given weeks 2-14 according to FDA-approved labeling for varenicline. Smoking cessation was defined as CO-verified (=6ppm) 7-day point-prevalence abstinence at week 14. Behavioral treatment adherence was defined as completing =6 sessions. Medication adherence, defined as adherence to the medication regimen on =80% of pill-taking days, was assessed via used blister packs and timeline followback assessment. Baron and Kenny's approach (1986) was used to test whether the effect of early medication adherence (through week 7) on abstinence was mediated by ST adherence. Results: Only 53% of the diverse sample (N=149) was planning to quit in the next 30 days. Overall, 69% of participants were adherent to ST and 50% adhered to the full medication regimen. Arms did not differ on ST adherence (OR=1.00, 95% CI=0.50, 2.01; p=.99) or medication adherence (OR=0.88, 95% CI=0.46, 1.67; p=.69). With respect to smoking cessation, 32% of participants adherent to ST achieved abstinence vs. 3% of non-adherent participants (p=.006). Among the 141 participants who did not drop out before start of medication, ST adherence mediated the effect of early medication adherence on abstinence: a) early medication adherence predicted abstinence: OR=3.56, 95% CI=(1.45, 8.77) per IQR increase in medication adherent days from 20 to 42 (p=.006); b) early medication adherence predicted ST adherence: OR=9.42, 95% CI=(4.41, 20.14) per IQR increase in medication adherent days (p<.001); and c) early medication adherence did not predict abstinence, when controlling for ST adherence: OR=1.86, 95% CI=(0.69, 5.03) per IQR increase in medication adherent days (p=.22). Conclusion: Varenicline may promote cessation among smokers with MDD and varied readiness to quit by increasing utilization of intensive behavioral treatment.

FUNDING: Federal; Academic Institution

POS4-4

E-CIGARETTE USE CHARACTERISTICS AMONG ADULT EXCLUSIVE E-CIGARETTE USERS WITH PLANS TO QUIT E-CIGARETTES IN THE NEAR FUTURE

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Purpose: Growing evidence suggests that many e-cigarette users plan to quit e-cigarettes someday, and many have more imminent plans to quit. To date, few interventions have been developed to target the unique needs of e-cigarette users quit wish to quit, including young adults who are less likely to report a history of combustible tobacco product use. The current study aims to characterize e-cigarette use characteristics and cessation history among adult exclusive e-cigarette users with imminent plans to quit e-cigarettes. Methods: The current study reports on 112 adult exclusive e-cigarette users who reported plans to quit e-cigarettes within the next 30 days. Participation included a

baseline assessment, 30 days of ecological momentary assessments, and a follow-up assessment. Inclusion criteria included: age 18-60, current daily e-cigarette use for at least 6 months, and interest in quitting e-cigarettes in the next 30 days. Individuals were ineligible if they reported recent use of combustible tobacco or cessation aids for quitting e-cigarettes. The current study reports on data collected during the baseline assessment. Participants provided information about current device, and quantity/frequency of e-cigarette use, and cessation history. Results: Across 112 participants (mean age=22.8, sd=5.12, 47% female), approximately 40 different devices were used. Most reported devices used were Juul (n=26, 23%), Vuse (n=13, 12%), Hyde (n=9, 8%) and Smok Novo (n=8, 7%). Most participants reported most frequently using a menthol/mint (n=51, 46%) or fruit (n=48, 42%) flavor. Less than 1/4 of participants (n=25, 22%) reported a history of regular cigarette use. Participants reported picking up their e-cigarette 40.61 times/day (range: 2-250) and taking 6.22 puffs/episode (range: 1-100). Participants has high levels of dependence measured by the PSECDI (m=13.08, sd=3.81). Participants reported making 2.88 serious e-cigarette quit attempts in their life (range: 0-40) and endorsed a variety of cessation strategies, including counseling (n=8, 7%), telephone support (n=5, 4%), books/pamphlets (n=13, 12%), tobacco clinic (n=1, 1%), support groups (n=1, 1%), family and friends (n=37, 33%), NRT (n=23, 21%), varenicline/bupropion (n=5, 4%), or no support (n=47, 42%). Conclusions: Consistent with research on users of combustible cigarettes, e-cigarette users who wish to quit report a history of repeated quit attempts and few report use of evidence-based treatment approaches.

FUNDING: Federal

POS4-5

HIGHER NICOTINE DEPENDENCE FOR VAPING VERSUS SMOKING AND WITH TANKS/MODS VERSUS DISPOSABLE E-CIGARETTES

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Significance: The nature of e-cigarette dependence is poorly understood, given the diversity of e-cigarette devices. Indeed, some e-cigarette devices may be associated with greater dependence than other devices and even combustible cigarettes, but these hypotheses remain to be tested. Likewise, little is known about factors underlying e-cigarette dependence such as sex, a well-established factor in combustible cigarette dependence. We sought to address these gaps by evaluating nicotine dependence among adults who used e-cigarettes or cigarettes from the US Population Assessment of Tobacco and Health (PATH) Survey. Methods: Participants aged 18+ who were either established e-cigarette users who had not smoked cigarettes in the past 30 days, or established cigarette smokers who had not used an e-cigarette in the past 30 days were included from the Wave 5 adult cohort PATH data (N=34,309). A Heaviness of Smoking Index (HSI; adapted for vaping) score was calculated to approximate dependence for both behaviors. Descriptive statistics were used to compare HSI scores by e-cigarette device type, sex, and tobacco product type (e-cigarette vs cigarette). Results: The final analytic sample included 7342 participants, of whom 5984 (81.5%) were cigarette users and 1358 (18.5%) were e-cigarette users. Individuals who used disposable devices had lower HSI scores (M=2.1) than those who used mods (M=3.1; t =-2.5, p<.05) and tanks (M=3.1; t =-3.1, p<0.01). Individuals who used cartridges had lower HSI scores (M=2.5) than those who used tanks (M=3.1; t =-3.1, p<0.01) and mods (M=3.1; t =-2.5, p<.05). Men who used cigarettes had higher HSI scores (M=2.3) than females who used cigarettes (M=2.2; t=2.2 p<0.05). Similarly, men who used e-cigarettes had higher HSI scores (M=3.0) than women who used e-cigarettes (M=2.7; t=2.1, p<0.05). When evaluating HSI by product, results showed that e-cigarette users (M=2.9) had higher HSI scores than cigarette smokers (M=2.2; t=8.0, p<.0001). Conclusions: Results indicated higher nicotine dependence scores among men vs women, adults who used e-cigarettes vs cigarettes, and tank/mod vs disposable e-cigarette devices. The results are consistent with previous literature on sex differences in cigarette dependence and suggest potential differences in dependence by e-cigarette device and tobacco product type. Future research should further investigate the associations among these factors and other variables with e-cigarette dependence.

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POS4-6

CIGARETTE SMOKING MOTIVES, THOUGHTS ABOUT QUITTING, AND PERCEIVED DISCRIMINATION AMONG INDIVIDUALS INVOLVED IN ALABAMA COMMUNITY CORRECTION PROGRAMS

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Background: Individuals in community corrections across the United States demonstrate higher rates of cigarette smoking, as compared to the general population. For those involved in community correction programs, functioning in society is often accompanied by stigmatization and discrimination from others, spanning across personal, professional, legal, and recreational walks of life. Despite a high prevalence of mental illness, tobacco use, and discrimination among this population, no research has been conducted on how these concepts may relate to each other and further, how they can inform cigarette cessation for this population. Methods: Individuals actively involved in community corrections were recruited from the UAB Substance Use Program, an onsite addiction treatment collocated with criminal legal community supervision programs, to participate in a study on cigarette smoking behaviors, attitudes on abstinence, and mental health. Participants came onsite to complete a series of questionnaires and were compensated for their time. Pearson correlations were conducted to assess how thoughts about cigarette cession and perceived discrimination relate to 12 thematic smoking motives in the Wisconsin Inventory of Smoking Dependence Motives (WISDM), a standardized measure that demonstrates validity in predicting future abstinence. The items on the WISDM demonstrated strong internal consistency in this sample (a = .97). The Everyday Discrimination Scale (EDS) was utilized to assess perception of discrimination (a = .88). Results: In the final sample of 514 participants living in Alabama, the average age was 40 years old, 52% male, roughly 54% White, and 46% Black or Bi-racial, and spent an average of 42 months incarcerated across their lifetimes. Significant and positive correlations emerged among one's desire to quit smoking and the automaticity, loss of control, craving, cue exposure-associative processes, tolerance, weight control, and primary dependence motivational domains. Participants' perceived degree of discrimination was positively and significantly correlated to every motivational domain except the social-environmental goals. Conclusions: In consideration to smoking cessation for individuals in community correction programs, addressing feelings of discrimination and how they relate to motives for continued use may be valuable in cessation program developments.

FUNDING: Federal

POS4-7

ASSOCIATIONS OF ANXIETY SENSITIVITY WITH E-CIGARETTE DEPENDENCE SEVERITY AND NEGATIVE REINFORCEMENT VAPING MOTIVES AMONG THREE RACIAL/ETHNIC SUBSAMPLES

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SIGNIFICANCE: In prior work, anxiety sensitivity (AS, fear of anxiety symptoms) has been consistently associated with negative reinforcement (NR) smoking motives, whereas AS typically has not been associated with cigarette dependence severity, including among African American smokers. However, some recent research has indicated that AS may be more robustly related to cigarette dependence severity among Latinx smokers, and emerging research has associated AS with both e-cigarette dependence severity and NR vaping motives, though this work has been limited to largely White samples. Therefore, we decided to investigate associations of AS with e-cigarette use among three racial/ethnic groups. Based on prior research, we hypothesized that AS would be consistently related to NR vaping motives, but would only be related to e-cigarette dependence among Latinx participants. METHODS: Adult e-cigarette users (N = 756; mean age = 35.7 years; 45.1% female) completed self-report measures of AS, e-cigarette dependence severity, and NR vaping motives. Linear regression analyses were conducted to examine whether AS is associated with e-cigarette dependence and NR vaping motives among non-Latinx Black (n = 65), non-Latinx White (n = 570), and Latinx White (n = 121) e-cigarette users (planned covariates: neuroticism and cigarette dependence severity). RESULTS: In non-Latinx Black participants, AS was significantly associated with NR vaping motives (beta = .32, p = .034) but not with e-cigarette dependence severity (beta = .11, p = .42). In non-Latinx Whites, AS was significantly associated with e-cigarette dependence severity (beta = .11, p = .025) and NR vaping motives (beta = .39, p < .001). In Latinx Whites, AS was also significantly associated with e-cigarette dependence severity (beta = .26, p = .011) and NR vaping motives (beta = .52, p < .001). After applying a Holm-Bonferroni correction to minimize the possibility of Type I error, however, only the last three associations remained significant. CONCLUSIONS: Findings suggest that AS associations

with e-cigarette use may be similar to what has been observed with cigarette smoking, in particular the seemingly larger effect sizes among Latinx smokers. These findings must be considered quite preliminary though, especially in relation to Black e-cigarette users, as the smaller sample size limited statistical power and may have prevented a true AS association with NR vaping motives from retaining statistical significance.

FUNDING: Academic Institution

POS4-8

CHARACTERIZING E-CIGARETTE FLAVOR USE AND PREFERENCE BY MENTHOL CIGARETTE STATUS AMONG US ADULTS USING E-CIGARETTES IN A SMOKING CESSATION ATTEMPT

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Background: Menthol cigarette use remains a large public health problem. The FDA plans to ban menthol cigarettes and is considering regulatory policies for flavored e-cigarettes. Examining e-cigarette flavor use by menthol cigarette status can help inform regulatory policies to reduce smoking and smoking-related harm. Methods: Online survey data were collected in summer 2021 from 857 adults (47.6% female) who reported using e-cigarettes in a recent attempt to quit smoking. Items assessed e-cigarette flavors used and preferred when quitting from 11 categories including menthol, tobacco, and other (e.g., fruit, candy, vanilla). Descriptive statistics and multinomial logistic regression models were used to examine associations between menthol cigarette status and e-cigarette flavors preferred (i.e., menthol, tobacco, other) when quitting smoking while controlling for demographic variables. Results: There were significant differences in e-cigarette flavors used by menthol cigarette status; 50.8% of menthol smokers used menthol e-cigarettes vs. 18.7% of non-menthol smokers ($p < .001$), and menthol was the most preferred e-cigarette flavor when quitting smoking among menthol smokers across multiple race/ethnicities: Non-Hispanic White, Non-Hispanic Black, and Non-Hispanic Other. In the multinomial model, use of menthol cigarettes was associated with greater preference for menthol flavored e-cigarettes (compared to tobacco flavor, AOR=14.29, and compared to other flavors, AOR=3.48, p-values <.001). Additionally, being female (AOR=1.82,p=.02), and younger age (AOR=.98, p=.04) was associated with preference for menthol (vs. tobacco) e-cigarette flavors, while older age was associated with preference for menthol (AOR=1.04) or tobacco (AOR=1.06),vs. other flavors, p-values<.001. Conclusions: These findings suggest that menthol smokers, compared with non-menthol smokers, are more likely to prefer menthol-flavored e-cigarettes over tobacco or other-flavored e-cigarettes when attempting to quit smoking.

FUNDING: Federal

POS4-9

PATTERNS OF FLAVOR, DEVICE, AND NICOTINE STRENGTH USE AMONG DAILY ENDS USERS: A ONE-YEAR LONGITUDINAL STUDY

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Background: Previous research suggests product preferences of cigarette smokers are stable; research on patterns of ENDS product use is less robust. Early studies suggest ENDS users often change flavors, enhancing the sensory experience of vaping (so-called 'vaper's tongue'). Here, we closely monitored types of flavors, ENDS devices, and nicotine concentrations used by daily e-cigarette users over a one-year span. Methods: Established exclusive ENDS daily users were recruited via online advertisements for a year-long study with monthly lab visits. We analyzed data from n=81 participants completing the 12-month course of visits. Data collected included participant-reported flavor usage on a 30-day calendar, self-reported most-used flavor, and staff collection of liquid samples and photographs of product taken by study staff. Product characteristics were identified by labelling on product packaging and cross-verified against online manufacturer's descriptions. Nicotine level was dichotomized as being low (≤24mg/mL, generally freebase) or high (>24mg/mL, generally salt nicotine) concentration. Results: Participants exhibited a balanced mix of stable flavor usage and switching behaviors; 52.9% had minimum one switching event (using predominantly one flavor-type at one visit and a different flavor-type at the following visit). Participants using primarily dessert/candy flavors were the most likely to have at least one switching event (63.6%) while tobacco flavor users were least likely (8.3%). Participants were generally stable in their device-type usage, with 58.5% using a single device type on all visits; high overall stability was largely driven by mod-box users (70.6% users of mod-box ENDS did not change their devices during study) with refillable pod, cartridge, and disposable product users being roughly even (48.1%, 50%, 53.8% stable usage pattern, respectively). Participants were generally stable in their nicotine-concentration usage, with 69.5% of participants using the same nicotine concentration for all twelve visits. Conclusions: ENDS product preference is generally stable among daily users; however significant variability of product use does exist. Switching between flavor- and device-types is more common than changing nicotine concentration. Predominant use of some flavors (tobacco) is highly stable while others (dessert) are associated with more switching. Use of mod-box style devices is highly stable.

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POS4-10

PREDICTORS AND OUTCOMES OF SELF-REPORTED COMPLIANCE WITH VERY LOW NICOTINE (VLNC) CIGARETTES IN A SMOKING CESSATION TRIAL

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Significance: Switching to VLNCs reduces dependence and improves cessation outcomes. However, non-compliance with VLNCs is often high, which may reduce their effectiveness. Studies of non-treatment seekers have shown that higher dependence and lower satisfaction with VLNCs are associated with lower compliance, but it is unclear how these associations may differ in the context of a cessation trial. Methods: Daily smokers (n=35) engaged in a 4-week pre-cessation intervention including VLNCs, transdermal nicotine patch, and weekly behavioral support sessions prior to a quit attempt. After the quit date, participants received standard nicotine replacement therapy and 4 additional behavioral sessions. Self-reported and biochemically verified abstinence was assessed at weeks 1, 3, 6 and 10 post-quit. Multiple regression analyses examined whether baseline smoking characteristics and abstinence self-efficacy predicted VLNC compliance (percent of VLNCs out of total cigarettes smoked). We further examined whether self-reported compliance was predictive of a) changes in smoking characteristics; b) changes in abstinence self-efficacy; or c) cessation outcomes. Results: Overall, participants reported smoking VLNCs 79% of the time. Baseline nicotine dependence, cigarettes smoked per day, craving, withdrawal and abstinence self-efficacy were all unrelated to compliance. Nicotine dependence, cigarettes per day and craving decreased significantly across the 4-week pre-treatment period (all p's<.01); the magnitude of this change was unrelated to compliance. However, greater compliance was associated with improvement in abstinence self-efficacy from baseline to pre-quit ($p<.05$), and predicted lower likelihood of relapse ($p<.01$). The association with quit outcomes remained significant when controlling for nicotine dependence and/or cigarettes smoked per day (both baseline and pre-quit), but was no longer significant when adjusting for change in self-efficacy. Conclusions: Consistent with the broader literature, dependence and smoking rates decreased during 4 weeks of VLNC and transdermal patch use, even with some usual brand smoking. However, greater VLNC compliance predicted better quit outcomes above and beyond any baseline smoking characteristics—an effect that was partially mediated by improvement in self-efficacy. Although preliminary, these findings suggest that identifying strategies to promote exclusive use of VLNCs during a brief pre-quit window may be beneficial.

FUNDING: Federal

POS4-11

POSITIVE AND NEGATIVE URGENCY RELATIONS WITH E-CIGARETTE DEPENDENCE SEVERITY ACROSS THREE RACIAL/ETHNIC GROUPS

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SIGNIFICANCE: Positive and negative urgency (PU and NU: the tendency to act impulsively in response to positive and negative affect, respectively) have consistently been associated with cigarette smoking. In contrast, PU and NU have rarely been associated with e-cigarette use, although (to our knowledge) they have not been examined in relation to e-cig dependence severity or among marginalized groups. Thus, we examined PU and NU relations with e-cig dependence severity across three racial/ethnic subsamples of e-cig users (N = 754; mean age = 35.7 years; 45.2% female). METHODS: Bivariate correlations, linear regressions (adjusted for combustible cigarette dependence severity), and comparisons of correlation coefficients were employed in examining PU and NU relations with e-cig dependence severity within and across groups. RESULTS: In Black (n = 65) and White (n = 569) participants, only NU was significantly associated with e-cig dependence severity (beta = .41 and .20, p = .028 and .001, respectively). However, in Latinx participants (n = 120), only PU was significantly associated with e-cig dependence severity (beta = .49, $p < .001$). A follow-up regression analysis revealed that race/ethnicity significantly moderated the association of PU with e-cig dependence (beta = .15, p = .024), such that PU was more strongly related to dependence among

Latinxs vs. Whites. Comparing the corresponding bivariate correlations also evidenced a significantly stronger correlation of PU with e-cig dependence severity among Latinx vs. White (r = .47 vs. r = .20, p = .003). CONCLUSIONS: Findings suggest that Black and White individuals may develop greater e-cig dependence in part due to impulsively attempting to soothe negative affective states. Conversely, findings suggest that Latinx individuals may develop greater e-cig dependence in part due to attempting to enhance positive affective states. If current findings are replicated in future (perhaps longitudinal) research, it will be important to try to understand what cultural factors may play a role in contributing to the seemingly differential influence of PU and NU on the severity of e-cig dependence across racial/ethnic groups (especially when e-cigs are marketed to aid in smoking cessation yet long-term effects are still unknown). In coming to an improved understanding of these factors, it may be possible to more effectively tailor and implement vaping cessation efforts for individuals from diverse backgrounds.

FUNDING: Academic Institution

POS4-12

EFFECTS OF MINT, MENTHOL, & TOBACCO-FLAVORED E-CIGARETTES ON APPEAL AND SENSORY EFFECTS, TOBACCO WITHDRAWAL, AND THE RELATIVE REINFORCING VALUE OF MENTHOL CIGARETTES IN MENTHOL SMOKERS: A PILOT STUDY

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SIGNIFICANCE: Cigarette smoking has substantially declined in the general population, yet the prevalence of menthol cigarette smoking continues to stagnate or increase in some vulnerable groups. Examining whether alternative tobacco products alter patterns of menthol smoking are critical to informing efforts for reducing the public health burden triggered by menthol cigarette use. This laboratory pilot study evaluated the effects of mint, menthol, and tobacco-flavored electronic cigarette (e-cigarette) solutions on appeal, sensory effects, tobacco withdrawal, and the relative reinforcing value of menthol cigarettes in e-cigarette-naïve adults who smoked menthol cigarettes daily. METHODS: Participants (*N*=17; *M* age=51.8 years old, 35.3% Female, 82.4% Non-Hispanic Black) attended 3 laboratory sessions, each after 16-hrs of tobacco abstinence. Participants self-administered a study-provided JUUL (0.7 mL with 5% nicotine by weight) in which flavor was manipulated (mint vs. menthol vs. tobacco). Pre- and post-administration assessments were completed to assess appeal, sensory effects, and tobacco abstinence effects (smoking urges, nicotine withdrawal symptoms, and affect states). Relative reinforcing value of menthol cigarettes was assessed via a concurrent progressive ratio task (PRT) in which participants earned choices for menthol cigarettes puffs vs. flavored e-cigarette puffs. Multilevel mixed effect linear regression models tested differences between the three flavored conditions on all study outcomes. RESULTS: Following overnight tobacco abstinence, vaping either a mint or menthol (vs. tobacco) flavored e-cigarette led to significantly greater reductions in smoking urges (Bs = -0.35 to -0.32; *ps* <.01). Additional secondary analyses illustrated that menthol (vs. tobacco) flavored e-cigarettes significantly suppressed urges to smoke for pleasure, whereas tobacco (vs. menthol) flavored e-cigarettes significantly reduced withdrawal-related anger (B = -0.57 to -0.12; *ps* <.01). Appeal, sensory effects, nicotine withdrawal, positive affect, and the relative reinforcing effects of menthol cigarettes did not significantly differ across flavored conditions (*ps* = .11-.99). CONCLUSIONS: Mint and menthol (vs. tobacco) flavored e-cigarettes may reduce tobacco withdrawal. Further work is warranted to guide future regulatory decisions on whether mint and menthol flavors may reduce menthol cigarette smoking behavior via withdrawal suppression in menthol smokers.

FUNDING: Federal

POS4-13

A PILOT FEASIBILITY STUDY OF A CONTINGENCY MANAGEMENT-BASED TOBACCO TREATMENT FOR PREGNANT WOMEN WITH OTHER SUBSTANCE USE CONCERNS

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Significance: Pregnant women who use other substances are a high-priority group characterised by disproportionately high rates of tobacco smoking. Tobacco treatment is lacking for this group so to address this, a contingency management-based treatment that included other cognitive behavioural strategies and nicotine replacement therapy (NRT) for women and their partners and featured non-face-to-face delivery was trialled and its feasibility assessed. Methods: A single-arm pre-post design pilot feasibility study was conducted across three tertiary referral antenatal services that support substance use in pregnancy in New South Wales and Victoria. Women were offered financial incentives contingent on carbon monoxide (CO) verified smoking cessation or reduction, NRT and cognitive behavioural counselling from enrollment till birth. Primary outcome was intervention feasibility (proportions enrolled and followed-up at 12-weeks postpartum; uptake of individual treatment components). Secondary outcomes were participant-reported acceptability (9-items rated 0-10, scores >5 considered favourable), treatment efficacy (verified 7-day abstinence at delivery; length of abstinence; self-reported reduction in cigarettes smoked/day from baseline to last treatment engagement). Results: Almost half the 101 referrals enrolled in the program. Mean age was 31.3 years (±6.2), 23%(10/46) were of Aboriginal or Torres Strait Islander background, mean gestational age was 22.3 weeks (±5.8). Baseline median cigarettes smoked/day was 10(IQR 6-20) and COppm 15(IQR 8-26). Retention to 12-week postpartum follow-up was just under 50%. Approximately two-thirds provided >1 CO verification for financial incentives and used NRT for =2 weeks. Half attended =1 counselling session. Approximately two-thirds self-reported abstinence at birth, although this fell substantially by 12-weeks postpartum. Median cigarettes smoked/day reduced significantly from baseline to last contact (p=<0.001). Women who stopped smoking had education beyond high school (p=<0.02), completed more CO samples (p=<0.001) and earned greater incentives (p=<0.001). All participant acceptability items scored favourably with median ratings for intervention helpfulness to stop smoking 8(IQR 7-10) and convenience 8(IQR7-9). Conclusions: This intensive tobacco treatment appears feasible and acceptable. Further study will determine whether multi-faceted support is effective for improving future smoking prevalence. Scale-up would require dedicated mobile phone software to improve contingency management delivery, extension into the postpartum period and improvements to counselling delivery and partner support. An economic evaluation is also required.

FUNDING: State; Academic Institution

POS4-14

TAILORING AND ANTI-SMOKING MESSAGING: EVALUATING THE EFFECTIVENESS OF TAILORED ANTI-SMOKING MESSAGES FOR YOUNG ADULT SEXUAL MINORITY WOMEN

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Significance: Tailoring has been widely adopted in LGBTQ-focused health campaigns. However, this strategy in anti-smoking messaging received mixed feedback from sexual minority women (SMW). We conducted a randomized controlled experiment to explore the effectiveness of LGBTQ-tailored anti-smoking messages among young adult SMW. We investigated how the anti-smoking messages with LGBTQ-tailored cues influenced different SMW groups' perceived message effectiveness (PME) via the mediation of perceived targetedness (PT) and emotions. Methods: This study employed a two (condition: LGBTQ-tailored vs. control) × six (message) mixed-factorial experimental design. A set of 28 anti-smoking visuals featuring young women, graphics, or settings were created. By adding cues (i.e., logos, slogans) highlighting LGBTQ health or women's health, a total of 56 messages were included. Participants were recruited through Prolific's online panels

and randomly assigned to view six messages within each condition. After each message exposure, they responded to the questions assessing PT, emotions, and PME. We used multilevel mixed effect analysis and multilevel generalized structural equation models to examine the interaction of condition and sexual orientation on PT, emotions, and PME. Results: Participants (N=156) were aged between 18 and 30 (M=23.97, SD=3.33) and identified as SMW ($N_{bisexual}$=113, $N_{lesbian}$=28, N_{other}=15). There were no significant interactions. However, the marginal means suggested that after viewing a message without LGBTQ cues, lesbians reported lower PME than bisexuals (ß=-.32, [-.62, -.02]; $M_{bisexual}$=3.74, $M_{lesbian}$=3.42), and participants identified as other reported lower PT than bisexuals (ß=-.62, [-1.23, -.003]; $M_{bisexual}$=2.83, $M_{lesbian}$=2.21). Viewing a message without LGBTQ cues made participants who identified as other report lower PT than bisexuals, which decreased PME (ß=.19, [.15, .23]). Lower PT decreased positive emotion (ß=.20, [.14, .25]), leading to reduced PME (ß=.28, [.22, .34]). Conclusion: The LGBTQ-tailored strategy we employed was not perceived as more effective than the control messages among SMW. Participants who identified as bisexuals tended to be less sensitive to LGBTQ cues. Tailoring with superficial cues may not be ideal for SMW-focused health message design, especially if the audience is predominantly bisexuals. Future research is needed to explore the effectiveness of other strategies in health messages targeting the SMW population.

FUNDING: Federal

POS4-15

ESCALATED RISK OF ADOLESCENT E-CIGARETTE USE ASSOCIATED WITH SEXUAL MINORITY STATUS PERSISTS ACROSS SUBGROUPS

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Background: E-cigarettes are the most commonly used tobacco product among US adolescents. Prior studies have identified a wide range of socioeconomic factors associated with greater e-cigarettes use. Recent studies document a higher e-cigarette use rate among adolescents identifying as lesbian, gay, or bisexual. So it is imperative to investigate the possible overlapping vulnerabilities associated with adolescent e-cigarette use. In this study, we investigate whether disparities in e-cigarette use among sexual minority adolescents vary across tobacco-relevant subgroups. Methods: Using the 2020 National Youth Tobacco Survey, we compared e-cigarette use rates among middle- and high-school students by sexual orientation (heterosexual versus gay, lesbian, or bisexual [LGB]). We calculated risk ratios (RR) with 95% confidence intervals (CI) using Rao-Scott Chi-Square tests. We performed stratified analyses by socio-demographics (sex, school level, race/ethnicity, and language spoken at home), school characteristics (urban location and percentage of minoritized students), household tobacco exposure, and e-cigarette advertising exposure. Sampling weights and survey structure were included in all analyses to account for the complex survey design and adjust for nonresponse. All statistical tests were 2-sided, and significance was set at p<0.05. Results: From a sample of 12,870 middle and high school students, e-cigarette use rates were 64% higher among LGB students. Stratified analyses indicate the higher risk of e-cigarette use among sexual minorities persisted across almost all subgroups examined. Specifically, higher risk of e-cigarette use associated with LGB status was more pronounced among middle-school (RR: 3.19; 95% CI: 2.25-4.25), Black (RR: 2.86; 95% CI: 1.63-5.03), and urban (RR: 2.36; 95% CI: 1.84-3.01) students. Conclusions: The greater divergence between LGB and heterosexual students observed among younger adolescents, racial minorities, and urban residents indicates overlapping vulnerabilities to e-cigarette use. Sexual-minority tailored education campaigns on the risks of e-cigarette use may be beneficial for reducing nicotine use among LGB adolescents.

FUNDING: Federal; Academic Institution

POS4-16

A QUALITATIVE EXPLORATION OF QUITLINE PERCEPTIONS AMONG AFRICAN AMERICAN/BLACK AND HISPANIC/LATINO/LATINA SMOKERS

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SIGNIFICANCE: Assisting tobacco users to quit remains one of the most cost-effective health care interventions, and tobacco quitlines have proven to be efficacious and accessible. While cigarette smoking remains most prevalent among non-Hispanic White (NHW) adults, the quit ratio has remained lower for African American/Black (AA/B) and Hispanic/Latino/Latina (H/L) smokers. In this context, the National Jewish Health Quitline (NJH QL) has sought to address the question of whether current QL services provide effective and equitable tobacco cessation services for AA/B and H/L smokers. This study aimed to gain an understanding of AA/B and H/L smokers' experiences and perceptions of smoking cessation QL services through interviews. METHODS: In this qualitative interview study, Penn State University researchers recruited adult smokers from July 2021 through October 2021 who had or had not engaged with smoking cessation QL services across 9 states (CO, ID, MA, MI, NV, PA, UT, VT, WY). Both NJH QL clients and non-clients completed a screening survey and were 21+ years or older, AA/B or H/L, interested in quitting, and had access to a computer/smartphone to complete a Zoom meeting. NJH QL clients were encouraged to share their perceptions of QL services, their perceptions of quitting smoking, and provided in-depth responses to prompt questions. Non-users of NJH QL services were asked to provide in-depth responses on their knowledge, perceptions, and barriers to using a telephone QL service. Means and frequencies described participants overall and by group. All interviews were about 1 hour, audio and video recorded via Zoom, transcribed, and cleaned for clarity and accuracy. NVIVO software was used for coding and inter-coder reliability was calculated and agreement (kappa >.80) was achieved for each codebook (NJH QL and non-QL). RESULTS: Overall, 35 (64.8%) participants across 5 different states (CO, MA, MI, NV, PA) completed an interview. Themes that emerged included: (a) awareness of the QL through media campaigns, (b) importance of enthusiastic support from coaches, (c) uncertainty about how QL counseling and other services help smokers quit, (d) appreciation of free nicotine replacement therapy and the importance of clear instructions, and (e) interest in tailored advertising and counseling by race/ethnicity matched coaches. CONCLUSION: This information can be used to improve smoking cessation services in communities with historically low quit rates. Additionally, this information could provide public health professionals with tools to increase engagement with the QL. The findings suggest that QL use among AA/B and H/L could be improved with tailored advertising and treatment conducted by enthusiastic and demographically matched coaches.

FUNDING: Nonprofit grant funding entity

POS4-17

VIRTUAL TEACHING & LEARNING (VTL): ADAPTING AN EFFECTIVE COMMERCIAL TOBACCO DEPENDENCE TREATMENT INTERVENTION AND PREVENTION EDUCATION PROGRAM FOR VIRTUAL PLATFORMS

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Virtual teaching & learning (VTL) is vital in meeting the challenges and opportunities posed by the COVID-19 pandemic and the rapid development of information technology. VTL's popularity lies in the use of the Internet to deliver a broad array of learning modalities such as self-paced, instructor-led, and hybrid learning to enhance knowledge and performance. VTL can potentially reach diverse audiences and facilitate focus in busy environments. Since 1998, the University of Arizona HealthCare Partnership (HCP) has administered the Arizona Nicotine Dependence Treatment Continuing Education and Certification Programs. Over 30,000 individuals have participated in these programs. In June 2020, HCP worked with the *Albuquerque Area Indian Health Service*, *Cowlitz Indian Tribe,* and the *Portland Area Indian Health Service* to adapt one of its programs for virtual delivery. The team incorporated VTL in HCP's educational offerings by adapting the *Basic Tobacco Intervention Skills Certification for Native Communities* program ("Program") for virtual platforms. The Program follows the U. S. Public Health Service Clinical Practice Guideline: Treating Tobacco Use and Dependence (2008). It uses the integrated 5A's Model and provides education and certification in areas such as commercial tobacco/electronic nicotine delivery systems (ENDS) and health, pharmacological treatments, social determinants of health, traditional tobacco use, indigenous medicine, and traditional healing, and effective communication among its topics. Individuals gain knowledge, skills, techniques, and strategies to offer brief tobacco treatment interventions and services within the structure of an existing program, and to act as a resource for other health professionals. Data from Jun. 2020 - Aug. 2022 describing over 250 participants were reviewed to assess the effectiveness of this virtual teaching & learning (VTL) educational intervention. Evaluation measures include participant knowledge, self-efficacy, and satisfaction. Participants report significant increases in self-confidence as well as high levels of satisfaction with the educational modality. Arizona's adapted *Basic Tobacco Intervention Skills Certification for Native Communities* program for virtual platforms suggests virtual teaching & learning (VTL) is a promising method for broad, population-based diffusion of evidence-based commercial tobacco dependence treatment intervention and certification in Native Communities.

FUNDING: Federal

POS4-18

DECIDETEXTO MOBILE CESSATION INTERVENTION FOR LATINO SMOKERS: A RANDOMIZED CLINICAL TRIAL

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Background: Overcoming the burden of tobacco-related disease among Latinos demands affordable and accessible smoking cessation solutions designed to address limited access to cessation resources. Mobile interventions such as text messaging are well suited for Latino adults, a group with the highest use of text messaging. Objective: To evaluate the efficacy of Decídetexto, a culturally and linguistically appropriate mobile smoking cessation intervention versus standard care on smoking abstinence prevalence at Month 6 among Latino smokers in the U.S. Methods: A 2-arm controlled clinical trial was conducted with Latino smokers (N = 457) randomized to one of two conditions: 1) Decídetexto or 2) standard of care. Decídetexto is a mobile smoking cessation intervention (available in English and Spanish) that incorporates two integrated components: 1) a tablet-based software that collects smoking-related information to develop an individualized quit plan, and 2) a 24-week text messaging counseling program with interactive capabilities. Decídetexto follows the Social Cognitive Theory as the theoretical framework. Standard of care consists of printed smoking cessation materials and referral to a telephone quitline. Participants in both groups were given access to free nicotine replacement therapy by calling the study's phone number. Participants were recruited using proactive and reactive approaches in community-based and clinical settings. All participants completed follow-up assessments at Months 3 and 6. Results: Participants' (n=457) mean age was 48.7 (SD=11.1), most were female (54.7%), primarily Spanish speakers (70.5%), daily smokers (91.7%), married (53.6%), and had an annual income below $30K (42.7%). Participants represent different regions: 30% Caribbean, 20.1% Central America and Mexico, 24.7% South American, and 23.4% U.S. Out of the 457 participants, 85% completed the 3-month follow-up assessment, and 86% completed the 6-month assessment. The primary outcome, self-reported abstinence at 6 months, demonstrated the abstinence rate was statistically significantly higher for the Decidetexto intervention (34.1%) than the standard of care (20.6%) (OR=1.99; (1.31,3.03) p=.01) using an intent-to-treat analysis. While biochemical verification was disrupted during the COVID-19 pandemic, cotinine-verified abstinence for the Decidetexto intervention was 14.4% compared to 9.2% in the standard of care group (OR=1.66; (0.93,2.97) p=.09), while not statistically significant, the difference is relevant from a clinical and public health perspective. Older adults, higher education, lighter smokers, and those who have quit before were more likely to quit smoking. Conclusion; Results support the efficacy of the Decídetexto mobile interventions for supporting smoking cessation among Latino adult smokers.

FUNDING: Federal

POS4-19

FLAVORED BLUNT AND HEMP WRAP USE AMONG YOUNG ADULT RACIAL AND SEXUAL GENDER MINORITIES

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Introduction: Growing legalization of cannabis in hand with federally proposed legislation to restrict flavors in combustible tobacco products in the U.S. may impact the use of flavored blunt (tobacco) and hemp (cannabis) wraps. Research is limited on the prevalence of use of these products but can shed light on how users may respond to these policies. Methods: This study draws from a U.S. national representative sample of young adults (n=976) aged 18-36 years. Non-Hispanic Black (NHB) and Hispanic (HIS) populations were oversampled in this study. In May 2022, respondents participated in an online survey about their use of flavored blunt and hemp wraps. Data were analyzed by race and sexual gender minority (SGM) status. Results: Young adults reported greater use of blunt wraps (23.4%) compared to hemp wraps (15.0%). Use of flavor was more common for blunt wraps (50.7%) than in hemp wraps (32.7%). NHB and SGM respondents were 1.5 and 2.0 times as likely, respectively, to report having ever used blunt wraps compared to non-Hispanic White (NHW) and heterosexual (HET) referents. NHB, HIS, and SGM respondents were 2.2, 1.6 and 2.3 times as likely to report having ever used hemp wraps compared to NHW and HET referents. Among those who had used either wrap, 75.1% used a flavor. Conclusion: The common use of flavor and disparities in blunt and hemp wrap use may contribute to varying responses to cannabis and tobacco regulatory policy.

FUNDING: Federal

POS4-20

CULTURALLY-SPECIFIC MESSAGING TO MOTIVATE CESSATION IN AFRICAN AMERICAN OLDER ADULTS WHO SMOKE CIGARETTES

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SIGNIFICANCE: While the U.S. adult population has shown significant reduction in smoking since 2000, older adult smokers remain stagnant in their cessation rates. Older adult smokers are half as likely to quit smoking than younger counterparts, but more likely to succeed in quit attempts when using evidence-based smoking treatment (EBST). Recent research suggests the potential utility of dementia prevention messaging to motivate smoking cessation among older adults, but there are unique smoking-related factors associated with the African American (AA) community (i.e., later smoking onset, lower daily smoking rate, increased menthol cigarette use, and lower cessation success than White smokers) that suggest older AA smokers may benefit from tailored interventions. Culturally-specific interventions for AA smokers are beneficial in terms of intentions to quit, utilization of EBST resources, and cessation success. However, there has yet to be a culturally-specific message for *older adult* AA smokers to motivate cessation attempts and increase the use of EBST. METHODS: 8 focus groups and key informant interviews were conducted with current and former AA smokers between 50-80 years old with no history of dementia or mild cognitive impairment. Interviews lasted 60 minutes, used a semi-structured interview guide, and were completed in person or virtually (via Zoom) and led by a trained moderator knowledgeable of smoking in AA communities. RESULTS: Directed content analyses using a combination of deductive and inductive coding identified themes in 5 domains: concerns about aging, previous tobacco prevention advertisements, recommendations for future tobacco prevention advertisements, smoking and health risks, and smoking cessation treatments. Participants reported a variety of concerns about aging, recognizing many of them were related to their smoking. Contrary to previous research with primarily White older adult smokers, dementia was no more important than any other health condition in motivating cessation attempts. In fact, most participants reported a strong existing motivation to quit, but multiple barriers impeded their cessation success. One key barrier to quitting was access to cessation resources, and participants reported a strong desire for support groups with similar peers trying to quit smoking. CONCLUSION: Findings highlight a need for increased resources to support cessation efforts in older adult AA communities and the utility of developing culturally-specific messages.

FUNDING: Federal; Academic Institution

POS4-21

THE INTERACTION OF TOBACCO RETAILER DENSITY AND RURALITY WITH TOBACCO USE PREVALENCE IN KENTUCKY

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Significance: Tobacco retailer density has been examined as a key correlate of tobacco use prevalence in the US, and nationally this relationship has been stronger in urban areas. We examine this relationship across counties in Kentucky, a state with the highest smoking rate in the US that is also in the top 10 of US states by rural population. Methods: Since Kentucky lacks tobacco retailer licensing, we used a list of tobacco retailers from 2021 provided by the state SYNAR program used to conduct minor's access inspections. We merged this data with county-level prevalence estimates for cigarette smoking and smokeless tobacco for each county in Kentucky calculated using three years (2017-19) of Kentucky Behavioral Risk Factor Surveillance System (BRFSS) data. We modeled the county-level frequency of each use indicator among adults as a function of tobacco retailer density, degree of rurality, and their interaction, controlling for percent adults in the population and percent with an advanced degree. We also examined tertiles of tobacco retailer density and Index of Relative Rurality for 2010. Results: Tobacco retailer densities per 1000 population ranged from 0.39-2.01; cutpoints for tertiles were 1.04 and 1.33. Index of Relative Rurality ranged from 0.185 (most urban) to 0.589 (most rural); tertiles for this variable were 0.506 and 0.536. The

range in county cigarette prevalence was 0.082-0.45, with a mean of 0.27 (SD = 0.071). For smokeless, use estimates ranged from 0 to 0.25 (M = 0.087, SD = 0.048). Controlling for demographic factors, we observed significant interactions between retailer density and rurality (p = .008 and .035 for cigarettes and smokeless, respectively) in linear models for each product. Post-hoc protected pairwise comparisons demonstrated that within the 40 most urban counties, rates of both cigarette and smokeless use were significantly higher among counties with the highest retailer density, compared to both low and midrange density counties. The differences in use prevalence for cigarettes and smokeless within the two more rural tertiles of counties did not vary significantly by retailer density tertile. Conclusion: Consistent with prior research, policies limiting tobacco retailer density could be most beneficial in urban-adjacent areas, even within a relatively rural state such as Kentucky.

FUNDING: Unfunded; Federal; Academic Institution

POS4-22

PREFERENCE FOR CIGARETTE BRANDS USING "NATURAL," "ORGANIC," AND "TOBACCO AND WATER" PACKAGING TERMS IN THE UNITED STATES: RESULTS FROM WAVE 5 (2018/19) OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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INTRODUCTION: Prior studies have demonstrated that cigarette brands marketed with the packaging terms "natural," "organic," and "tobacco and water" or similar terms may appeal to smokers as perceived healthier alternatives to regular brands. The purpose of this study was to describe the proportion of cigarette smokers with a preference for cigarette brands with the packaging terms "natural," "organic," and "tobacco and water." METHODS: The study population comprised current established cigarette smokers (100+ lifetime sticks with daily or non-daily use) participating in Wave 5 (W5) of the Population Assessment of Tobacco and Health (PATH) survey. We assessed two outcomes: 1) overall proportion of smokers with a preference for cigarette brands with the packaging terms "natural," "organic," and "tobacco and water"; and, 2) differences in preference stratified by non-daily/daily smoking status, age, gender, and harm perception of usual cigarette brands. All analyses are weighted; odds ratios from bivariate regression models. RESULTS: Overall, 5.35%, 0.35% and 4.1% of smokers preferred brands with "natural," "organic," or "tobacco and water", respectively. Non-daily smokers (vs daily) had higher odds of preference for brands that use "natural" (OR: 1.77; 95% CI: 1.36, 2.30) and "tobacco and water" (OR: 2.58; 95% CI: 1.94, 3.43). Younger (ages 18-24) and older smokers (ages 65+) had two times higher odds of preference for brands with "natural" compared to smokers ages 45-54. Females had lower odds of preference for "natural" (OR: 0.65; 95% CI: 0.48, 0.89), "organic" (OR: 0.45; 95% CI: 0.21, 0.99) and for "tobacco and water" terms (OR: 0.62; 95% CI: 0.43, 0.90). Smokers who believe their usual brands are less harmful than others (vs no difference) had higher odds of preference for "natural" (OR: 9.31; 95% CI: 6.91, 12.54), "organic" (OR: 12.19; 95% CI: 4.24, 35.04), and "tobacco and water" terms (OR: 3.34; 95% CI: 2.18, 5.13). Similarly, smokers who believe some cigarette brands are less harmful than others (vs no difference) had higher odds of preference for "natural" (OR: 2.82; 95% CI: 1.93, 4.14) and "tobacco and water" terms (OR: 3.34; 95% CI: 2.18, 5.13). CONCLUSION: Findings suggest age and sex disparities in preference for cigarette brands with the potentially misleading terms "natural", "organic", "tobacco and water". In addition, adults who perceive their usual brands as less harmful consistently preferred these terms.

FUNDING: Federal; Academic Institution

POS4-23

THE ROLE OF IQOS RISK PERCEPTIONS ON CIGARETTE SMOKING BEHAVIORS: RESULTS FROM A PROSPECTIVE PILOT STUDY

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Background: IQOS is a heated tobacco product marketed as an alternative to combustible cigarette smoking. Little is known about cigarette smokers' IQOS health risk perceptions and if these risk perceptions impact IQOS use and cigarette smoking behavior. Methods: Adult, daily, non-treatment-seeking cigarette smokers (n=27), naïve to IQOS, were recruited from Philadelphia, PA. Participants were introduced to IQOS and then completed measures of risk perceptions. Participants were given an IQOS 2.4 holder, charger, and HeatSticks and asked to switch completely from cigarettes to IQOS for 14-days. The effects of risk perceptions on changes in IQOS use, cigarettes per day (CPD), the substitution of IQOS for cigarettes, and motivation to quit smoking were evaluated. Results: Over the 14-day switch period, CPD significantly decreased (B=-0.18, 95%CI=-0.27, -0.09, p<0.0001), IQOS use significantly increased (B=0.02, 95%CI=0.00, 0.03, p=0.04), as did the percentage IQOS HeatSticks that replaced CPD (B=0.02, 95%CI=0.01, 0.03, p=0.005). Participants who perceived IQOS as less risky than cigarettes used fewer IQOS HeatSticks per day. A lower percentage of IQOS HeatStick substitution for cigarettes was observed for participants with higher versus lower risk perceptions (B=- 0.14, 95% CI=-0.28, -0.01, p=0.042). Motivation to quit increased from a mean of 5.53 to 6.79 on the contemplation ladder from baseline to day 14 (B=1.26, 95%CI=0.54, 1.79, p<0.001). Conclusions: Smokers reduced their smoking rate and increased motivation to quit smoking while using IQOS. IQOS risk perceptions did not directly account for reductions in smoking, although they may contribute indirectly through increased IQOS use.

FUNDING: Federal

POS4-24

QUANTIFYING THE IMPOVERISHING EFFECT OF TOBACCO CONSUMPTION IN INDIA

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As in many other LMICs, tobacco use is a plea that affects disproportionately lower socioeconomic groups. Many people on the verge of poverty suffer unnecessary spending on tobacco products and on health services to treat tobacco related diseases, which exacerbates poverty in India. The annual direct healthcare costs attributable to tobacco spending alone amount to 0.23% of GDP. It has been estimated that approximately more than 2% of the population was pushed into poverty due to tobacco spending and attributable medical expenditures in the year 2004-05. This study contributes to the literature in two ways. First it updates previous estimates of the impoverishing effect of tobacco use for the year 2017-18, that is 13 years since the last estimate. Also, it goes one step further by directly estimating how tobacco use affects the probability of becoming poor.

FUNDING: Nonprofit grant funding entity

POS4-25

POST-LAW TRENDS IN YOUTH AND ADULT USE OF TOBACCO PRODUCTS AND ADULT QUIT ATTEMPTS IN MASSACHUSETTS (MA) COMPARED TO FOUR NEIGHBORING STATES

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Significance: In late 2019, MA passed the nation's most comprehensive statewide restricting retail sales of flavored tobacco products, including menthol, which led to reduced sales in MA. This study estimated tobacco use trends over 16 months (April 2021 to July 2022) following the implementation of the law in MA and 4 neighboring states. Methods: The survey was fielded continuously among MA, New Hampshire, Vermont, Rhode Island, and Connecticut youth (ages 13-17) and adults (ages 18+) from the Prodege panel (~120 youth and 120 adults each month). We fit generalized linear models to estimate the past 30-day use of cigarettes, e-cigarettes, cigars, smokeless tobacco (SLT), and hookah for youth and adults over time. We also estimated adults' cigarette and e-cigarette quit attempts. Outcomes were modeled as a function of time (one-day increments), state (MA vs. 4 neighboring states) and an interaction between time and state. The functional form of time to the log-odds for each outcome was evaluated by comparing local polynomial regression to linear time trends. Difference in tobacco use and quit attempt trends in MA vs. neighboring states was estimated by the coefficient for the state by time interaction term. We used Maximum Likelihood or Penalized Maximum Likelihood estimators depending on data sparsity. Results: Among youth, all outcomes had approximately linear trends over time. There were no differences in trends for MA compared to neighboring states for any product. All products had a flat trend, except e-cigarettes which had a small increase (b = 0.001, P = 0.03). Among adults, cigar use was flat over time in MA but showed a small decrease in neighboring states. There were no differences in trends for cigarettes, e-cigarettes, SLT, and hookah, or cigarette and e-cigarette quit attempts between MA vs. neighboring states. Conclusion: Our analysis found MA's tobacco use trend was comparable to 4 neighboring states across a 16-months period and was flat for most products, except

e-cigarettes among youth. All products had flat trends in MA, except e-cigarettes which increased in MA and comparison states. Given drop in sales, this may imply intensity of use may be decreasing and that flavor bans should be paired with cessation support.

FUNDING: Federal

POS4-26

CHARACTERISTICS OF LOW- AND MIDDLE-INCOME COUNTRIES THAT EXCEL AT TOBACCO CONTROL

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Significance: This study examines the characteristics of low- and middle-income countries that have achieved high levels of MPOWER compliance. These results can be used to identify similar low- and middle-income countries that can be targeted and supported with improved implementation of MPOWER. Methods: The design of this study was based on a previous observational longitudinal analysis of MPOWER implementation that was produced by the authors. Low- and middle-income countries that achieved high levels of compliance (n=75%) were subjected to co-variate analyses of various economic, social and political indices including but not limited to *literacy levels, human development index score*, the *national corruption index score*, and the *political regime index score*. Results: Higher levels of national MPOWER implementation are consistent with higher human development index scores and elevated literacy levels and with lower rates of government corruption and less autocratic government regimes. These barriers are systemic and require change that is outside of the domain of tobacco control and align with the improved implementation of the United Nations *Social Development Goals*. Countries that meet the criteria for high MPOWER implementation but have not achieved high levels of compliance can be targeted and supported with implementation of effective tobacco control programs and policies. Conclusion: More work is needed to improve national MPOWER implementation especially among low-income countries including measures to *Raise (taxes)*, *Warn* (mass media) and *Offer* (help to quit). This outcome can be achieved through enhanced targeting and support for low- and middle-income countries that are not struggling with multiple overriding systematic barriers to tobacco control. We will describe these opportunities in our forthcoming presentation.

FUNDING: Unfunded

POS4-27

ASSESSING THE RELATIONSHIP BETWEEN SELF-EFFICACY AND HOPE: DECOMPOSING WITHIN- AND BETWEEN-SUBJECT EFFECTS ON CESSATION-RELATED BEHAVIORS IN A CIGARETTE LABELING TRIAL

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Background: Negative affect explains cigarette warning label effects; however, positive emotions like hope have been little studied. Analyses of behaviors that follow within-person changes in hope and self-efficacy may help illustrate labeling effects. Methods: We analyzed data from a cigarette labeling trial with adult smokers (n=367) who received a 14-day supply of their preferred cigarettes in packs modified to reflect their labeling condition. Over two weeks, participants were surveyed 4-5 times/day, including queries of self-efficacy to quit (SEQ), self-efficacy to reduce cigarettes (SER), and feeling hopeful about quitting (hope). Each evening, participants reported if, in the prior 24 hours, they had: forgone cigarettes they would normally smoke; stubbed out cigarettes before finishing them. In mixed-effects logistic models, each behavior was regressed on the preceding day's SEQ, SER, and hope while disaggregating between- (i.e., person-level mean across all observations) and within-person (i.e., deviation from person-level mean from each observation) variation. Interactions between within-person hope and SEQ or SER were assessed, controlling for labeling condition. Results: In bivariate models, both between- and within-person SEQ (b=0.56& 0.15, respectively; p <0.001), SER (b=1.15 & 0.37, respectively;p<0.001), and hope (b=0.84 & 0.11, respectively; p<0.001) predictedforgoing. In full models, interactions between hope and both SEQ (b=-0.16,p<0.001) and SER (b=-0.40, p<0.001) predicted forgoing; interaction plotsshowed positive effects of hope on forgoing for those with lower than theiraverage SEQ or SER, with null or decreasing effects of hope among those withhigher SEQ or SER. In bivariate models, between-person effects for SEQ (b=0.56,p=0.02), SER (b=0.97, p<0.001), and hope (b=0.89, p<0.001) predictedstubbing out, but within-person effects were found only for hope (b=0.25,p<0.001). In full models, the interaction between hope and SER (b=-0.13,p=0.006) but not SEQ predicted stubbing out; interaction plots showed positiveeffects of hope on stubbing out across SER levels, with stronger effects forthose with lower than higher SER. Results across labeling conditions will bedescribed. Conclusions: Within- and between-person variation in self-efficacy and hope predicted forgoing cigarettes and, to some extent, stubbing out—behaviors that predict cessation attempts. Tailored interventions might aim to capitalize on such within-person changes.

FUNDING: Federal

POS4-28

'HARVEST WAS ABUNDANT, BUT WE HAD NO BUYERS' - UNCOVERING CHALLENGES AND OPPORTUNITIES OF TOBACCO CROP SWITCHING IN INDONESIA

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Introduction: Indonesia integrates tobacco crop switching in Revenue Sharing Fund of Tobacco Products Excise (DBHCHT) regulation as one of main strategies to improve tobacco farmers' wealth. However, tobacco production increases but tobacco farmers' wealth declines. This study aimed at investigating supports and barriers driving tobacco farmers' decision to switch from tobacco crop. Methods: Three different data collections were performed from July to October 2021. First, legal documents concerning on DBHCHT were systematically searched and reviewed. Second, Ministry of Finance (MoF) and district agriculture/plantation services in Central Java, East Java, and West Nusa Tenggara were interviewed. Third, focus group discussions (FGDs) consisted of tobacco farmers were performed. Results: Farmers admitted that tobacco crop was unprofitable due to high operating costs. An unfortunate experience when post-harvest marketing and selling of crop alternatives were failed created a hesitation towards crop switching to many farmers. Although policy mandates and stakeholders' assistances seemed to encourage crop switching, uncoordinated communication among stakeholders prolonged the promotion of DBHCHT for crop switching. Missing information of DHCHT often occurred as farmers perceived low involvement in the decision making as well as the absence of local stakeholders' assistance in post-harvest of crop alternatives. All farmers favored to cultivate non-tobacco crops, but the soil condition merely fitted for tobacco due to lack of water sources. Conclusion: Opportunities and barriers of crop switching include three major keys: economic, stakeholder and policy supports, and soil formation. Developing strategies based on these three major issues may help to promote tobacco crop switching.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS4-29

CHOOSING TO SMOKE OR VAPE: THE RELATIVE IMPORTANCE OF PRODUCT TYPE, CIGARETTE NICOTINE CONTENT, VAPE NICOTINE CONTENT, AND VAPE FLAVOR AVAILABILITY VARIES BY HYPOTHETICAL CONTEXT IN DISCRETE CHOICE EXPERIMENTS

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SIGNIFICANCE: Discrete choice experiments (DCEs) can systematically present tradeoffs to assess how people prioritize product characteristics when choosing between sources of nicotine. Here, we investigate whether hypothetical context affects the relative importance of product type, nicotine content, and flavor availability in choices between cigarettes and a vaping device. METHODS: The DCE design used throughout yielded 8 cigarette vs. e-cigarette choices (cigarette nicotine content: normal or very low; vape nicotine content: moderate or low; vape flavor availability: tobacco, menthol, fruit, and dessert or tobacco and menthol). Part A: Participants completed three versions of the DCE, with instructions to make choices as if: alone, with a friend who is smoking, and with a friend who does not smoke or vape. Part B: Participants completed three versions of the DCE with instructions to make choices as if in a setting with: no use restrictions, smoking restrictions, and both smoking and vaping restrictions. All participants were recruited via Prolific between April-July 2022 (n = 150 adults who vape and smoke regularly for Part A and B, each). We analyzed responses using hierarchical Bayesian regression and calculated importance based on the average estimated utilities for product attributes. RESULTS: Part A: Cigarette nicotine content was most important in all choice contexts, yet the average importance of product type was greater (31.5, SD = 1.7) and cigarette nicotine content was lesser (44.7, SD = 1.5) when making choices as if with a friend who does not smoke or vape, relative to making choices as if alone (21.2, SD = 1.7; 55.8, SD = 2.0) or with a friend who smokes (23.1, SD = 1.9; 58.1, SD =

2.1). Part B: When making choices as if in a setting with no use-restrictions, cigarette nicotine content was most important on average (50.2, SD = 1.9), followed by product type (22.0, SD = 1.5). When making choices as if in a setting with smoking-restrictions, product type was most important (56.0, SD = 2.0), followed by cigarette nicotine content (28.0, SD = 1.8). When making choices as if in a setting with smoking and vaping restrictions, product type and cigarette nicotine content had near equal importance (41.4, SD = 2.1; 41.8, SD = 2.0). CONCLUSIONS: Among this sample, hypothetical context affected product choice patterns. This supports the hypothesis that the expected reinforcing value of a nicotine product is dynamic, rather than inherent or fixed.

FUNDING: Federal

POS4-30

CLOSING THE LOOPHOLES OF A FLAVORED CIGAR BAN: ANTICIPATED CHALLENGES AND SOLUTIONS

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SignificanceFor the first time since Congress authorized the FDA to regulate tobacco in 2009, FDA proposed two tobacco product standards on May 4, 2022. After a period of public comment and agency review, if the product standards are finalized in their current form, they will ban menthol cigarettes, which comprised 37% of the U.S. cigarette market in 2019 and 2020, and flavored cigars, which have exceeded 50% of cigar sales every year since 2012. After FDA announced a plan to ban menthol cigarettes in 2018, these authors described why FDA is likely to prevail in a tobacco industry lawsuit. This commentary complements our analysis regarding menthol by examining potential challenges to FDA's proposed ban on flavored cigars and highlights issues FDA should consider. As explained below, Congressional action is also needed to complement FDA's enforcement efforts. ConclusionTo maximize the public health benefit of FDA's proposed product standard on flavored cigars, FDA should consider the following five ideas, and Congress should be pressed to consider a sixth idea. First, the FDA should prevent manufacturers from selling cigars with flavoring levels above an objective standard that can serve as a floor, supplementing the factors FDA may rely on in making characterizing flavor assessments. Second, FDA should proceed with its proposal to ban components that impart flavors to tobacco products and prevent them from gaining a foothold in U.S. markets. Third, FDA should update its approach for substantial equivalent applications for cigars to recognize that flavors raise serious questions of public health. Fourth, to deal with the threat of illicit trade, the FDA should implement a track and trace program. Fifth, FDA should also require cigar manufacturers to pay for a federal surveillance and evaluation infrastructure to monitor different cigar types. Sixth, Congress should amend the PACT Act to prohibit the shipment of illicit flavored cigars and fund USPS adequately to improve enforcement.

FUNDING: Federal

POS4-31

SOCIAL MEDIA USE AND MENTHOL CIGARETTE SMOKING AMONG SOUTH AFRICAN ADULT SMOKERS

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Significance: Despite the recent reports of increasing social media use by leading tobacco brands and the growing market share of menthol cigarettes in LMICs, only limited information is available on factors associated with the use of menthol cigarettes in LMICs. Hence, this study sought to determine the prevalence and the factors associated with menthol cigarette use among South African adult smokers. Methods: This study involved the analysis of the 2021 South African Social Attitude survey (SASAS)(n=2837). The SASAS is a nationally representative sample of South African adults =16-years old. Data obtained among others, included participants' sociodemographic profile, menthol as a regular brand smoked and reasons for brand choice (taste, satisfaction and health consideration), time to first cigarette, past quit attempt and intention to quit smoking. Participants also indicated how often they used social media in the last four weeks. Analysis included chi-square and multi-variable adjusted logistic regression. Results: The prevalence of current combustible cigarette smoking was 25.7% (95% CI: 22.5-29.1). Of these smokers, 12.8% (n=105) reported regular use of mentholated cigarette. Menthol cigarette use was slightly higher among females than males (18.6% vs. 10.9%; p=0.078) and was significantly more common among those who self-identified as whites (24.8%) or coloured/mixed heritage (23%) as compared to self-identifying as Black African (9.4%) or Indian/Asian (4.1%). Menthol cigarette smokers smoked marginally significantly fewer cigarettes per day compared to non-menthol smokers (7.4 vs. 8.6; p=0.054). Compared to those who did not, those who consider taste (10.8% vs.19.8%; p=0.013) and health benefits (11.8% vs. 31%; p=0.045) in making a brand choice reported higher use of menthol cigarettes. In a controlled model, the only factors associated with menthol cigarette smoking were self-identifying as coloured/mixed heritage (OR=2.689; 95%CI: 1.290-5.608) as compared to being a black African, increasing social position (OR=1.228; 1.015-1.486) and taste being the reason for brand choice (OR=2.303;1.167-4.546). Furthermore, as compared to those who never used a social media over a four-week period, those reporting more frequent use of social media had higher odds of reporting menthol cigarette use. Conclusion: Menthol cigarette use is associated with frequent exposure to social media, which may possibly be related to industry marketing of these flavours with 'taste' as a unique sensory attribute. The study findings suggest the need for regulation of social media marketing and ban on menthol flavours in South Africa in order to improve health outcomes in the two minority ethnic/racial population groups who already have the highest smoking prevalence.

FUNDING: Nonprofit grant funding entity

POS4-32

DISSUASIVE CIGARETTE STICKS: A CROSS-SECTIONAL STUDY EXPLORING HARM PERCEPTIONS AND SUSCEPTIBILITY AMONG COLLEGE STUDENTS

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BACKGROUND: Tobacco companies use designs and logos on cigarette packages and sticks to promote their products. While cigarette pack design regulations restrict advertising possibilities on cigarette packages, the cigarette stick remains a powerful marketing tool, especially for youth. The purpose of this study was to describe college students' reactions to "regular" (standard design - cork tip) and "dissuasive" (textual design - health consequences) cigarette sticks. *METHODS:* A cross-sectional survey was conducted among a convenience sample of students (18 years or older) at the University of Nevada, Reno, between April-May 2022. Independent measures were age (18-24; 25-44; 45 years +), gender (man; woman; non-binary), and smoking status (non-smoker; occasional smoker; daily smoker). Outcomes were absolute harm perceptions and susceptibility (based on the images of the "regular" and the "dissuasive" cigarette sticks). Participants were exposed to two different images. One image illustrated a "regular" (standard design - cork tip) cigarette sticks with no brand displayed. The second image illustrated "dissuasive" (textual design- health consequences) cigarette sticks with no brand displayed. The textual design displayed the health consequences of smoking, such as 20 yrs. - addiction; 30 yrs. Impotence; 40 yrs. Ulcer; 50 yrs. Cancer; 60 yrs. Death. All participants were exposed to both images. Descriptive analysis was conducted with frequencies, percentages, and chi-square tests with outcomes stratified by age, gender, and smoking status. *RESULTS*: The sample included 1,289 participants. Almost 59% of the participants were women, and just over half were < 24 years. Around 91% of the sample were non-smokers. The "regular" cigarette stick elicited a lower average absolute harm score than the "dissuasive" cigarette stick (3.94 vs. 4.48; p < .001). In addition, participants were significantly more susceptible to try the "regular" cigarette stick than the "dissuasive" stick in all three categories; use in the next six months (1.42 vs. 1.29); if a friend offered it to you (1.60 vs. 1.50); if you were offered a free sample (1.40 vs. 1.33; all p's <.001). *CONCLUSIONS:* Implementing a dissuasive cigarette sticks policy may be a promising population-level approach to reducing smoking initiation but needs to be evaluated experimentally and nationally representative samples.

POS4-33

EFFECTS OF NON-FLAVOR ADDITIVES TO FREE RADICAL FORMATION IN ELECTRONIC CIGARETTE AEROSOLS

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Significance: Free radicals capable of causing oxidative damage and stress are found in relatively large quantities in electronic cigarettes. While their formation is largely dependent on the solvent (propylene glycol and glycerin) and coil temperature, we have also found that they can be modified by addition of flavor chemicals. However, e-liquids often contain other additives including preservatives, pH modifiers, and nicotine to make their e-liquid and the resulting aerosol more pleasing to consumers. Methods: In an effort to understand the roles of these additives and better characterize free radicals formed by electronic cigarettes, we added a number of different additives to the e-liquid and analyzed their free radical output in the aerosol. Additives, including pH modifiers

(sodium hydroxide, hydrochloric acid), preservatives (benzoic acid, citric acid, ascorbic acid), antioxidants (butylated hydroxyanisole, phenyl-N-tert-butylnitrone), chelating agents (EDTA), or nicotine, were added to a base mixture of propylene glycol and glycerin (60:40, vol:vol). Aerosols were generated at a temperature of 250°C on a temperature controlled Wismec Reuleaux RX200S Mod and 0.5 ? stainless steel coil (SS316) Uwell Crown Coil and tank with a puffing topography of: puff duration, 3 seconds; interpuff interval, 30 seconds; flow rate, 500 mL/min; and number of puffs, 40. Free radicals in the aerosols were captured in an impinger containing phenyl-N-tert-butylnitrone (PBN) and analyzed using electron paramagnetic resonance (EPR). Results: As compared to base, hydrochloric, benzoic, and ascorbic acid showed concentration dependent decreases in free radical production. Ascorbic acid, which is both an antioxidant and a pH regulator showed nearly a 70% decrease when added at 100 µM to the e-liquid as compared to the base. Many of the other additives, including nicotine, showed little change as compared to the base e-liquid. Conclusion: This matches well with our previous findings that electronic cigarette radicals are largely polar in nature and these findings suggest that their formation is likely pH dependent. Future studies will need to be done to better understand how these free radicals are formed and what potential health impacts they may have on who are exposed to them.

FUNDING: Federal

POS4-34

THE ASSOCIATION BETWEEN CHRONIC DISEASE AND CIGARETTE AND E-CIGARETTE USE FROM YOUNG ADULTHOOD TO ADULTHOOD IN ADD HEALTH PARTICIPANTS

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Significance: Chronic disease prevalence in young adults is increasing; 15-20% report 1 or more chronic diseases. Asthma is the most common chronic disease but rates of other chronic diseases such as diabetes and hypertension are increasing in young adults. Previous research has shown mixed evidence (primarily cross-sectional) for an association between asthma and smoking, however associations with other chronic disease is not established. This study examined cross-sectional and prospective relationships between chronic disease and e-cigarette/cigarette use from young adulthood to adulthood using waves 3-5 of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Methods: Wave 3 (w3; 2001-2002; ages 18-26, n=15197), Wave 4 (w4; 2008; ages 24-34, n=15,701), and Wave 5 (w5; 2016-2018; ages 33-44, n=12,300) of the nationally-representative Add Health Study were used. W3, w4, and w5 cigarette use and w5 e-cigarette use were created by dichotomizing the question on past 30-day use. Presence of asthma diagnosed by a health care professional (yes/no) was assessed at w3, w4, and w5. A second non-asthmatic chronic disease (NACD) composite variable was created using 7 additional chronic diseases measured by Add Health (diabetes, migraine, heart problem, hepatitis B/C, high blood pressure, epilepsy, and cancer). Weighted multilevel logistic regression (controlling for age, race/ethnicity, gender, and education) was used to assess cross-sectional associations at w3, then prospective chronic disease (asthma and NACD at w3) associations with w4 and w5 cigarette and w5 e-cigarette use. Results: Logistic regressions showed no significant cross-sectional and prospective relationships between asthma and cigarette and e-cigarette use. NACD was significantly associated with cigarette use 7 years and 15 years later. Wave 3 NACD was significantly associated with w4 cigarette use (aOR 1.376, p<.0001, CI 1.151, 1.646) and with w5 cigarette use (aOR 1.489, p<.0001, CI 1.205, 1.839) but not e-cigarette use. Conclusions: Current and long-term associations differed by type of chronic disease and tobacco product; however the w5 assessment of e-cigarettes may underestimate current use as the question was limited to cigarette-like devices and was conducted before widespread use of later generation ENDS. The significant long-term relationship between chronic disease and cigarette smoking from young adulthood to adulthood indicates a priority area for public health intervention.

FUNDING: Unfunded; State; Academic Institution

POS4-35

AWARENESS, SUSCEPTIBILITY, AND USE OF ORAL NICOTINE POUCHES AND COMPARATIVE RISK PERCEPTIONS WITH SMOKELESS TOBACCO AMONG YOUNG ADULTS IN THE UNITED STATES

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Significance. Oral nicotine pouches (NPs) that contain nicotine but no tobacco leaves are rapidly gaining popularity. However, there is limited research on NPs, including within priority populations. In the current study, we examined susceptibility to and use of NPs in young adults as well as comparative risk perceptions with smokeless tobacco. Methods. In 2021, 609 young adults (18-25 years) completed an online survey. Participants reported on NP susceptibility and use as well as on comparative product perceptions for NPs versus smokeless tobacco. We ran unadjusted between-groups comparisons and an adjusted multinomial logistic regression to identify relationships between product perceptions and NP susceptibility and use. Results. Participants were non-susceptible (66.2%), susceptible (23.5%), or had used NPs (10.3%). Comparative product perceptions between NPs and smokeless tobacco suggested that young adults, as a whole, expressed uncertainty about the relative risk/benefit of using NPs versus smokeless tobacco. However, unadjusted and adjusted findings indicated that favorable perceptions of NPs versus smokeless tobacco were disproportionately observed among susceptible participants and NP users compared to non-susceptible individuals. Demographic differences also were observed (e.g., NP users were more likely than non-susceptible and susceptible individuals to use smokeless tobacco). Conclusions. Favorable perceptions of NPs versus smokeless tobacco may contribute to product susceptibility and use among young adults above and beyond known correlates like smokeless tobacco use. As additional NP products enter the market, intensified surveillance of NP use among young adults and other priority populations like youth is needed to inform potential future regulatory actions.

FUNDING: Federal; Nonprofit grant funding entity

POS4-36

E-CIGARETTE USE AMONG ASIAN AMERICAN NATIVE HAWAIIAN AND PACIFIC ISLANDER YOUTH: INSIGHTS FROM THE MONITORING THE FUTURE STUDY (2018-2019)

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Background: Although increases in e-cigarette use among youth and young adults have prompted greater research efforts to identify and characterize e-cigarette use patterns, Asian American, Native Hawaiian, and Pacific Islanders (AANHPI) remain an understudied population. Methods: Data were obtained from the Monitoring the Future (MTF) study, which includes a random, probability-based sample of 8th, 10th, and 12th grade students surveyed annually across the contiguous United States. The final analytic sample (N=43,964) included respondents who provided information on race/ethnicity and e-cigarette use behaviors. E-cigarette use measures included current use (on 1+ of past 30 days) and more regular use (on 10+ of past 30 days). Differences in sociodemographic and e-cigarette use measures by race/ethnicity group were compared using chi-square tests. Results: Of the analytic sample, approximately 5% identified as AANHPI. Among those, 11.7% (n=254) reported current e-cigarette use and 4.9% (n=111) of indicating more regular use. A greater proportion of AANHPI respondents indicated current and more regular e-cigarette use, relative to Black respondents (8.7%, 2.5%). In addition, the proportion of Latino respondents who reported more regular use (4.3%) was lower, relative to AANHPI respondents. The proportions of White respondents who reported current (24.6%) and more regular (11.3%) e-cigarette use exceeded all other race/ethnicity subgroups. Conclusions: A considerable number of AANHPI youth and young adults report current use of e-cigarettes. Future studies should continue to examine vaping behaviors among AANHPI especially given the recent rise in racism-related stress experienced by this underrepresented population.

FUNDING: Unfunded

POS4-37

E-CIGARETTE USE BEHAVIOR AND EXPECTANCIES AMONG SEXUAL MINORITY AND HETEROSEXUAL COLLEGE STUDENT E-CIGARETTE USERS

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Significance: Research has identified significant disparities in substance use among sexual minority (i.e., lesbian, gay, bisexual, other) youth and young adults. Indeed, sexual minority young adults are disproportionately more likely to use e-cigarettes than non-sexual minority young adults. However, beyond documenting differences in prevalence rates, little is known about differences in patterns of or motivations for use. Therefore, the current study sought to examine differences in e-cigarette use frequency, e-cigarette dependence, and e-cigarette outcome expectancies between sexual minority and heterosexual college student e-cigarette users. Methods: Participants were 163

college students who were current e-cigarette users; identified as heterosexual (n = 104; *Mage* = 20.49, *SD* = 9.24; 78.8% female; 74.0% White) or lesbian, gay, bisexual, or other (i.e., sexual minority; n = 59; *Mage* = 19.7, *SD* = 2.0; 62.7% female; 86.4% White); and completed self-report measures for course credit. Results: After controlling for the effects of gender identity, students who identified as a sexual minority used e-cigarettes more frequently [$F(1,123) = 15.23$, $p < .001$, $?_p^2 = .11$] and reported greater e-cigarette dependence [$F(1,154) = 8.91$, $p = .003$, $?_p^2 = .05$] than their heterosexual peers. They were also more likely to have positive reinforcement expectancies for e-cigarette use [$F(1,143) = 12.65$, $p < .001$, $?_p^2 = .08$], but not negative consequences, negative reinforcement or weight/appetite control expectancies. Conclusions: Sexual minority college student e-cigarette users consume e-cigarettes more frequently and are more dependent on e-cigarettes than their heterosexual peers, potentially because of expectations that e-cigarette use will be pleasurable rather than a health risk or a way to manage negative emotions or weight/appetite. Therefore, interventions to reduce e-cigarette use among sexual minority college students would benefit from targeting positive reinforcement expectancies about e-cigarettes.

FUNDING: Unfunded; Federal

POS4-38

E-CIGARETTE USAGE AND REASONS FOR USE AMONG A REPRESENTATIVE SAMPLE OF THE GENERAL POPULATION IN FRANCE

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The use of the Electronic Cigarette (EC) is at the heart of scientific controversies, in particular because of the lack of data on its effectiveness in stopping smoking, its health impact or even on the trajectory of users. In France, the High Council of Public Health has called for caution in using these devices for cessation, but their usage have been increasing steadily since 2016, and is currently one of the highest in Europe (3.8% in 2016 - 6% in 2020). Objectives: To measure and analyze the prevalence of and reasons for ECs usage. Cancer Barometer (INCa and SpFrance) data were used, consisting of a cross-sectional phone-administered survey conducted in a representative sample of the general population in France in 2021 (n=4938). ECs usage was measured on the basis of awareness, experience of use, and current use. Participants were asked to specify their usage motivations (to reduce tobacco consumption; to stop smoking; to replace tobacco but without the intention of stopping; other). Descriptive analyses and multinomial logistic regressions were conducted to identify socio-demographic determinants of trying EC. In this sample, 99.6% of respondents were aware of ECs, 36.9% had ever used them, 7.5% considered themselves current users, and 29.5% were former users. Women were less likely to have tried ECs (OR = 0.82 [0.68-0.98]). Participants under age 55 (15-24, OR= 21.19 [14.25-31.51]; 25-34, OR=8.51 [6.36-11.40]; 35-44, OR=4.40 [3.31-5.84]; 45-54, OR=2.26 [1.73-2.95]), unemployed persons (OR= 0.73 [0.58-0.90]), urban-based residents (OR=1.24 [1.02-1.51]), current smokers (OR=75.80 [56.35-101.95], and daily smokers (OR=27.72 [19.80-38.82]) were more likely to have previously tried ECs. Among current users, the most commonly cited reasons for use were to stop combustible cigarettes (CCs, 48%), to replace CCs but without the intention of stopping (21.5%), and to reduce CCs (16.7%). In addition, 13,5% mentioned other reasons, notably for pleasure or to avoid certain tobacco-related constraints. This study addresses the lack of EC use data in Europe pointed by the SHEER reports of 2020 and confirms the current increase in the prevalence of vaping observed in France, which is greater compared to other European countries. Our results improve the understanding of motivations for both previous and current ECs. French public health practitioners can use these findings to monitor EC usage, as CC smokers are resorting to ECs in order to reduce/quit smoking.

FUNDING: Unfunded; Federal; Academic Institution

POS4-39

AUTOMATED DISCOVERY OF PERCEIVED HEALTH-RELATED OUTCOMES ABOUT E-CIGARETTES FROM REDDIT

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Significance: Public health communications concerning the risks of ENDS must address the public's perceived health-related concerns. Identifying concerns of consumers can lead to more targeted messaging campaigns from health organizations. Current survey methods that rely on participant responses to specific questions may miss important unsolicited health concerns. Our analyses focus on machine learning methods utilizing crowdsourced conversations from the social media platform Reddit to discover naturally emerging ENDS health-related perceptions and outcomes. Methods: We obtained a sample of Reddit posts discussing ENDS-related health concerns. We collected all posts from the Reddit subcommunity, or "subreddit", *"r/electronic_cigarette"* from its inception in September 17, 2008 through April 1, 2022 (N=10,403,433 posts) and identified posts containing questions about health outcomes, e.g. *"does vaping cause"* or *"does ejuice flavor cause"*. We collected replies (N=1,438) to these posts explicitly discussing health concerns. To form a larger dataset of posts discussing health concerns, we used a machine learning-based semantic search model to identify 10,905 posts from the subreddit with the most similar content to the collected replies. We compared these posts discussing health concerns to a random non-overlapping sample of posts (N=10,905) from the same subreddit. For every word in the 21,810 posts, we computed the conditional probability that the word was used in a post about health concerns compared to being from the random sample. All words with at least 0.8 conditional probability (N=367) were annotated with an open coding scheme for exclusive health categories. Three coders labeled the words with 100% agreement. Results: Of the 367 unique words, 121 were annotated as a health concern and grouped into 14 categories. The most cited categories of concerns were respiratory (3,983), addiction (1,147), allergy (643), oral health (589), and cardiovascular (278). Others included: mental health (191), gastrointestinal (141), oncologic (227), inflammation (64), neurological (207), dermatological (31), orthopedic (28), and sleep concerns (79). Health-related words with no clear category were grouped as non-specific. Conclusions: Machine learning models can identify potential consumer beliefs and perceptions regarding ENDS-related health topics found in social media platforms such as Reddit, which can inform campaign and health messaging and public education opportunities.

FUNDING: Federal; Academic Institution

POS4-40

CIGARETTE SMOKING, HEART DISEASE, AND SUICIDAL THOUGHTS AND BEHAVIORS

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Objective: Despite the association between cigarette smoking and heart disease and evidence that each conditions are linked to suicidal thoughts and behaviors, no prior study has examined both cigarette smoking and heart disease in relation to suicidal thoughts and behaviors. The current study used data from a national sample of US adults to examine the relationship between cigarette smoking and suicidal thoughts and behaviors, the relationship between heart disease and suicidal thoughts and behaviors, and whether those with cigarette use and heart disease had greater odds of suicidal thoughts and behaviors than those with one or neither of these factors. Methods: Data came from individuals who completed Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions-II (NESARC-II) and responded to questions about smoking status (current, former, never), history of heart disease (yes, no) and presence of suicidal thoughts and behaviors (yes, no). Chi-square analyses were used to calculate the odds of history of suicidal thoughts and behaviors among current smokers, former smokers, and never smokers (n=3987) and the odds of history of suicidal thoughts and behaviors by heart disease history (n=3949). A binary logistic regression analysis was used to calculate the odds of presence of suicidal thoughts and behaviors by both smoking status and history of heart disease. Results: Pearson chi-square analyses showed that there was a significant difference in suicidal thoughts and behaviors by smoking status ($?^2(2, N=3987) = 87.95$, $p>.001$). Individuals with current cigarette smoking had greater odds of reporting suicidal thoughts and behaviors compared to those with former smoking or never smoking. There was no significant difference in suicidal thoughts and behaviors between individuals who reported versus did not report a history of heart disease ($?^2$ (1, N=3949)=1.89, p=.169). In the regression analysis, cigarette use was significantly associated with suicidal thoughts and behavior (?2 (2)=87.651, p>.001)

and the addition of heart disease status as an explanatory variable did not significantly improve the model (p=.157), nor did the addition of an interaction term between cigarette use status and heart disease status (p=.352). Conclusion: Current cigarette smoking was related to greater odds of suicidal thoughts and behaviors, and having comorbid heart disease did not add additional explanatory power.

POS4-41

SHOULD ANTI-TOBACCO COMMUNICATIONS INDUCE THE NEGATIVE EMOTION OF SADNESS?

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Significance: Public service announcements (PSAs) constitute a cornerstone in tobacco control, but gaps exist in understanding how emotionally-evocative PSAs impact smoking. Sadness is one of the most frequent emotions in PSAs, and our past research has shown that inducing sadness unrelated to smoking (incidental sadness) increases smokers' craving, impatience to smoke, and actual smoking behavior. Will inducing sadness related to smoking (integral sadness, as in most PSAs) lead to similar unintended consequences? Guided by the Appraisal Tendency Framework of emotion and decision making, we assessed the influence of integral sadness on craving and quit intentions. Methods: In a randomized experiment, we varied the degree to which the procedure to induce sadness was related to smoking. Participants (N=393 smokers from Prolific) were randomized to one of four groups in which sadness was induced using subtly different tasks, resulting in three levels of relatedness to smoking: low- (two conditions), moderate- (one condition), and high-smoking-relatedness (one condition). We then measured craving to smoke using 3 items from the brief Questionnaire on Smoking Urges and readiness to quit smoking using the contemplation ladder. Results: Participants in the high-smoking-relatedness sadness group (vs. other groups) reported significantly lower craving for cigarettes (ds = -.29 to -.41, P's < .05). The differences between conditions were significantly mediated by perceived relatedness between the emotion induction task and smoking. However, participants in the high-smoking-relatedness sadness group (vs. low-smoking-related sadness groups) reported significantly lower levels of readiness to quit (d = -.31, p = .036; d = -.34, p = .019), suggesting unintended "boomerang" effects. Conclusions: These findings enrich our understanding about how emotions yield specific effects on motivation to smoke and provide the first evidence that different kinds of sadness can change motivation to smoke and readiness to quit in different ways. Unlike incidental sadness (unrelated to smoking), integral sadness (related to smoking) may produce paradoxical effects on smokers: i.e., reducing craving and but also reducing readiness to quit. This raises important questions about how sadness might be used to more powerful effect in anti-tobacco communications. These findings have theoretical and practical relevance for informing the design of anti-tobacco communications.

FUNDING: Federal

POS4-42

COLLEGE STUDENTS' PREFERENCES OF SMOKING CESSATION INTERVENTIONS: A DISCRETE CHOICE EXPERIMENT

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Background: College students are in a critical period for developing lifelong health behaviors, including the establishment or the cessation of smoking-related activities, as they face significant life transitions in their social, educational, and occupational status. Smoking cessation interventions that meet their needs and preferences can better promote smoking cessation. Research to examine attributes associated with the format and content of smoking cessation interventions among college students is lacking. Methods: An online discrete choice experiment (DCE) survey, supplemented with a think-aloud method, was conducted to elicit preferences for the format and content of smoking cessation interventions. A convenience sample of 54 college students was recruited online and completed the DCE survey during face-to-face online interviews. Conditional logistic regression models were constructed to determine optimal profiles of smoking cessation interventions. Results: The DCE data identified three important attributes for the intervention format and three for the intervention content. College students preferred smoking cessation interventions that included cutting down the amount of nicotine content, a more intense but shorter time commitment, and two-way interactions. In addition, interventions should emphasize autonomy, incorporate changes in other health behaviors, and provide NRTs. Time commitment and NRTs had interaction effects with smoking status. Think-aloud data supported the DCE data and reflected their values on social groups and misconceptions about NRTs. Conclusion: The DCE data, collected online, identified six important attributes of smoking interventions. Interventions should also incorporate an understanding of students' values on their social groups/peers and address misconceptions related to NRTs.

FUNDING: Academic Institution

POS4-43

REACHING YOUTH SMOKERS THROUGH A MULTI-PRONGED APPROACH: COMPARISON OF THREE RECRUITMENT METHODS OF A YOUTH QUITLINE SERVICE

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Significance: Conventional smoking cessation services could hardly reach adolescent or young adult smokers as they are unlikely to seek help to quit. Using different recruitment methods may promote service accessibility and uptake. We compared the characteristics and cessation outcome of youth smokers enrolled in a youth-centred cessation service by three different recruitment methods. Methods: The University of Hong Kong Youth Quitline provides free telephone cessation counselling with multiple follow-ups to youth smokers aged 25 years or below in Hong Kong. From December 2016 to February 2022, the Youth Quitline recruited 1197 youth smokers (79.9% male; mean age=19.4 ± 3.2 years), including 276 (23.1%) recruited through referral from other institutions (e.g., schools) or people (e.g., parents, peers) or self-referral, 735 (61.4%) through proactive outreach in schools and community sites, and 186 (15.5%) through website or social media platforms (WhatsApp, Facebook and Instagram). The primary outcome was biochemically validated abstinence at 6 months after service intake. Logistic regression was used to calculate odds ratio (OR) of validated abstinence by recruitment methods, adjusting for sociodemographic, nicotine dependence and other predictors of quitting. Results: More participants recruited via online than outreach and referral were aged 18 or older (80.7% vs 69.4% vs 60.0%, p<0.001), had moderate to heavy nicotine dependence (53.2% vs 27.6% vs 40.9%, p<0.001), poor self-rated health (27.6% vs 12.3% vs 21.9%, p<0.001) and risk of depression (51.4% vs 37.4% vs 42.5%, p<0.05). More participants recruited through outreach than referral and online had tertiary education (71.2% vs 37.3% vs 42.2%; p<0.001) and no intention to quit within 30 days (71.6% vs 58.3% vs 59.7%, p<0.001). Compared with referral (14.9%), the biochemically validated quit rate was similar in participants recruited online (12.2%; adjusted OR 1.15, 95% CI 0.59-2.22) but significantly lower in those recruited through outreach (7.1%; adjusted OR 0.34, 95% CI 0.20-0.60). Conclusions: Multi-pronged recruitment strategies help reach youth smokers with more diverse characteristics. Online recruitment can attract youth smokers who are more nicotine dependent and have poorer health, whereas outreach can engage those with less motivation to quit. The lower quit rate in participants recruited through outreach could be due to their lower motivation to quit and more effective interventions are needed.

FUNDING: Academic Institution; Other

POS4-44

HOLD ONTO YOUR BUTTS: A SOCIOENVIRONMENTAL MODEL FOR ASSESSING FRESHWATER ECOSYSTEM VULNERABILITY TO CIGARETTE BUTT LITTER POLLUTION

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Littering of cigarette butts, which contain toxic chemicals and microplastics, represents a major environmental challenge associated with the use of tobacco products. In 2020, an estimated 150 billion cigarette butts, or more than 85 million pounds, were littered in the United States. This litter poses a threat to freshwater ecosystems, and the people who rely on them, through runoff from rainfall and stormwater systems. However, data on the patterns of cigarette butt litter pollution across the U.S., and how this litter corresponds to freshwater ecosystem vulnerability, are not currently available. This knowledge gap limits the ability to respond to this environmental health and water quality challenge. Additionally, documenting these patterns may inform the 'affected environment' of disposal-related impacts of cigarettes as part of the Food and Drug Administration's assessment of environmental impacts mandated by the National Environmental Policy Act. We modeled the vulnerability of freshwater ecosystems to cigarette butt litter with a socioenvironmental Geographic Information Systems (GIS) approach. We synthesized social (census tract-level estimates of population and smoking prevalence, state-level cigarette consumption data, published littering behavior) and environmental data

(stream network, impervious surface area) to model spatially explicit cigarette butt litter concentrations throughout the contiguous U.S. at the sub-watershed scale (median area equal to 104 square kilometers). The model produced spatial comparisons of freshwater ecosystem vulnerability to cigarette butt pollution, highlighting urban regions as 'hot spots' of exposure to cigarette butt pollution despite rural areas having higher smoking prevalence. This illustrates the relative influences of smoking prevalence, total population, and impervious surface area - information that may help devise targeted strategies to reduce cigarette butt pollution. The spatial data layer generated by the model can be used as a basis for future studies on associations among cigarette butt pollution, environmental health, and water quality outcomes. The socioenvironmental model makes progress towards One Health Initiative goals for integrating public and environmental health related to tobacco use.

POS4-45

TRANSITIONS IN COMBINATIONS OF DEVICE AND LIQUID CHARACTERISTICS AMONG FREQUENT ELECTRONIC NICOTINE DELIVERY SYSTEM USERS OVER 3 TIMEPOINTS, 2020-2021

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Significance: Features of electronic nicotine delivery system (ENDS) and liquid affect user nicotine exposure and use behaviors, but little is known about how frequent ENDS users transition between ENDS device/liquid combinations. Methods: 379 US adult (21+) participants who used ENDS frequently (5+ days/week) self-reported and uploaded photos of their most used ENDS device and liquid in three waves of online surveys from May 2020 to November 2021. Device/liquid combination was defined by device (i.e., re-usable/disposable, adjustable/no adjustable settings, tank/refillable pod or cartridge/disposable pod or cartridge) and liquid features (i.e., nicotine salt/freebase). Participants reporting using the same combination across waves were considered stable users. Data were analyzed using Chi-square, independent t-test, and analysis of variance. Results: Approximately 90% of frequent ENDS users began with one of five device/liquid combinations. The most prevalent combination in wave 1, reported by 34.8% of participants, was re-useable devices with adjustable settings and a tank refilled with a free-base nicotine liquid (R-A-T-F). Among these, 65.2% reported using R-A-T-F stably across waves. In wave 1, no significant difference was found in nicotine concentration and device power between stable and unstable users of each combination. In waves 2 (W2) and 3 (W3), compared to unstable users, stable R-A-T-F users reported significantly lower nicotine concentrations (mg/mL) (W2: 5.4 vs 17.4, p<0.001; W3: 5.6 vs 24.7, p<0.001) and higher device power (watt) (W2: 59.5 vs 44.5, p<0.01; W3: 57.6 vs 31.8, p<0.001). The second most frequent combination in wave 1, reported by 24.3% of participants, was re-usable devices with no adjustable settings and a disposable pod or cartridge filled with a nicotine salt liquid (R-N-D-S). Among these, 71.7% reported using R-N-D-S stably across waves. In waves 2 and 3, compared to unstable users, stable R-N-D-S users reported significantly higher nicotine concentrations (mg/mL) (W2: 48.6 vs 37.0, p<0.001; W3: 47.7 vs 36.5, p<0.01). Conclusion: Most frequent ENDS users who began with R-A-T-F and R-N-D-S continued using the same device/liquid combinations over a 1.5-year period. Users who transitioned from R-A-T-F to other combinations were more likely to increase the nicotine concentration of their liquid and reduce device power compared to the stable group.

FUNDING: Federal

POS4-46

EXPOSURE TO AND APPEAL OF TOBACCO ADS AND DISPLAYS IN CHINA: A QUALITATIVE EXPLORATION OF PERCEPTIONS AMONG CHINESE YOUTH

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Background: Adolescents are uniquely vulnerable to nicotine addiction, and rates of youth tobacco use in China remain high. Although China implemented bans on e-cigarette sales to minors and tobacco advertising in public places, Chinese youth remain exposed to tobacco marketing, which may contribute to smoking/vaping initiation. Methods: From December 2021-January 2022, we conducted 20 online focus group discussions (FGDs) with 119 adolescents in 10 Chinese cities to explore sources of tobacco ad and product display exposure and what features made ads/displays attractive. Study cities differed by population size, economic development, and geographic location. Each city had one FGD with girls and one FGD with boys with 5-6 participants in Grade 10 between 15-16-years-old. Participants were asked 1) to describe local sources of tobacco advertising and promotion; and 2) describe the attractiveness of tobacco advertising and displays. Recordings were transcribed in Chinese and translated to English and then thematically coded. Results: All groups discussed exposure to tobacco ads/displays in public places, including retail stores or kiosks in their neighborhoods or near their schools, subway stations, and shopping malls. Many groups also discussed how orderly cigarette displays in convenience stores were aesthetically pleasing and noticeable. Use of color and unique flavors made cigarettes in ads/displays more appealing. Exposure to television, radio, and newspaper tobacco ads was rare and infrequently mentioned. Nearly all groups discussed that exposure to online tobacco ads was common, particularly exposure to e-cigarette commercial ads and posts made by classmates or friends selling e-cigarettes. Most groups identified how eye-catching colors, youthful imagery (e.g., fashionable models, skateboarding culture), product packaging, and price promotions (e.g., discounts, free trials) featured in e-cigarette ads/displays attracted their attention. Conclusion: Results suggest that Chinese youth are regularly exposed to tobacco ads and displays in public places and online. Many ads/displays described across FGDs were placed in youth-friendly locations (e.g., near schools, in malls) with youth-appealing features. The documented relationship between youth exposure to tobacco marketing and increased susceptibility to future use suggests additional regulatory efforts are needed to reduce youth exposure to attractive tobacco product marketing in China.

FUNDING: Nonprofit grant funding entity

POS4-47

COMPREHENSIVE PROFILING OF LUNG PROTEOMICS AND RELATIONS TO VOLATILE ORGANIC COMPOUNDS, INFLAMMATION, AND GENE EXPRESSION IN ELECTRONIC CIGARETTE USERS AND SMOKERS

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Rationale: Electronic cigarettes (ECIG) are commonly used tobacco products. While there are reports of potential effects of ECIG on lung epithelium, including on proteomics, there is limited knowledge regarding whether altered proteins are associated with toxic exposure and other biological effects compared to smokers (SM) and never-smokers (NS). Methods: We assessed lung proteomics using mass spectrometry in healthy ECIG users (EC, n=12), SM (n=14), and NS (n=33). Two-way ANOVA was used to determine group differences controlling for gender, FDR<0.1 with a fold-change >2. Spearman correlations were examined of proteins with urinary exposure biomarkers (i.e., ten volatile organic compounds, VOCs) and effect biomarkers (i.e., lung gene expression, bronchoalveolar lavage cytokines) (Raw P<0.05). Results: In SM compared to NS, 47 proteins were differentially expressed (31 up-, 16 down-regulated). Enriched pathways were NRF2-mediated oxidative stress response, aryl hydrocarbon receptor signaling, and xenobiotic metabolism signaling. Two up-regulated proteins, NQO1 (4.6-fold) and AL3A1 (2.9-fold) in SM compared to NS were also significantly highly expressed in EC compared to NS. In SM, AK1BA, CP1B1, and MAOX were 17-fold, 7.3-fold, and 5.4-fold more highly expressed than in EC, respectively. 87% of the identified proteins (n=41) correlated significantly positively with corresponding gene expression. In SM, of 13 proteins correlated with at least one of the VOCs, AK1BA had a significant correlation with several VOCs (r=0.60-0.72), including 2-HPMA (propylene oxide) and 3-HPMA (acrolein), HEMA (ethylene oxide), and HPMMA (crotonaldehyde). AK1BA was also significantly correlated with IL-13 (r=0.60). In EC, NQO1 was significantly correlated with AAMA (acrylamide) (r=0.88) and with IFN-gamma (r=0.64). AL3A1 was significantly correlated with IL-2, IL-4, and IL-10 (r=0.62-0.85). Conclusions: We found different expression of proteins enriched in smoking-related pathways in lungs of EC and SM compared to NS, with larger differences for SM. We observed correlations of proteins with exposure and effect biomarkers that differed between smoking and vaping. The evidence suggests that EC may represent lower health risks but may not be harmless compared to NS

and may have different biological effects from smoking. Further studies are needed to understand the potential contributions of these links to lung disease risk and harm reduction effects of EC.

FUNDING: Federal; Academic Institution

POS4-48

PATTERNS OF BIRTH COHORT-SPECIFIC SMOKING HISTORIES IN BRAZIL

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Significance: Brazil is a global leader in tobacco control. However, recent data shows that downward trends in smoking may be stagnating or even reversing among youth and smoking-attributable deaths still make up 14.9% of all deaths among males. Detailed analyses of smoking patterns by birth cohort could guide tobacco control decision-making in Brazil. This study characterizes histories of smoking initiation, cessation, prevalence, and intensity for the population of Brazil by age, gender, and birth cohort. Because of survey data limitations in Brazil, this study leverages nationally representative surveys and supplements with information from non-nationally representative data where necessary. Methods: Using the 2008 Global Adult Tobacco Survey and the 2013 and 2019 National Health Surveys, historical smoking patterns in Brazil were estimated and supplemented with data from the 2006-2019 Surveillance System of Risk Factors for Chronic Diseases by Telephone Interviews. Age-period-cohort models with constrained natural splines were applied to estimate annual probabilities of smoking initiation and cessation, current smoker prevalence, and mean cigarettes smoked per day (CPD) by age, gender, and birth cohort. Results: Current smoker prevalence has declined considerably since the 1950 and 1955 birth cohorts for males and females, respectively, reflecting decreased smoking initiation and increased smoking cessation probabilities over time. Among female cohorts born on or after 2000, smoking initiation may be increasing even as their smoking cessation has increased considerably. Males have higher estimated smoking initiation, intensity, prevalence than females across cohorts. Mean CPD has remained relatively constant across period and cohorts, showing only a minor decrease among males. Conclusions: Stagnant mean CPD, increasing female smoking initiation, and limited improvement in male cessation among recent cohorts present challenges to tobacco control. These results may reflect the fact that there have been no major tobacco control policy changes at the national level in recent years. This study provides a detailed account of Brazil's smoking experience to date using a methodological approach that can be replicated for other countries with limited data. The cohort-specific smoking parameters generated by this study can be used to inform decision models that evaluate the impact of tobacco use and policies on long-term health outcomes in Brazil.

FUNDING: Federal

POS4-49

STRATEGIES OF PARENTS WHO USE E-CIGARETTES IN NEGOTIATING RISK PERCEPTIONS OF SECONDHAND EXPOSURE BY THEIR CHILDREN, PARENTAL RESPONSIBILITY, AND CHALLENGES OF EFFECTIVELY ADDRESSING THE DANGERS OF E-CIGARETTES FOR PARENTS: A QUALITATIVE STUDY

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Significance: Children's secondhand exposure to parental e-cigarette use within the home can greatly increase their risks of future adverse health outcomes, including substance use disorders, addictive behaviors, and mental health disorders, among others. This study is the first in-depth investigation of parents' patterns of e-cigarette usage within the home and their perceptions of risk to their children through secondhand exposure. This exploratory research offers information and concepts that can contribute to future intervention research and education public health messaging about the risks of vaping and the importance of cessation. Methods: Funding from the National Institutes of Health was used for this research. Fifteen parents who reported e-cigarette usage and lived with their children were recruited as participants in this study. Participation included a brief demographic survey and a semi-structured interview via Webex. Interviews were transcribed and then coded using the qualitative data management software NVivo. Thematic analysis was used to identify the patterns and meaning of themes and ideas across the data and to analyze their relationship to the aims and goals of the study. Results: Participants considered e-cigarette use, in general, to be a relatively low-risk habit while also acknowledging, to varying degrees, the health risks of secondhand exposure for their children. Parents developed behavioral strategies to reduce their children's secondhand exposure, though rarely intended to quit vaping themselves. Conclusion: These results demonstrate the need to develop and disseminate future health messages for e-cigarette-using parents who may have low-risk perceptions of e-cigarette usage and of secondhand exposure for their children. The perception of e-cigarette usage as low-risk conflicts with the only empirically supported strategy to reduce their children's secondhand exposure, which is to ban all e-cigarette use within the home. This study also identifies possible targets for future intervention efforts through parents, such as effective communication strategies with children about the health consequences of vaping.

FUNDING: Federal

POS4-50

THE IMPACT OF ANTI- AND PRO-SMOKING MESSAGES AMONG DAILY AND NONDAILY SMOKERS AND NON-SMOKERS IN CHINA: RESULTS FROM A NATIONAL REPRESENTATIVE SURVEY

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Significance: Tobacco advertisements and promotions have been common in mass media and public places in China for decades. But in 2015, the China amended the Advertising Law to prohibit the distribution of tobacco advertising, and initiated waves of tobacco control media campaigns. The study examines the impact of the new media environment on people's cigarette-related beliefs and policy support, and assesses the patterns among daily smokers, nondaily smokers, and nonsmokers. Methods: A secondary data analysis was performed with the 2018 Global Adult Tobacco Survey (GATS-China) of 4,384 daily smokers, 575 nondaily smokers, and 14,417 nonsmokers. A separate logistic regression on health harm beliefs and tax support was performed for each smoking status group using unweighted data, controlling for demographic variables. Separate multiple regressions were conducted to test the relationships between exposure to anti- and pro-smoking messages and intention to quit. Results: Overall, 57.6% of the respondents reported being exposed to anti-smoking messages from one or more sources in the past 30 days, while 7.7% of them were exposed to pro-smoking messages from one or more sources. Nonsmokers' exposure to anti-smoking messages was significantly related to higher likelihood of believing that smoking is harmful (aOR = 8.023, p<. 001) and supporting increased cigarette tax (aOR = 1.873, p <. 001), and their exposure to pro-smoking messages was associated with lower likelihood of believing smoking is harmful (aOR = .095, p<. 001) and supporting increased tax (aOR = .229, p < .001). Similar patterns were found among daily smokers, where anti-smoking messages were significantly associated with higher likelihood of health harm beliefs (aOR = 6.065, p < .001) and tax support (aOR = 2.528, p < .001), while pro-smoking messages were significantly associated with reduced tax support (aOR = .245, p = .039). The patterns were not significant among nondaily smokers. Exposure to anti-smoking (b = .127, p < .001) and pro-smoking messages (b = -.036, p = .023) were significantly associated with daily smokers' intention to quit. The relationships were not found in nondaily smokers. Conclusion. China's advertising policies seem to be working with a lot more respondents reporting seeing anti-smoking than pro-smoking messages. Anti-smoking media campaigns need to be continued and expanded and cigarette promotions need to be further restricted.

FUNDING: Nonprofit grant funding entity

POS4-51

FLAVORS IN US ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) ADVERTISING (2015-2020)

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Introduction: Electronic Nicotine Delivery System (ENDS) products come in a variety of appealing flavors (e.g., fruit, dessert, menthol). Tobacco companies have historically used flavors as an advertising tactic, but little is known about flavor type and prevalence in ENDS advertisements, specifically. We assess the presence of flavored ENDS in ads over time, and by media outlet (e.g., magazines, online) and brand. Methods: We

acquired ENDS ads (N=4,546) that first ran between 2015-2017 (n=1,685; Study 1) and 2018-2020 (n=2,861; Study 2) in outlets including opt-in emails, direct-to-consumer mail (Study 1 only), video (TV and online), radio (Study 2 only), static online/mobile (i.e., ads without video or moving graphics), social media, outdoor (e.g., billboards; Study 2 only), and consumer magazines. We coded for the presence of flavored ENDS products and flavor type (e.g., fruit, tobacco, menthol) and merged this information with metadata on ad year, outlet, and manufacturer/retailer brand. Results: Overall, nearly half (45.5%; n=2,067) of ads in our sample featured a flavored product. Tobacco (59.1%; n=1,221), menthol (42.9%; n=887), and fruit (38.6%; n=797) were the most advertised flavors among ads for flavored ENDS. Over time, the proportion of ads containing tobacco- and menthol-flavored ENDS generally decreased before menthol rebounded in 2020. The proportion of ads containing fruit, mint, and dessert flavors generally increased over time untila substantive drop in 2020. We also found notable differences in flavored ENDS advertising by outlet and brand. Conclusions: The overall presence of flavored ENDS in our sample of ads remained relatively consistent, with tobacco flavor decreasing over time and other characterizing flavors (e.g., fruit, mint, dessert) increasing over time, until 2020 when presence of characterizing flavors decreased.

FUNDING: Federal

POS4-52

TRENDS AND PATTERNS IN CIGARETTE SALES BY MAJOR MANUFACTURERS IN MEXICO

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Background: The tobacco industry is known for taking advantage of design features to increase product appeal and manipulate user harm perceptions, including crushable flavor capsules in cigarettes. Previous research found that the aggressive introduction of capsule cigarettes was one of the key contributors to the rapid growth of Pall Mall in Mexico; examining manufacturers sales data might shed light in tactics being used by the tobacco industry in certain markets and help to inform evidence-based policies. This study analyzed sales trends and patterns by major cigarette manufacturers in Mexico in recent years. Methods: National data on cigarette sales from supermarkets, convenience stores, pharmacies, government-owned retail outlets, traditional stores, minimarts, booths and kiosks in Mexico between October 2018 and September 2021 were acquired from the Nielsen Company. Overall and monthly sales of all, unflavored, and flavored non-capsule and capsule cigarettes in US dollars were assessed for the 3 top-selling manufacturers during this time period. Market share was calculated by dividing each manufacturer's sales by total sales in each product category. The number of unique brand variants by manufacturer was also assessed. Results: Philip Morris Mexico (PMM) led cigarette sales in Mexico between October 2018 and September 2021, with a total sale value of US$7.14 trillion(t), followed by British American Tobacco (BAT, US$3.55t) and Japan Tobacco International (JTI, US$379 million(m)). While PMM had the largest cigarette market share overall across manufacturers (63%), BAT sold most of the capsule cigarettes (US$2.28t, market share 52%). All three saw a substantial increase in monthly capsule cigarette sales: 29% growth (US$191m to US$203m) for PMM, 28% growth (US$86m to US$103m) for BAT, and a 94% growth f(US$766,785 to US$1.48m) for JTI (vs. changes of -2%, +9%, and +16% for unflavored cigarette sales during the same time period, respectively). Meanwhile, the number of capsule cigarette brand variants changed from 28 to 26 for PMM (7% decline), 30 to 42 for BAT (40% growth), and 2 to 6 for JTI (200% growth). Conclusion: The expanding capsule cigarette market in Mexico led by major manufacturers is concerning, given misconceptions of reduced harm and greater appeal of capsule cigarettes among youth. From October 2018 to September 2021, BAT held the largest market share while JTI had the most aggressive growth in capsule cigarette sales. An increase in brand variants that corresponded with growth in capsule cigarette sales was observed for BAT and JTI but not for PMM, suggesting that varied marketing strategies were adopted by manufacturers. Findings underline the need for continued monitoring and enhanced regulations to address the public health threat posed by capsule cigarettes.

FUNDING: Nonprofit grant funding entity

POS4-53

ASSESSING COVID-19 VACCINATION UPTAKE AND HESITANCY IN TOBACCO USERS

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Significance: The coronavirus disease (COVID-19) pandemic has affected more than 92 million people in the U.S. since March 2020, with high-risk individuals (such as tobacco users) suffering worse outcomes when infected with COVID-19. To prevent deaths and rising cases, the Centers for Disease Control and Prevention (CDC) recommended a primary COVID-19 vaccine to high-risk populations beginning December 2020 and the first booster dose beginning September 2021. Although more than two-thirds of the population have been fully vaccinated against COVID-19, vaccine uptake has been declining with only 48% of the total population receiving the first booster dose. Previous studies have alluded low vaccine uptake to vaccine hesitancy, trust, and concerns regarding vaccine's safety and side effects. This study aimed at understanding the factors related to COVID-19 vaccine hesitancy and its impact on COVID-19 vaccine uptake in tobacco users. Methods: We assessed COVID-19 vaccine uptake and hesitancy by surveying a convenience sample of Pennsylvanian adult smokers. A unique survey link was emailed to 4,081 valid email addresses on April 28, 2022, approximately 8 months after tobacco users were eligible to receive the first booster dose in the state of Pennsylvania. The survey inquired about tobacco use, COVID-19 vaccination status, and reasons for receiving or declining the COVID-19 vaccine. Results: Participants (n=183) were 27% male, 96% White, and had a mean age of 48.1 (SD=11.5) years. 78% of participants were current tobacco users, with majority (58%) reporting current cigarette smoking with an average of 16 (SD=7.9) cigarettes smoked per day. Nearly 80% (n=145) reported receiving at least one dose of a COVID-19 vaccine and of those who did, the major reasons that prompted them to get the COVID-19 vaccine were; to protect them against COVID-19 infection (77%), to protect them against COVID-19 variants (68%), and to return to pre-pandemic social activities (54%). From the 22% of respondents that did not receive a COVID-19 vaccine, the major reasons they declined the COVID-19 vaccine were; they felt politics have played too much of a role in the COVID-19 vaccine development process (87%), the COVID-19 vaccine was too new/rushed (85%), they were worried about possible side effects (80%), they do not trust the government to make sure the COVID-19 vaccine is safe/effective (78%), and they felt the risks of COVID-19 were being exaggerated (62%). Finally, 61% (n=86) received the COVID-19 booster shot, and 25% (n=36) reported they do not plan to receive the booster. Conclusion: Our findings suggest that there are major reasons why tobacco users received or declined the COVID-19 vaccine. Thus, understanding and addressing vaccine hesitancy in specific populations such as tobacco users can help increase vaccine uptake rates and tailor future interventions to targeted populations to prevent mortality.

FUNDING: Federal

POS4-54

DECÍDETEXTO-MEXICO, MOBILE CESSATION SUPPORT IN TIME OF COVID-19 PANDEMIC

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Significance: The COVID-19 pandemic has changed smoking patterns. In Mexico, a survey conducted during 2020 revealed that cigarette consumption was higher than consumption prior to contingency. Overcoming the burden of tobacco in Mexico requires affordable, accessible and effective technological solutions, in addition to having access to Nicotine Replacement Therapy (NRT) treatments. In this study, we examine the results of mHEALTH *Decídetexto*, a complete remote smoking cessation treatment in Mexican adults. Methods: Quasi-experimental study, no control group, two measurements: baseline and 12 weeks. One hundred Mexican smokers were recruited in 12/32 cities of the State of Morelos (including its capital city) through traditional (eg, newspapers) and digital channels (eg, Facebook, E-mail, Web) to participate in *Decídetexto*, a 12-week SMS program to quit smoking. *Decídetexto* follows Social Cognitive Theory and consists of preprogrammed messages, keyword-based messages (eg, desire, health), and ad-hoc messages answered by a counselor. The program offered NRT at no cost. A 12-week follow-up evaluation was completed (86% rate). The cut-off point of abstinence 7 days and satisfaction with the program were evaluated. Results: 51% from capital city. Average age of participants was 47 years old, primarily female (51%) with at least a graduate degree (52%). 81% smoked daily, an average of 11 cigarettes per day (CPD), 29% smoked their first cigarette within five minutes of waking up, 17.0% used menthol cigarettes, 79% flavored cigarettes use and 45% of 1-5 quit attempts in past year. 14.0% of participants were at high-risk alcohol consumption, 20% depression (PHQ-2) and 24% anxiety (GAD-2). The 97% eligible participants for NRT requested an initial supply and 26% completed treatment. At 12 weeks, 24% of participants were biochemically verified abstinent using cotinine urine and 12.7% of non-quitter participants reported a decrease in number CPD. Over 90.9% of participants reported being very to extremely satisfied with *Decídetexto,* being the efficient service for the delivery of TRN treatment. Conclusion: Given the context of the pandemic, the current evidence shows a benefit of mHEALTH interventions. We consider that the results were successful. Also because we

include a population where there are no smoking cessation care services and access to NRT. There was high satisfaction with the program even when there was no physical contact with health personnel.

FUNDING: Federal; Academic Institution

POS4-55

SWITCHING FROM CIGARETTES TO IQOS: A PILOT EXAMINATION OF IQOS-ASSOCIATED REWARD, REINFORCEMENT, AND ABSTINENCE RELIEF

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Background: It is unknown whether IQOS-associated decreases in cigarette craving, nicotine withdrawal, greater subjective reward, and relative reinforcing value predict subsequent switching from cigarettes to IQOS products. Methods: Nontreatment-seeking adult daily smokers (n=33; 18 to 65 years old) completed a within-subject pilot study consisting of a baseline ad-lib smoking period (days 1-5), two laboratory visits (days 6-7), and a two-week period where participants switch from using cigarettes to using IQOS (days 8-21). Mixed-effect modelling estimated the percentage of baseline cigarette consumption replaced by daily IQOS HeatSticks used. Predictors of use included IQOS-associated reinforcement, subjective reward, and craving and withdrawal relief. Results: IQOS use alleviated cigarette abstinence-associated craving (change=-14.22, p<.001) but did not alleviate withdrawal symptoms. Smokers initially substituted IQOS for 59% of their average daily cigarette consumption, increasing to 87% by switch period end (B=0.02 [95%CI=0.01, 0.03], *p*=.002). Neither subjective reward of IQOS nor relief of cigarette craving and withdrawal symptoms were predictive of this change. By study end, IQOS consumption was 124% of regular cigarette consumption among participants with a low reinforcing value of cigarettes relative to IQOS (ß=0.03 [95%CI=0.00, 0.06], *p*=.049). In contrast, participants with a higher reinforcing value of smoking replaced 76% of their cigarettes with IQOS. Conclusions: IQOS shows potential as an alternative to combustible cigarettes. However, IQOS use may result in dual use for most smokers and increase tobacco consumption among a subgroup of smokers. These preliminary findings highlight the need for a larger investigation of the relationship between IQOS use and cigarette smoking.

FUNDING: Federal

POS4-56

LEVERAGING A DIGITAL MIXED METHODS APPROACH TO DETECT AND CHARACTERIZE E-CIGARETTE-RELATED ADVERSE EVENTS

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Significance: This project characterized the health effects and contextual factors associated with adverse events (AE) and Electronic Nicotine Delivery Systems (ENDS) using a digital mixed methods approach in order to better understand the evolving risk environment associated with these addictive products. Methods: The study used a digital mixed methods approach using qualitative online focus groups and big data to conduct digital surveillance of popular social media platforms to detect self-reported ENDS behavior and AE-related conversations. Focus groups were stratified on current and former e-cigarette use; whether or not adverse events had been experienced; and product use type. Digital surveillance used data mining and natural language processing to identify AE themes as reported by online users. Results: From March-April 2021, 16 focus groups were held with 114 young adult participants in California. Results found that participants reported over 40 ENDS-attributed AEs among approximately three-quarters of all study participants and that AEs vary greatly, including across multiple dimensions of user and product experience. Preliminary data from focus groups was used to inform digital surveillance on Twitter, Yelp and TikTok. This resulted in detection of user-generated AE topics similar to focus groups, though some users also reported purposefully getting sick to get a "nic buzz". Yelp data identified AEs among unlicensed tobacco and vaping retail store fronts, Twitter data detected over a thousand AE nicotine sickness posts and found that the volume increased over the study period, and TikTok data detected videos of user nicotine sickness and overconsumption along with higher user engagement on these posts. Conclusion/Discussion: Using a digital mixed methods approach this study was able to elucidate on several characteristics of ENDS-related AEs not readily reported via survey or other surveillance methods. Novel findings include: (1) early awareness and lived experiences by young adults with AEs prior to coverage on EVALI; (2) identifying a connection between overconsumption behavior and AEs as self-reported by social media users; (3) mention of AEs and counterfeit vaping products among unlicensed retailers; (4) lack of health promotion or tobacco cessation messages, tools, and communication in online spaces where people discuss and report AEs; and (5) the high degree of co-use among nicotine, tobacco, and cannabis products and AEs associated with cannabis use.

FUNDING: State

POS4-57

EFFECT OF CIGARETTE TAX INCREASE ON RETAIL CIGARETTE PRICE: FINDINGS FROM THE ITC VIETNAM SURVEYS

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Significance: The pure ad valorem tax (calculated as a percentage of the factory price) on all cigarettes has increased from 70% to 75% in Vietnam in January 2019. This study aimed to examine the effect of raising tax on the retail price of a cigarette pack. Methods: The data were from Waves 1, 2, and 3 of the International Tobacco Control (ITC) Vietnam Projects (W1: October-November 2018, n=1,870 male smokers; W2: October-November 2019, n=1,564; W3: November-December 2020, n=1,308). The price of a cigarette at last purchase was measured using two questions (1) "In the last time you purchased cigarettes, did you buy them by the single, the pack or the carton of cigarette?" and (2) "How much did you pay for that (by single/pack/carton of cigarettes)?". The inflation-adjusted price of a cigarette pack was calculated. To test whether cigarette price significantly increased across three waves, weighted generalized estimating equations (GEE) for self-reported cigarette price were performed by using normal or Gaussian distribution, identity link function, and exchangeable correlation structure. Results: The retail price of a cigarette pack was unchanged after increasing tax. In particular, the weighted mean price of a cigarette pack was VND 12,330 (US$ 0.54), 12,700 (US$ 0.55), and 12,120 (US$ 0.53) in 2018, 2019, and 2020, respectively. There was no significant increase in cigarette prices across the three waves (percentage change W2-W1: 2.22%, p-value=0.515, and W3-W1: 1.33%, p-value=0.698) in overall and in both domestic and international brands separately. Among specific brands, only Thang Long brand, the most used domestic brand, showed a slight increase of approximately 4% in cigarette price between W1 and W2 (p<0.01). The GEE model also showed no significant increase in retail price after increasing cigarette tax, controlling for covariates. The factors associated with reporting higher cigarette prices included younger age, living in an urban area, having a higher educational level, being dual users of cigarette and other tobacco products, and preferring international cigarette brands. Conclusion: The retail price of cigarettes was low; therefore, the slight increase in the cigarette tax was insufficient to raise the current retail price. Given a low-resource setting, a sharp rise in the cigarette price by introducing a specific tax (such as US$ 1.00 per pack regardless of the type of cigarettes) should be a key tobacco control policy in Vietnam because of its effectiveness and inexpensive implementation.

FUNDING: Other

POS4-58

MAPPING THE SYSTEM THAT CAUSES OF SMOKING INITIATION FROM THE PERSPECTIVE OF DISADVANTAGED YOUNG ADULTS: A QUALITATIVE SYSTEM DYNAMICS STUDY IN THE NETHERLANDS

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Significance: Despite implementation of various tobacco control policies in the previous decades, smoking prevalence is persistently high among disadvantaged young people. This qualitative system dynamics study mapped the complex system that drives smoking among disadvantaged youth in the Netherlands. Methods: We applied Group Model Building (GMB) (N=7) and semi-structured interviews (N=11) with 16-24-year-old young people in vocational education. Audio recording were thematically analysed using ATLAS.ti. A causal loop diagram was created using STICKE software. Results: Participants identified several causes of smoking among young people, which we grouped into personal influences (mainly stress, curiosity, low-risk-perception, and addiction), social influences (mainly smoking friends, social function of smoking, and smoking family), and environmental influences (mainly facilitating work and school environment and insufficiently stringent tobacco control policies). We found two main driving mechanisms: coping and normalisation. Coping is the use of smoking to alleviate stress. Participants looked for ways to escape stressful situations (e.g., domestic violence, divorce, parents' relationships, mental health problems) and find moments of relaxation. They perceived

smokers to seem happier and less stressed. This lead to starting smoking and continuing smoking, which in turn lead to addiction, making smoking seem rewarding. Addiction, as a driver of stress and poorer mental health, causes a reinforcing feedback loop. Normalisation is the process of keeping smoking accepted within groups of people. We found that participants were influenced to start smoking by smoking behaviours of friends to belong to a group, but also by family, images of smoking in the media and smokers in public spaces. The perception that 'everybody smokes' was common and this decreased the perception of riskiness of smoking and increased curiosity. Smoking increased making friends with other smokers and increased the perception that many others smoke. This further normalises smoking. Conclusions: From the perspective of disadvantaged young adults, smoking initiation was mainly escalated and maintained by coping and normalisation mechanisms. Addressing these causes may require policies both in and outside the realm of tobacco control, for example strengthening mental health services and social security.

FUNDING: Other

POS4-59

EXAMINING THE RELATIONSHIP BETWEEN FREQUENT E-CIGARETTE AND CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: A CROSS-LAGGED ANALYSIS USING DATA FROM THE TRUTH LONGITUDINAL COHORT (2016-2019)

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Background: Few studies to date have examined the bidirectional relationship between cigarette and e-cigarette use following the introduction of high nicotine e-cigarettes. Even fewer studies have investigated how these relationships differ by gender. Methods: This longitudinal study examined the relationship between frequent cigarette and e-cigarette use among a sample of youth and young adults from the Truth Longitudinal Cohort (TLC, N = 12,149) over six-waves of data collection from 2016 to 2019. Cross-lagged and simultaneous effects models were used to model bidirectional paths between dichotomized measures of more regular cigarette (CIG) and e-cigarette (ECIG) use. Analyses were conducted in Mplus using weighted least squares with mean and variance adjustment estimation procedures. Results for an overall model and a multi-group model for males and females are presented. Results: In overall models, CIG use was predictive of later CIG use and ECIG use was predictive of later ECIG use across all time points. Prospective relationships between frequent CIG use and frequent ECIG use differed across time. ECIG use in Winter/Spring 2016 was predictive of CIG use in Fall 2016 (estimate = -0.08, SE = 0.04) and ECIG use in Fall 2016 was predictive of CIG use in Winter/Spring 2017 (estimate = 0.16, SE = 0.04). CIG use in Winter/Spring 2019 was predictive of ECIG use in Fall 2019 (estimate = 0.15, SE = 0.05). Results were similar across models for females and males, except for transitions in CIG use in Winter/Spring 2017 to ECIG use in Winter/Spring 2018. For males, the relationship was negative (estimate = -0.14, SE = 0.05) and for females, the relationship was positive (estimate = 0.17, SE = 0.07). Conclusion: Results showed significant bidirectional associations between CIG and ECIG use, even after controlling for the sociodemographic characteristics of age, gender, and parent's education level, and measures of sensation seeking, peer and family cigarette use, and concurrent use of alcohol, marijuana, and other combustible tobacco products. Results also suggest that the relationship between CIG and ECIG use differed across gender when high nicotine e-cigarettes gained predominance in the tobacco marketplace.

FUNDING: Unfunded

POS4-60

EXAMINING DIFFERENCES IN CONCURRENT SMOKING AND SUBSTANCE USE AMONG PEOPLE PARTICIPATING IN DIFFERENT TYPES OF DRUG TREATMENT COURTS

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Significance: Cigarette smoking is common among people with substance use disorders (SUDs). While numerous studies demonstrate an association between smoking and SUDs, it is not known if this relationship extends to people participating in traditional drug treatment (tDTC) or opioid intervention courts (OIC): a population at increased risk for substance-related morbidity and mortality and with a higher prevalence of smoking than the general population. OIC is an intensive short-term program targeting individuals at the highest risk of overdose to hasten treatment linkage, whereas tDTC is a comprehensive program that monitors clients from 12-18 months. A better understanding of the patterns of concurrent smoking and substance use among this high-risk population might illuminate additional opportunities for intervention to reduce morbidity and mortality. Method: We used preliminary data from the baseline survey of the HEROIC (Health Evaluation of the Results of Opioid Intervention Court) study, a longitudinal study of tDTC and OIC clients that is currently in the recruitment phase (n = 111). We examined differences in concurrent smoking and substance use as a function of treatment court type between clients enrolled in a tDTC and an OIC. We defined current substance use to include non-medical use of prescription drugs (NMUPD), illicit drug use, and hazardous drinking. We used logistic regression models to examine the effect of treatment court type on concurrent smoking and substance use. The final models controlled for depression symptomatology and age. Results: Compared to tDTC clients, OIC court clients had greater odds of concurrent smoking and singular NMUPD, poly-NMUPD (ps < .001). Similarly, OIC clients had greater odds of concurrent smoking and singular illicit drug use, and poly-illicit drug use relative to tDTC clients (ps <.001). This association was not observed with regard to hazardous drinking (p > .05). Conclusion: Overall, OIC court clients had greater odds of concurrent smoking and substance use than tDTC court clients. By definition, OIC clients represent a population at higher risk of opioid overdose compared to tDTC clients and the prevalence of smoking may reflect greater substance use, in general. From a transtheoretical model perspective, engagement in SUD treatment may also present an opportunity to concurrently assess smoking cessation readiness.

FUNDING: Federal

POS4-61

BIOMARKERS OF EXPOSURE AMONG YOUTH SMOKERS, VAPERS, AND DUAL USERS: ASSOCIATIONS WITH PRODUCT CHARACTERISTICS AND DIFFERENCES ACROSS COUNTRIES

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Significance. Biomarkers of exposure (BoE) serve as indicators of exposure to nicotine and harmful constituents of tobacco products. Few studies have examined BoE among youth including comparisons between vaping, smoking and dual use, and the impact of product characteristics, such as the nicotine profile of e-liquids. We examined BoE among youth in Canada and England (where nicotine e-liquid content was capped at 20mg/mL). Methods. After completing online surveys, participants aged 16-19 (n=255) from non-user, exclusive vaper, exclusive smoker, and dual user groups were recruited from commercial panels in Canada and England between Sept 2019 - Oct 2021. Participants were sent a urine collection kit and one-page survey, to be returned by post or courier. Urine samples were tested for metabolites of nicotine, including cotinine, NNAL, and VOCs Participants self-reported last use of cigarettes and e-cigarettes, and characteristics of the last e-cigarette product used (e.g., nicotine profile). Linear regression models adjusting for age, sex, and country examined differences in biomarkers based on past-week use of cigarettes and e-cigarettes. Linear regression models with a subsample of 89 past-week vapers examined differences in self-reported use of nicotine salt-base e-liquids. Results. Cotinine levels were strongly associated with past-week use. Non-users had lower cotinine levels than all other groups (geometric mean=4.3ng/ml, p<.001 for all contrasts). Cotinine levels of dual users (219.0 ng/ml) were somewhat higher than exclusive vapers (219.0 vs 115.9 ng/ml, p=.14) and, to a lesser extent, exclusive smokers (138.6 ng/ml, p=.35), with little difference between exclusive smokers and exclusive vapers (p=.61). Among past-week vapers, substantially higher cotinine levels were found among those who reported the last e-cigarette they used contained nicotine salt than among those who reported it did not (464.3 vs. 89.7 ng/ml, p=.02) or did not know if it contained nicotine salt (74.6 ng/ml, p=.07). Cotinine levels were higher among exclusive vapers in Canada vs. England (187.1 vs. 36.2 ng/ml, p=.03). Results will also be presented for other nicotine biomarkers and indicators of dependence, as well as other biomarkers. Conclusion. Findings indicate similar nicotine exposure among exclusive smokers and vapers, with the highest levels among vapers who report using nicotine salt-base e-liquids. Implications for e-cigarette regulations across countries will be discussed.

FUNDING: Federal

POS4-62

HEALTHCARE PERSPECTIVES OF ADOLESCENT E-CIGARETTE USE: ASSOCIATED RISK FACTORS AND RESOURCES. A QUALITATIVE STUDY.

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Significance: In the past decade, e-cigarette use has become the most common form of nicotine consumption for adolescents and young adults, and nicotine's addictive, psychoactive, and furtive qualities present health risks that negatively impact younger users. Considering these health implications, healthcare providers may be in an ideal position to intervene when they encounter adolescents who vape, and this investigation seeks to characterize their perception of the risks associated with vaping and the resources necessary to remedy vaping behavior. Methods: Interviews and focus groups were conducted with 13 Hampton Roads healthcare professionals (physicians, inpatient nurses, school nurses, and athletic trainers) who directly interact with adolescents. Using vignettes, opinions were elicited to describe variables that may predispose a teen to vaping, risks attributable to current vaping behavior, and resources to mitigate vaping-associated risk. In this investigation, a given risk can have a bidirectional relationship with vaping. Vignette-based responses were grouped based on the vaping behavior within the vignette, with two vignettes portraying an adolescent who currently vapes, and one vignette portraying an adolescent who has yet to vape. Interviews were conducted via Zoom and transcribed manually. Themes were identified using common language and analyzed for frequencies using Microsoft Excel. Results: For adolescents who may not yet have begun vaping, healthcare professionals identified peer pressure as the primary variable promoting vaping initiation. Other variables included personality, proximity to use, and home environment. Resources for adolescents who required preventative interventions were focused on education, social and familial support, and development of social strategies. For adolescents who already exhibit vaping behavior, motivation for use (life event, stress relief or coping mechanism) was identified to be the most prominent factor associated with vaping use. Poly-substance use, social context of use, and detriment to health were also major risk factors. Adolescents who already vape were thought to require education, medical intervention, motivational interviewing, and mentorship. Conclusion: Healthcare professionals' responses varied based on an adolescent's level of interaction with vaping behavior. Findings contained in this study may help healthcare providers address adolescent vaping prevention and cessation.

FUNDING: State; Other

POS4-63

ENUFSNUFF: TESTING A TEXT-BASED CESSATION INTERVENTION FOR RURAL AND MEDICALLY UNDERSERVED SMOKELESS TOBACCO USERS

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Smokeless tobacco (chew or dip) use remains more prevalent in rural and medically underserved populations than in the general population, leading to disparities in tobacco-related cancers and chronic disease. Exacerbating the disparity, underserved smokeless users who want to quit have access to few effective interventions. Text-based interventions offer a broad reach and may be particularly effective if combined with a Scheduled Gradual Reduction to quit approach. The aim of this 2-arm randomized controlled trial was to test the efficacy of a text-based Scheduled Gradual Reduction (SGR) intervention plus support messages versus a currently available evidenced-based cessation intervention to promote smokeless tobacco (SLT) cessation in rural and medically underserved communities. SLT users were randomized to either the SGR group (n=264) that included a six-week scheduled reduction to quit program and 10 weeks of text-based cessation support messages or 2) evidenced-based intervention (n=268), the adapted Enough Snuff Program, that included a cessation booklet and biweekly support texts over 10 weeks. We assessed self-reported 7-day point prevalence cessation from SLT at end of program and at 6-months post-enrollment. An interim analysis of outcomes was conducted. The sample was predominately male (99%) and white (97%) with a mean age of 44 (range=19-79), reflecting the demographic of SLT users. The median number of dips per day was 10. The two treatment groups did not significantly differ on baseline demographic or tobacco use characteristics. Our retention rate at the end of program was 71% and at 6 months was 67%. At end of program, the intention-to-treat (ITT) self-reported quit rate was higher for the SGR arm (28%) versus the control arm (18%; p=0.006; OR= 1.77, 95% CI = 1.18, 2.67). The same was true among those for whom we have follow-up data: SGR (39%) vs. control (28%; p=0.03,OR=1.63, 95% CI = 1.05,2.54). At 6-months: ITT: SGR (20%) versus control (16%; p=0.22, OR=1.32, 95% CI = 0.84, 2.07); completers: SGR (35%) vs. control (29%; p=0.21, OR= 1.37, 95% CI = 0.84, 2.24). This is one of the first text-based cessation clinical trials for SLT users that also used scheduled gradual reduction. Quit rates in both arms were high and higher than most other SLT cessation interventions. Text-based programs can promote cessation and may be a scalable, effective method to improve SLT cessation, especially in rural and other underserved areas.

FUNDING: Federal

POS4-64

DESCRIBING AND UNDERSTANDING RECENT AND NEW CONCURRENT USERS OF CIGARETTES AND ENDS

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Introduction: Although concurrent use of electronic nicotine delivery systems (ENDS) with smoking cigarettes is common, limited data are available on factors associated with use patterns and trajectories. This study examines perceptions and experiences with ENDS and cigarettes in relationship to ENDS use and smoking patterns among established cigarette users who (re-)initiated ENDS use in the past month. Methods: The study used national data (n=301) from a survey of US adults who were recent or current smokers and initiated ENDS within the past thirty days (December 2020 to October 2021). Use pattern of cigarettes and ENDS within 30-45 days after initiating ENDS was the outcome variable: stopped vaping/continued smoking (Rejectors), concurrent use-mostly smoking (Concurrent-Smoker), concurrent use-equal use (Dual User), concurrent use-mostly vaping (Concurrent-Vaper) or stopped smoking/continued vaping (Switchers). Predictor variables were perceived relative harm, enjoyment from ENDS, motivation to quit cigarettes, cigarette craving reduction from ENDS use, irritability reduction with ENDS use, ENDS satisfaction, and ENDS taste. Chi-square, Fisher's exact and one-way ANOVA tests were used to examine associations between the predictors and use patterns. Results: Approximately 44.5% of participants were Current-Smokers, 19.3% Dual Users, 19.3% Current-Smokers, 10.6% Switchers, and 6.3% Rejectors. There were significant associations between perceived relative harm, comparative enjoyability, motivation to quit cigarettes, cigarette craving reduction, irritability reduction, ENDS satisfaction, and ENDS taste with use patterns. Overall, Switchers and Concurrent-Vapers had more positive views and experiences with ENDS across factors, perceiving ENDS as less harmful and equally or more enjoyable than cigarettes. In contrast, Concurrent-Smokers and Rejectors had more negative views with about 60% of Concurrent-Smokers and 90% of Rejectors perceiving ENDS as less enjoyable than cigarettes, and Rejectors had the lowest average motivation to quit smoking. Conclusions: Perceptions and use experiences are important factors to consider when examining ENDS initiators' use trajectories. Results demonstrate that ENDS initiators are separating into different use patterns based on several factors within a relatively short period of time. Future longitudinal research should further examine factors highlighted here, as they might limit real-world substitution of ENDS cigarettes.

FUNDING: Federal; Other

POS4-65

A HIGH-FAT DIET HAS SEX-SPECIFIC EFFECTS ON NICOTINE VAPOR SELF-ADMINISTRATION IN MICE

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Background: Studies investigating the relationship between diets and drug use have shown that individuals that consume high-fat diets are likely to be dependent on other substances such as nicotine. However, the exact neurochemical mechanisms that modulate this effect have not been clearly elucidated. Therefore, our objective was to investigate if high-fat diet (HFD) impacts nicotine intake and in parallel examine potential changes in dopamine signaling in mice. Methods: Adult male and female C57/BL6J mice were used in nicotine e-vape® self-administration (EVSA) assays after being maintained on a standard diet (SD) or HFD for 6 weeks. Weight and amount of food consumed by mice were recorded weekly. After the EVSA schedule, dopamine release in the nucleus accumbens core (NAc) was examined with fast-scan cyclic voltammetry. Results: Compared to SD-fed mice, female mice assigned to HFD exhibited increased nicotine EVSA during low-effort responding (FR1). Conversely, both male and female HFD-fed mice exhibited reduced motivation-related behavior in a progressive ratio

task. Overall, HFD-fed mice exhibited reduced phasic dopamine release compared to standard-diet mice. Conclusions: The results gathered from our experiment suggest that the HFD-induced nicotine intake may be due to a decrease in NAc dopamine release. Furthermore, these data which support previous findings that fat-rich diets may enhance nicotine intake is clinically relevant to understanding the etiology of HFD-induced obesity and nicotine addiction.

FUNDING: Federal; Academic Institution

POS4-66

SCOPING REVIEW OF GUIDANCE ON CESSATION INTERVENTIONS FOR ELECTRONIC CIGARETTES AND DUAL ELECTRONIC AND COMBUSTIBLE CIGARETTES USE.

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Significance: While there is a strong body of evidence to support clinical guidelines for smoking cessation, evidence for cessation of electronic cigarettes (e-cigarettes) and dual use of e-cigarettes and combustible cigarettes is still emerging, and guidelines have not yet been established. This review aimed to map current recommendations for cessation interventions for both e-cigarette and dual users, tailored to adolescents, youth and adults as well as provide direction for future research. Methods: We systematically searched MEDLINE, EMBASE, PsycINFO and grey literature databases for publications that provided guidance or recommendations on vaping cessation for e-cigarette users and complete cessation of cigarettes and e-cigarettes use for dual users. Papers focused on combustible cigarette cessation, the harm reduction potential of e-cigarettes, cannabis vaping, and the management of e-cigarette or vaping use associated lung injury were excluded. Data was extracted on general characteristics and recommendations made by the papers. Different critical appraisal tools of the Joanna Briggs Institute and the Appraisal of Guidelines for Research and Evaluation II instrument were used to assess the quality of evidence. Results: A total of 13 publications on vaping cessation interventions were included. Most papers were focused on youth, and results showed that behavioral counselling and nicotine replacement therapy were the most recommended interventions for vaping cessation. We found only one randomized controlled trial (RCT) evaluating the effectiveness of a text-messaging based behavioural intervention for vaping cessation. While 10 of the papers reviewed were appraised as 'high quality' evidence, it is worth noting that 5 papers based their evidence on interventions applied for smoking cessation. No studies were found on complete cessation of cigarettes and e-cigarettes for dual users. Conclusion: There is little evidence in support of effective vaping cessation interventions and no evidence for dual use cessation interventions. For an evidence-based cessation guideline, RCTs should be rigorously designed to examine the effectiveness of different behavioural interventions and medications for vaping cessation and dual use cessation among different subpopulations. Moreover, future research should longitudinally assess the sustainability of abstinence among former smokers and dual users following interventions.

FUNDING: State; Nonprofit grant funding entity

POS4-67

REAL-TIME PLEASURE AND SATISFACTION WITH ENDS RELATIVE TO CIGARETTES PREDICTS CHANGES IN CIGARETTE USE OVER TIME

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Significance: A key practice and policy question is how to help smokers uninterested in quitting or who have been unsuccessful with quitting, to switch completely to e-cigarettes or ENDS as a harm reduction approach. Little is known about factors that may enhance switching, but product characteristics may matter. This study examined whether relative perceptions of pleasure and satisfaction with both cigarettes and e-cigarettes, assessed with ecological momentary assessment (EMA) at the time of use, were associated with changes in patterns of cigarette and ENDS use over one year in a sample of smokers who had recently started using ENDS (dual users) but who were not currently attempting to stop smoking. We hypothesized that dual users whose experience of pleasure and satisfaction with ENDS was similar to or greater than that from cigarettes would be more likely to decrease their cigarette use over time. Methods: Participants (N = 279; 42% female, mean age = 35.6, SD=12.69) completed 7 days of EMA interviews including random prompts and event recordings of cigarette and ENDS use. At each cigarette or ENDS EMA interview, participants rated their levels of pleasure and satisfaction (1-10 scales) with the product. Participants also completed biweekly surveys of their tobacco product use for 12 months. We used a multivariate mixed-effects location scale (MELS) shared parameter model to examine the longitudinal association between the EMA pleasures/satisfaction ratings with the cigarette and ENDS use data over the subsequent year (26 biweekly reports). Covariates included age, gender, and nicotine dependence. Results: As pleasure/satisfaction for ENDS, relative to cigarettes, increased, cigarette use decreased over time (estimate = -.0.1574, $p < .0003$), and ENDS use increased (estimate = 0.1557, $p < .002$). More consistency in the ratings of pleasure/satisfaction for ENDS was also associated with higher ENDS use rates. In addition, the higher the pleasures/satisfaction for ENDS relative to cigarettes, the more negative the association between the trends of cigarette and ENDS use over time (estimate = -0.4081, $p < .0001$). In other words, greater real-time pleasure/satisfaction from ENDS predicted a greater decline in cigarette use and increase in ENDS use over the following year. Conclusions: Subjective pleasure/satisfaction of ENDS is important in predicting decreases in cigarette use over time and in promoting potential complete switching of products.

FUNDING: Federal

POS4-68

PARENT-YOUTH DYADIC ENDS USE: FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH, WAVES 3-5

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Significance: Since 2014, electronic nicotine delivery systems (ENDS) have been the most commonly used tobacco product by U.S. youth. Prior work has established parental tobacco use as a risk factor for youth tobacco use and recent work suggests that this pattern extends to youth ENDS use as well. However, work modeling parent and youth behaviors from other domains emphasizes that health behaviors may be bidirectional: not only by parent impacts on their youth but also by youth impacts on their parents. Methods: We examined these potential dyadic influences of ENDS use among youth and their biological mothers in Waves 3, 4, 4.5, and 5 (2015-2019) of the Population Assessment of Tobacco and Health Parent/Youth Surveys. These Waves contain consistent items and responses from 20,871 unique youth respondents, for a total of 51,666 youth responses across waves; we included responses from the youth's biological mother as well (15,995 mothers, for a total of 35,414 responses from biological mothers). Using structural equation modeling, we generated a cross-lagged panel model, using probit regression for prediction of the dichotomous behavioral outcome (ENDS use in the past 30 days, yes or no). Diagonally weighted least squares was used for robust estimation and multiple imputation was used to account for missing data. We controlled for youth's grade in school, sex, race and ethnicity, parent-reported income, and parent and youth cigarette use (past 30 day, yes or no). Results: We found robust intra-individual effects across waves (p's < .007 for all biological mothers and youth). Inter-individual effects showed moderately consistent positive effects from parent to youth and from youth to parent across waves. Youth ENDS use at Wave 4 (Beta = .29, p = .017) predicted parent ENDS use at Wave 4.5; similarly, youth ENDS use at Wave 4.5 (Beta = .37, p = .007) predicted parental ENDS use at Wave 5. Parent ENDS use at Wave 3 (Beta = .32, p = .042) predicted youth ENDS use at Wave 4, and parent use at Wave 4 (Beta = .20, p = .066) and Wave 4.5 (Beta = .23, p = .059) was marginally predictive of youth ENDS at the respective following wave. Conclusions: These findings suggest that intergenerational transmission of ENDS use is complex, with behavior of youth and biological moms both influencing the other. Future work should extend these investigations to other parents or influential adults in a youth's life, and to broader family and social networks. Additional research could also explore the mechanisms of how ENDS use spreads within parent-youth dyads, such as via beliefs, communication, and/or availability of ENDS products.

FUNDING: Federal

POS4-69

CORRELATES OF HEATED TOBACCO PRODUCT USE FREQUENCY AND ITS ASSOCIATION WITH SMOKING QUIT ATTEMPTS AMONG MEXICAN ADULT SMOKERS

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Background: Tobacco companies promote Heated Tobacco Products (HTPs) as a safer alternative to combustible cigarettes; however, whether HTPs help smokers quit

is uncertain. This study assesses the correlates of HTP use frequency and whether HTP use predicts smoking cessation attempts. Methods: We analyzed data from five surveys (Nov. 2019-Mar. 20216) of an open cohort of 6,837 adult smokers in Mexico. Participants were surveyed every four months and followed to the extent possible. Self-reported last month HTP use frequency categories included: 1) No use, 2) Once a month, 3) Once a week, and 4) Daily. Covariates included sociodemographics and smoking- and HTP-related variables (e.g., relative risk perceptions, ad exposure, behaviors among family and friends). Mixed-effects multinomial logistic models regressed HTP use frequency (ref=no use) on covariates. Among followed-up to the subsequent survey (n=2,923), we assessed self-report duration of smoking quit attempts (SQAs) between surveys (i.e., no SQA, SQA<30 days, SQA=30 days). Models regressed SQAs at follow-up (ref=no SQA) on HTP use frequency at baseline, controlling for covariates. Results: Consistent predictors of all frequencies of HTPs use (monthly; weekly; daily) included: more frequent smoking cigarettes (i.e., >5 cigarettes/day vs nondaily: aRRR=1.63; 1.64; 5.36, respectively); more frequent e-cigarette use (i.e., frequent use vs no use: aRRR=5.19; 8.87 & 3.67, respectively); exposure to information about HTPs inside stores (aRRR=1.71; 1.72 & 2.90, respectively) and outside stores where tobacco is sold (aRRR=1.57, aRRR=1.63 & aRRR=1.80, respectively); and having family (aRRR=1.79; 2.07 & 2.32, respectively) or friends (aRRR=3.57; 3.13 & 4.51, respectively) who use HTPs. Compared with young adults, 40-49 year olds were less likely to use HTP (aRRR=0.55). Using HTPs less than once a week but at least once a month predicted SQA=30 days (aRRR=2.09), but HTP use was otherwise unassociated with quitting behaviors. Conclusions: Mexican smokers who use HTPs are likely to be more frequent smokers and e-cigarette users with social network members who also use HTPs. Monthly, but not more frequent, HTP use predicts smoking cessation behaviors, suggesting that HTPs do not meaningfully assist with smoking cessation in Mexico.

FUNDING: Federal

POS4-70

THE USE OF E-CIGARETTES FOR WEIGHT AND APPETITE CONTROL AMONG COLLEGE FEMALES

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Introduction: Previous research suggests e-cigarette users, particularly young adult females, report using e-cigarettes as a weight control method. The objective of this study was to test how college student females' weight perception and body shape satisfaction associate with the use of e-cigarettes for weight control. Methods: College females (n=425, 18-25 years old, M_{age}=21) who reported at least weekly e-cigarette use and used e-cigarettes to control weight, suppress appetite, or stop food cravings completed an online survey (February-May 2021). Measures included self-reported weight perception (overweight, underweight, no current weight problem), body shape satisfaction (never, rarely, sometimes, often, always), e-cigarette use frequency (days per week), cigarette use (yes, no), and e-cigarette use to control weight (yes, no), suppress appetite (yes, no), and to stop food cravings (yes, no). The Penn State E-Cigarette Dependence Index was used to determine e-cigarette dependence. Binomial logistic regressions were performed to test if weight perception and body shape satisfaction was associated with e-cigarette use for weight control, controlling for e-cigarette dependence, e-cigarette use frequency, cigarette use, age, race/ethnicity, sexual orientation, and sorority membership. Analysis also controlled for e-cigarette use for appetite suppression and to stop food cravings as the research aim focused on intentional e-cigarette use for weight control. Results: College females reported e-cigarette use for weight control (54%), appetite suppression (56%), and to stop food cravings (69%); 28% used for all three reasons. Participants were primarily white (61%), non-Hispanic (57%), heterosexual (79%), sorority members (82%), and used e-cigarettes 6-7 days a week (60%). College females who perceived themselves as overweight were significantly more likely to use e-cigarettes to control their weight compared to those who perceived themselves as having no current weight problem (aOR = 2.480, CI = 1.436, 4.281, p = <.001) after controlling for covariates listed above, no other significant associations among weight perception were seen. There were no significant associations between perceived body shape satisfaction and e-cigarette use for weight control. Conclusions: College females who perceive themselves as overweight may be at increased risk to using e-cigarettes for weight/appetite regulation, putting them at risk for early chronic disease and continued nicotine addiction.

FUNDING: Academic Institution

POS4-71

IS THE BEIRUT WATERPIPE SMOKING METHOD STILL VALID? PUFF TOPOGRAPHY, PROTONATED/FREEBASE NICOTINE CONTENT, PAHS, CARBONYLS, AND CO IN WATERPIPE TOBACCO, CHARCOAL, AND AEROSOLS MEASURED USING REAL-TIME IN-SITU SAMPLING IN A BEIRUT AREA CAFÉ

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Waterpipe tobacco smoking remains a globally prevalent tobacco use method about which much is still unknown, including toxicant content and effects. While toxicant content has been assessed in the analytical lab using smoking machines, this approach involves representing complex human behaviors with greatly simplified models. One such model, the Beirut Method, specifies a fixed puffing regimen, a waterpipe head preparation protocol, and a charcoal use schedule for generating smoke samples for quantitative chemical analyses. Because of the significant evolution of waterpipe products and use methods since the Beirut Method was developed more than a decade ago, its relevance to waterpipe smoking today requires evaluation. In this study, we visited a heavily frequented waterpipe café located in Beirut to examine waterpipe products and use methods, as well as puffing topography and mouth-level toxicant exposure by users. The latter was performed using RINS, a real-time in situ sampling instrument developed by our group that automatically captures a fixed fraction of the smoke drawn by the user during a smoking bout. In addition to puffing topography, a wide range of toxicants was quantified including carbon monoxide (CO), polycyclic aromatic hydrocarbons (PAHs), carbonyl compounds (CCs), and nicotine. We found that though the tobacco products and waterpipe apparatuses had changed greatly since our field campaigns a decade ago, the mean puff topography of waterpipe users did not differ significantly from the Beirut Method. In addition, inhaled total particulate matter, and nicotine did not vary significantly from previous real-time measurement studies. On the other hand, PAH and CO emissions decreased significantly while CCs emissions showed a significant increase, likely reflecting changes in the products used.

FUNDING: Federal

POS4-72

PEOPLE WHO VAPE, VAPE FOR THE FLAVORS AND VAPE MORE OFTEN

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Background: It's estimated that around 77-84% of current vapers report using flavored e-cigarettes, and flavored e-cigarettes is more common among younger adults and never smokers. It is unclear whether flavored e-cigarettes are good for helping smokers switch completely to e-cigarettes or dangerous for attracting new users, especially young people. Methods: We used the online crowdsourcing platform, Prolific, to survey current e-cigarette users in the US and UK. Measures were drawn from existing international surveys. Results: The study included 1064 current vapers (535 UK; 529 US). The mean age was 34.7 years old; most were male (51%), white (85%), and had a bachelor's degree or above (55%). Most were ever (80.5%) or current smokers (55.5%). When asked about reasons for vaping, "E-cigarettes come in flavors that I like" was the most common reason (88.7%). This was the top reason regardless of nationality UK (89.7%) vs US (87.7%; p=0.3327), sex (90.6% of men, 87.1% of women; p=0.0315) or race/ethnicity (93.6% of Asian or Chinese, 92.1% of Latinos, 88.2% of Whites, and 87.2% of Blacks or African Americans; p=0.6862). Most participants who vaped for flavor used their e-cigarette daily rather than nondaily (60.9% vs 39.1%; p=0.0475). Conclusions: Most in this study reported the main reason they vaped was for the flavors. Vaping for flavor was strongly associated with daily vaping and was more prevalent among men. Flavors are prevalent, they are the main driver to vape, and they heighten exposure to nicotine and the toxicants in vape juice.

FUNDING: Academic Institution

POS4-73

EXPLORING YOUNG ADULTS' BELIEFS ABOUT CIGAR SMOKING: A BELIEF ELICITATION STUDY

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Significance: Young adults are vulnerable to initiating cigar smoking, which is associated with multiple cancers and pulmonary and cardiovascular disease. While previous research examined beliefs related to cigar smoking in general, little is known about young adults' beliefs about smoking different types of cigars (i.e., large cigars, cigarillos, and little filtered cigars), especially among those susceptible to initiation. We examined tobacco-naïve young adults' beliefs about smoking each cigar type through a belief elicitation exercise. Methods: The parent study surveyed a U.S. sample of tobacco-naïve young adults (18-30 years; n=948) susceptible to electronic cigarettes through Qualtrics online panel in August 2021-January 2022. In this analysis, participants completed cigar smoking susceptibility measures and were randomly assigned to questions about one of the three cigar types on behavioral (i.e., general, positive, and negative emotions), normative (i.e., people in one's life supportive/unsupportive of their potential cigar smoking; likely/unlikely people to smoke), and control (i.e., easy/difficult aspects of initiation) belief questions. Participants' responses were coded into emergent themes within each belief. Themes were compared across cigar type and by cigar susceptibility status. Results: About 71% of participants were susceptible to any cigar use. Some similar themes of negative health effects, familial support to not smoke, and ease of access of cigars emerged for all cigar types. Different themes by cigar type also emerged. For example, among behavioral beliefs, large cigars and cigarillos were described as cool more often than little filtered cigars. Among normative beliefs, participants associated large cigars with older adults and cigarillos with younger adults. Among control beliefs, large cigars were considered expensive whereas cigarillos were considered cheap. Additionally, cigar susceptible participants had more positive behavioral beliefs including cigars being stress relieving and having appealing flavors compared to non-susceptible participants. Cigar susceptible participants also more often described that their friends were supportive of them trying cigars and that cigars were easily accessible. Conclusions: These findings provide targets beliefs for the development of cigar smoking prevention messages, which can potentially enhance the public health impact of these messages.

FUNDING: Federal

POS4-74

IMPACT OF E-CIGARETTE USE BEHAVIORS AND DEVICE CHARACTERISTICS ON HEAVY METAL BIOMARKERS IN A MARYLAND COHORT

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SIGNIFICANCE: Electronic cigarettes have rapidly evolved from "mod" devices mostly used by smokers as a risk reduction strategy with adjustable settings, to "pod" devices with disposable cartridges, marketed to youth never smokers. Inhalation of metals that have been found in e-cigarettes can lead to adverse health outcomes such as asthma and lung cancer. Evaluating e-cigarette use behaviors, device type, settings, and biomarkers are essential to understanding potential heavy metal exposures attributed to e-cigarette use. OBJECTIVE: Assess heavy metal concentrations in blood, urine, and exhaled breath condensate (EBC) of e-cigarette users and controls by use behaviors and device type. METHODS: We recruited 17 Mod, 24 Pod, 10 smokers, 14 dual users (cigarette and e-cigarette), and 30 non-users. Sociodemographic characteristics, e-cigarette/tobacco use behaviors, and device characteristics were collected by survey. Blood, urine, EBC and aerosol samples were analyzed for heavy metals using ICP-MS. Data was corrected for background and limit of detection. Chi-squared tests for categorical variables, ANOVA tests for continuous variables, and linear regressions were used to assess relationships between variables and user groups. PRELIMINARY RESULTS: Never smokers and younger users were more likely to use higher nicotine concentration than former smokers. Significant differences ($p<0.05$) were found between user group and Cd, Mn, Ni, and Zn in blood. Cr and Ni in mod users was 1.2 and 1.5 times higher, respectively, than pod and nonusers. CONCLUSIONS: Differences in user behaviors and device type determine exposure to certain metals. Blood Cd, Mn, Ni, and Zn were associated with user group.

FUNDING: Federal; Academic Institution

POS4-75

EXAMINING THE INFLUENCE OF STRESS ON SUSCEPTIBILITY TO HOOKAH TOBACCO SMOKING AMONG YOUNG ADULTS

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Significance: Hookah tobacco smoking (HTS) is practiced mostly by young adults. However, many young adults have not yet engaged in HTS but are open to use, that is, they are susceptible. Heighted level of perceived stress may distinguish susceptible versus non-susceptible young adults. Hence, as aims we 1) Examined among 18-24 year olds mean differences in perceived stressed between those susceptible or not to HTS, and 2) Determined whether mean differences between these two groups remained significant after accounting for other known risk factors of susceptibility to HTS. Methods: A cross-sectional research design was employed to assess the association between perceived stress on susceptibility to HTS. Participants were recruited from Amazon's Mechanical Turk (Mturk), an online consumer platform whereby individuals are paid to complete surveys. Participants completed a 15 -20 minute survey and received $2.00 to their Mturk account upon survey completion. The survey included demographics, a 4-item assessment of susceptibility to HTS, the 10-item Perceived Stress scale, as well as measures for perceived harms, peer and parental use, risk appraisals, motives for HTS, and marketing exposure to hookah. Additionally, for exploratory analyses, we explored whether differences in perceived stress differed by susceptibility status for emotion regulation and coping strategies using the 18-item Difficulties in Emotion Regulation scale and the 16-item Coping Strategies Inventory. Results: The total sample consisted of 75 susceptible and 42 non-susceptible participants. Most participants were White (n=80), Non-Hispanic (n=105), Female (n=76), and Enrolled in college (n=88). Susceptibles reported being significantly more stressed than non-susceptibles (M= 23.87, SD = 6.47 vs. M= 20.21, SD= 6.32, p=.0038). This remained significant after controlling for other risk factors for susceptibility. *Exploratory analyses:* Differences in perceived stress were more strongly associated with the Nonacceptance of Emotional Responses subscale in susceptibles than non-susceptibles (r=.65, p=<.001 vs. r=.36, p=.0178), with the opposite being true for the Lack of Emotional Clarity subscale (r=.35, p=.0024 vs. r=.52, p=.004). For coping strategies, differences in perceived stress were more strongly associated with the Total Engagement subscale in susceptibles than non-susceptibles (r=.24, p=.0413 vs. r=.02, p=.9226), as well as the Emotion-Focused Engagement subscale (r=.38, p=.0008 vs. r=.17, p=.2856), and the Emotion-Focused Disengagement subscale (r=.54, p=<.0001 vs. r=.25, p=.1038). Conclusions: As stress emerged as a unique risk factor, future research should explore whether it promotes experimentation with HTS in this vulnerable population.

FUNDING: Academic Institution

POS4-76

STOPPING USE OF BOTH E-CIGARETTES AND COMBUSTIBLE CIGARETTES ASSOCIATED WITH SMOKING CESSATION AMONG ADULTS: FINDINGS FROM A LARGE LONGITUDINAL DIGITAL SMOKING CESSATION INTERVENTION STUDY

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Introduction: Many individuals are adopting electronic cigarettes (e-cigarettes) to support their cessation efforts. Digital interventions are widely being implemented in real-world settings (e.g., part of national Quitlines or websites such as smokefgree.gov) to promote tobacco cessation. However, we do not yet understand how this use of e-cigarettes impacts the outcomes of digital tobacco cessation interventions. Methods: In this longitudinal study, we examined the association of e-cigarette use behavior with smoking cessation among U.S. adult smokers (n=990; 18 years and older) participating in a 6-month digital smoking cessation trial. The trial tested two types of messaging interventions, including motivational and informational messages that promoted evidence-based strategies but did not include messages related to e-cigarette use. We compared demographic and baseline smoking characteristics across four e-cigarette use groups and estimated the odds ratios (OR) of 6-month smoking cessation among the e-cigarette use groups using multiple logistic regression. Results: Four e-cigarette use groups were identified based on the assessment of participants' baseline and 6-month e-cigarette use (never users, n=621; recently started users, n=60; sustained users, n=187; recently stopped users, n=122). Compared to never users, more participants were younger among those who recently started ($p<.05$), sustained ($p<.001$), or recently stopped using e-cigarettes ($p<.001$), and more participants who stopped using e-cigarettes self-identified as non-White ($p<.05$). Compared to never users, participants who recently stopped using e-cigarettes had higher odds of smoking cessation (OR=1.69, 95% CI [1.06, 2.68], while those who sustained (OR=0.92, 95% CI [0.51, 1.52] and recently started using e-cigarettes had lowest odds of smoking cessation (OR=0.59, 95% CI [0.31, 1.14]. Conclusions: A "dose-response" trend was found between stopping the use of both e-cigarettes and cigarettes and 6-month smoking cessation. Adult smokers who were most successful at quitting combustible cigarettes were those who stopped using e-cigarettes during the intervention. However, many sustained using both products. As

the tobacco community increasingly adopts e-cigarette use for harm-reduction, careful consideration of how to promote stopping e-cigarette use following cessation from combustible cigarettes may be needed to increase the impact of digital interventions.

FUNDING: Federal

POS4-77

POLYSUBSTANCE USE PATTERNS AND MENTAL HEALTH OUTCOMES AMONG COLLEGE STUDENTS: A GENDER AND RACE/ETHNICITY STRATIFIED ANALYSIS OF THE HEALTHY MINDS SURVEY

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Significance. Polysubstance use is associated with risk behaviors and negative outcomes superseding the use of single substances. College students who use multiple substances are increasing, and present a unique risk profile. This study examined gender and racial/ethnic differences in mental health outcomes by polysubstance (alcohol, marijuana, e-cigarette) use patterns among college students. Methods. Data are from undergraduate students from the 2020-21 Health Minds Survey, a multi-campus, web-based survey (n=117,996, college N=140). Participants reported on past-month e-cigarette and marijuana use, past 2-week heavy alcohol use, anxiety (GAD), and depression (PHQ-9). Sex- and race-stratified linear regression models examined effects of single/dual/polysubstance use on anxiety and depression, adjusting for demographics, confounders, and school clustering. Results. Alcohol+marijuana was the most common product use pattern among males and females (5.9% respectively) overall, and for male and female Blacks (6.4% and 6.9% respectively), Hispanics (5.9% and 6.0% respectively), and White females (6.4%). Alcohol+marijuana+vaping was most prevalent among Asian males and females (3.7% and 3.9%, respectively) and White males (7.9%). In adjustedmodels, alcohol+marijuana+vaping was significantly associated with the largest increase in anxiety scores among male and female Blacks (ß=2.7 and 2.1, respectively) and Hispanics (ß=1.3 and 1.8) compared to no use. Male and female Asians and Whites who report marijuana+vaping had the largest increase in anxiety scores (ß range: 1.2-1.8). Similar patterns were observed for depression. Compared to non-users, Black male and female alcohol+marijuana+vaping users have the highest increase in depression scores (ß=4.3 and 3.0, respectively) while White male and female marijuana+vaping users have the highest increase (ß=2.3 and 2.0, respectively). Similar depression patterns were observed for male and female Hispanic marijuana+vaping users (ß=1.9 and 2.7, respectively). Asian males who report marijuana+vaping use pattern showed the highest increase in depression (ß=2.5) while Asian females who reported alcohol+marijuana+vaping showed the highest increase in depression (ß=3.0) compared to non-users. Conclusion. Compared to other product use patterns, marijuana+vaping and alcohol+marijuana+vaping patterns contributed most to increased anxiety and depression among college students across different racial/ethnic groups.

FUNDING: Federal; State

POS4-78

CHANGES IN HIGH SCHOOLERS' KNOWLEDGE AND PERCEPTIONS OF E-CIGARETTES FOLLOWING PARTICIPATION IN A ONE SESSION EDUCATIONAL PROGRAM

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Significance: E-cigarette advertising and flavors often target and appeal to adolescents, many of whom do not understand the addictiveness of e-cigarettes and the associated health risks. Adolescents are also particularly susceptible to social and peer influences and may lack the necessarily skills to resist social pressures to use e-cigarettes. Consequently, educational programs designed to improve adolescents' knowledge of e-cigarettes, address common misperceptions of risks, and provide refusal skills play an important role in combatting e-cigarette initiation and use. The current study evaluates changes in high schoolers' e-cigarette knowledge, perceptions, and refusal skills following participation in a school-based educational session.*Method:* Study participants were 322 Kentucky high school students (M_{age} = 16.1 years) who participated in a single 60-minute session of a vaping prevention curriculum within the Stanford Tobacco Prevention Toolkit. The study design is a one arm pre-post analysis in which participants completed pre- and post-test assessments of e-cigarette knowledge, perceptions, and refusal skills. Matched pairs t-tests and McNemar tests of paired proportions were applied to assess changes in study outcomes associated with participation in the curriculum. *Results:* Following the curriculum, participants perceived e-cigarettes as more addictive (p < .001), more harmful to their lungs (p<.001), and less effective at reducing stress (p < .001). They also perceived tobacco companies as being less truthful about the health risks (p = .03) and addictiveness (p < .001) of their products. A higher proportion of participants correctly identified e-cigarette contents (p<.001), but there were no significant changes in knowledge questions related to addictiveness. Participants also indicated it would be easier to say no to a friend if offered an e-cigarette (p <. 001), or just walk away from the situation (p = .02). *Conclusions:* Study findings demonstrate that a single session educational program based on the Stanford Tobacco Prevention Toolkit was associated with positive changes in high school students' perceptions of e-cigarette risks and benefits and confidence in their refusal skills. Future research should apply more rigorous causal designs, such as randomized control trials, and also evaluate long-term changes in adolescents' e-cigarette perceptions and use following participation in the program.

FUNDING: Federal; State; Academic Institution

POS4-79

ASSOCIATION OF URINARY MERCAPTURIC ACID METABOLITES OF VOLATILE ORGANIC COMPOUNDS WITH INFLAMMATORY MARKERS AND GENES IN ELECTRONIC CIGARETTE USERS AND SMOKERS

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Background: Electronic cigarettes (EC) are widely used. Understanding health implications of inhaling e-aerosol volatile organic compounds (VOCs), and their potential health effects, especially for the lung is critically important. Methods: A cross-sectional bronchoscopy study was conducted among 40 never-smokers (NS), 18 EC users, and 26 smokers (SM). We compared 10 mercapturic acid metabolites of VOCs, 3-hydroxycotinine plus cotinine (3-HC+COT), and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) in urine for the three groups. We also examined cell counts, cytokines, and gene expression using bronchoalveolar lavage and brushings in lung. We determined differentially expressed genes pairwise between groups using ANCOVA adjusted for age and gender. A total of 1808 genes differentially expressed across the group comparison at FDR q=0.1 were used for Spearman rank correlation analysis with VOCs. Genes with p-value<0.05 and |correlation| = 0.75 were used to visualize the correlation network using Cytoscape 3.9.1. and for IPA pathway analysis. Results: Nine mercapturic acid metabolites of VOCs (PMA, MHBMA3, MHBMA 1&2, HEMA, CNEMA, 3-HPMA, 2-HPMA, AAMA, HPMMA) were significantly higher among SM compared to NS. Similarly, eight VOCs (PMA, MHBMA3, MHBMA 1&2, HEMA, CNEMA, 3-HPMA, AAMA, HPMMA) were significantly higher in SM as compared to EC, except MMA, and 2-HPMA. In EC users, CNEMA, PMA, and MHBMA 1&2 were significantly correlated with IL-6 (r=0.60, r=0.68, r=0.59), and IL-1ß (r=0.57, r=0.74, r=0.55) respectively. However, in SM, 3-HPMA, and CNEMA were the most correlated VOCs with IL-8 (r=0.87, r=0.85), IL-1ß (r=0.6, r=0.74), and IFN-? (r=-0.69, r=-0.78). In EC users, differentially expressed genes correlated with VOCs were MUCL1 (r=-0.78) and NQO1 (r=-0.76) with AAMA, GPX2 (r=-0.8) with 3-HPMA, and in SM were CYP4F3 with 3-HPMA (r=0.87); MUC2 with HEMA (r=0.76), CNEMA (r=0.80), AAMA (r=0.81); AKR1B10 with 2-HPMA (r=0.77), and 3-HPMA (r=0.76). IPA analysis showed NRF2-Mediated Oxidative Stress Response, an inflammatory pathway, is a common significantly enriched smoking-related canonical pathway in EC users (ABCC1, CBR1, GPX2, GSR, NQO1, SQSTM1) and SM (CYP2F1, FTH1, FTL, GSR, SOD2) respectively. Conclusion: In this cross-sectional bronchoscopy study, we found exposure to VOCs was associated with inflammatory markers and inflammatory response genes in EC users and SM, compared to NS. Urinary VOCs and biological effects in EC users were much less than for SM.

FUNDING: Federal; State; Academic Institution

POS4-80

YOUTH USE OF MENTHOL CIGARETTES AND ACCESSORIES AFTER THE MENTHOL BAN IN ENGLAND AND CANADA, PERCEIVED IMPACTS OF THE BAN, AND IMPLICATIONS FOR HEALTH EQUITY: FINDINGS FROM THE ITC YOUTH SURVEYS

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Significance: Menthol cigarette bans can improve public health but may also result in unintended consequences. This study examined behavioural outcomes of menthol bans implemented in England (May 2020) and Canada (October 2017) among youth smokers, overall and by demographic characteristics. Methods: Cross-sectional weighted data from the ITC Youth Surveys in August 2021 (Wave 5) included youth aged 16-19 in England (N=4316) and Canada (N=4604). Logistic regression models were estimated separately for England and Canada on: (1) perceived impact of the menthol ban on smoking and (2) past 30-day use of different menthol cigarette types (any menthol/capsule cigarettes, 'regular' factory-made (FM) menthol cigarettes, and legal menthol accessories—e.g., cards, filters), adjusting for sex, age, race/ethnicity, and perceived addiction. Results: Among ever-menthol smokers who were aware of the ban in England (37.7%, N=351), 20.8% (95%CI: 16.1-26.5%) reported that they smoke less or stopped smoking because of the ban, with no demographic differences. A minority of smokers reported that they switched to non-menthol cigarettes (9.0%, 6.0-13.2%) or smoked more (3.2%, 1.5-6.6%), while 71.3% reported that their overall smoking did not change because of the ban (65.2-76.7%). Among past 30-day smokers in England (N=715) and Canada (N=419), respectively, 48.9% (44.5-53.2%) and 39.8% (34.7-45.2%) reported past 30-day use of any menthol cigarettes, with 25.4% (21.7-29.6%) and 26.8% (22.2-31.8%) using FM menthol cigarettes, and 32.2% (28.2-36.5%) and 17.5% (13.7-22.1%) using menthol accessories. The odds of using FM menthol cigarettes were greater among Black (44.1%, Adjusted Odds Ratio (AOR)=2.64, p=0.004) and other non-White/multiracial (38.8%, AOR=2.38, p=0.005) than White smokers (22.3%) in England only. For menthol accessory use, odds were greater among Black (52.1%, AOR=2.59, p=0.005) and other non-White/multiracial (43.0%, AOR=2.09, p=0.020) than White smokers (28.9%) in England and greater among Black (38.5%) than White smokers (13.0%) in Canada (AOR=4.27, p=0.003). Conclusions: While youth perceptions that they stopped or smoke less because of the menthol ban in England were more common than switching to non-menthol cigarettes, awareness of the menthol ban was low, and the majority reported no change in smoking. The disproportionate continued use of menthol among Black and other non-White or multiracial youth smokers in England and Canada remains a concern.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS4-81

TOBACCO USE AMONG OLDER ADULTS AGED =65 YEARS—GLOBAL ADULT TOBACCO SURVEY, 18 COUNTRIES, 2015-2020

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Background: Tobacco-related diseases and death are highest among persons aged =65 years. Since quitting is beneficial at any age, understanding the differences in tobacco use among age groups is vital to implementing effective smoking cessation programs to reduce the risk of smoking-related diseases and death. We estimated the prevalence of current tobacco use among older adults aged =65 years from low- and middle-income countries (LMICs) and compared it with those aged 15-64 years. Methods: Recent data from 18 countries that conducted the Global Adult Tobacco Survey between 2015 and 2020 were included in the analysis. Weighted prevalence estimates and 95% confidence intervals (CIs) for current tobacco use among those aged =65 years were calculated for each country overall and by gender. Current tobacco use was defined as smoking tobacco or using smokeless tobacco daily or occasionally during the past 30 days. For each country, we also estimated and compared prevalence ratios by age group (i.e., =65 years vs. 15-64 years) using logistic regression models. Prevalence ratios were considered statistically significant if *P*-value was <0.05. Analyses were conducted in SAS-callable SUDAAN (RTI International, Research Triangle Park, NC). Results: More than 284 million adults aged =65 years reported current tobacco use. The median prevalence of current tobacco use among older adults was 13.8%, ranging from 5.5% (95% CI = 4.1%, 7.5%) in Costa Rica to 63.1% (95% CI = 58.3%, 67.7%) in Bangladesh. Among both men and women, Costa Rica reported the lowest prevalence of current tobacco use at 8.5% (95% CI = 6.1%, 11.7%) for men and 2.9% (95% CI = 1.4%, 5.7%) for women; Bangladesh reported the highest prevalence of current tobacco use at 60.9% (95% CI = 54.3%, 67.0%) and 65.7% (95% CI = 58.9%, 71.8%), respectively. Compared with adults aged 15-64 years, older adults reported a significantly higher prevalence of current tobacco use in 5 of 18 (28%) countries. Conclusion: Prevalence estimates for current tobacco use among older adults varied in the countries included in this analysis. Moreover, in the majority of countries, older adults were not more likely to report higher rates of current tobacco use than those aged 15-64 years. Consistent monitoring of tobacco use indicators among older adults is critical to identifying disparities within this population and advancing health equity.

FUNDING: Unfunded

POS4-82

IMPACT OF E-CIGARETTE USE ON YOUTH AND YOUNG ADULT MARIJUANA USE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Significance: E-cigarette and marijuana use remain prevalent among young people, especially as marijuana use in e-cigarettes (vaping marijuana) has become popular in recent years. Marijuana use among college-aged adults reached a historic high in 2020. A meta-analysis of 21 studies published in 2018 or earlier showed e-cigarette use is effective in increasing risk of subsequent marijuana use among youth and young adults. This study builds upon the prior review including studies since 2018 to estimate the overall effect of the impact that e-cigarette use has on marijuana use. Methods: A systematic review and meta-analysis were conducted in accordance with PRISMA and registered with PROSPERO. We searched PubMed, Embase, and Web of Science from October 1, 2018 to March 15, 2022 using keywords: e-cigarettes, vaping, ENDS, JUUL; marijuana, cannabis, THC; youth, young adults. Preferred subject terms were used where appropriate. The 21 studies from the previous review were also included. Covidence software was used to screen results and abstract data. Inclusion criteria were: studies of the association of e-cigarette use and marijuana use that employed estimates of risk (e.g., odds ratios) that could be compared in a standardized way; studies of youth (12-18 years old) or young adults (18-29 years old); original research; full-text articles; and English language articles. The present analyses included adjusted estimates of risk only (e.g., adjusted for sociodemographic variables, other substance use, and more). Meta-analyses were conducted using the metan command in STATA. Results: 887 unique titles and abstracts were screened, of which, 59 underwent full-text review, and 34 studies were ultimately included. When pooled across 63 adjusted estimates of risk abstracted from 34 studies, e-cigarette use increased risk of marijuana use by 276% (aOR=3.76, 95% CI=3.18-4.45, I^2=95%). Sub-group analyses revealed the pooled effect of e-cigarette use on marijuana use was significantly higher for youth (aOR=4.31; 95% CI=3.64-5.09, I^2=94%) than for young adults (aOR=1.71; 95% CI=1.33-2.20, I^2=73%) and significantly higher for cross-sectional studies (aOR=4.89; 95% CI=4.08-5.86, I^2=93%) versus cohort studies (aOR=2.74; 95% CI=2.25-3.34, I^2=89%). Results were similar by study quality (poor or fair vs. good), study follow-up period (12 vs. >12 months), U.S. vs. non-U.S. samples, effect estimate type (odds vs. risk ratio), type of marijuana use (e.g., combustible vs. vaped), and behavioral measure of marijuana use (e.g., ever vs. past 30-day use), although all findings were significant. Conclusion: Findings from 34 studies show e-cigarette use is effective in increasing risk of marijuana use. Greater health messaging, interventions, and federal restrictions that address e-cigarette use can help limit the drastic rise in marijuana use, especially vaping marijuana in this population.

FUNDING: Federal

POS4-83

ADOLESCENT AND PARENT PRIORITIES FOR VAPING AND E-CIGARETTE EDUCATION: A DYADIC STUDY

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Significance: Although e-cigarettes continue to be the most prevalent tobacco product used by adolescents, the role of parents in addressing adolescent vaping has been rarely examined. Parents are well-educated of the dangers of smoking and have been previously successful in prevention of adolescent smoking. This study aims to characterize preferences and priorities of adolescent-parent dyads in health education on vaping and e-cigarette use. Methods: Investigators conducted separate semi-structured interviews with adolescents aged 11-18 (n=30) and their parents (n=30). Participants were also given a questionnaire to complete. Adolescent-parent dyads were recruited from university-affiliated email listservs in March 2022. Data collection was conducted via Zoom video conferencing. Interviews were recorded, transcribed verbatim, and analyzed using thematic and content analysis inductively and deductively via NVivo software. Questionnaire responses were analyzed using descriptive statistics. Results: Adolescent participants' mean age was 13.2 years old (SD 1.5), 76.7% were middle schoolers, 51.6% were female, 66.7% were white, and 20% were black or African American. Parent participants were 83.3% female, 84.4% white, and 100% college educated. Most adolescents and parents were aware of the problem of adolescent vaping and the negative effects of vaping on developing lungs and brains. However, parents perceived that they lacked sufficient knowledge on vaping and desired to learn more about a variety of topics, such as parenting strategies, e-cigarette regulations, and harm reduction. Many adolescents had learned about vaping in school, but most did not retain information about vaping and were interested in additional approaches, such as short videos and learning directly from a healthcare professional. Some topics adolescents wanted to learn more about included more information on vaping health risks and how to quit vaping. Although

adolescents and their parents had limited conversations about vaping, both stakeholders agreed that parental influence and communication would have a mostly positive impact on prevention of adolescent vaping. Conclusions: Our results highlight priorities in content and preferences of platform for vaping and e-cigarette education targeted towards adolescents and parents. Future research will integrate their perspectives into development and implementation of a stakeholder-tailored educational intervention for adolescent vaping prevention.

FUNDING: Academic Institution

POS4-84

THE IMPACT OF SHISHA FLAVORANTS ON THE OXIDATIVE POTENTIAL AND PHYSICO-CHEMICAL CHARACTERISTICS OF WATERPIPE TOBACCO SMOKE

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Significance: Hookah is growing in popularity across the world, and Waterpipe Tobacco Smoke (WTS) is associated with many health risks, such as cardiovascular disease and cancer. Flavored shisha attracts young smokers, but there are limited studies on flavorants in WTS. Studies of flavorants in e-cigarette liquid have found that the toxicity and concentration of reactive oxygen species (ROS) is higher for smoke generated from flavored liquid compared to unflavored. ROS are capable of damaging cellular molecules due to their high reactivity or oxidative potential (OP). OP can be quantified using cellular or acellular assays. We compare the relative OP of WTS from four different shisha flavors as measured by acellular and cellular assays and evaluate the possible contributions of the physico-chemical properties of WTS to the measured oxidative potential and cellular toxicity of the smoke. Methods: Waterpipe tobacco smoke was generated using an electronic smoking apparatus. Particles and gas phase compounds were collected using filters and impingers, respectively. Samples were extracted and analyzed using DTT and DCFH acellular assays. Type II pneumocytes were exposed to WTS at the air-liquid interface and viability determined using the NRU and LDA cellular assays. The particle concentration and size distributions were analyzed using a TSI Engine Exhaust Particle Sizer. Particle and gas phase composition was measured using Liquid Chromatography Time of Flight Mass Spectrometry and Gas Chromatography Triple Quadrupole Mass Spectrometry, respectively. Results: The WTS generated from flavored shisha displayed higher oxidative potential than that from unflavored shisha and the humectant control. The results from the two acellular assays, however, do not show agreement. Furthermore, neither assay predicts the cellular assay results. Flavor differentiating compounds were observed in both the particle and gas phases of WTS. Differences in the particle concentration and size distribution were observed within the first 30 puffs of a smoking session for smoke generated from different flavors. Conclusions: Acellular assays can not be used as proxies to predict the relative toxicity of waterpipe tobacco smoke generated using different flavors of shisha. The physico-chemical properties of waterpipe tobacco smoke can help explain observed differences in assay sensitivity and relative observed differences in oxidative potential.

FUNDING: Academic Institution

POS4-85

IMPACT OF E-CIGARETTE USE ON YOUTH AND YOUNG ADULT CIGARETTE USE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Significance: Studies show e-cigarette use is implicated in the EVALI (e-cigarette or vaping associated lung injury) crisis and as a gateway to cigarette and other combustible tobacco use among young people. Two meta-analyses, one of 9 studies published in 2017 or earlier and one of 17 studies published in 2018 or earlier, showed e-cigarette use is effective in increasing risk of subsequent cigarette use among youth and young adults. This study builds upon the prior reviews including studies since 2018 to estimate the overall effect of the impact that e-cigarette use has on cigarette use. Methods: A systematic review and meta-analysis were conducted in accordance with PRISMA and registered with PROSPERO. We searched PubMed, Embase, and Web of Science from January 1, 2018 to March 1, 2022 using keywords: e-cigarettes, vaping, ENDS, JUUL; tobacco, cigarette; youth, young adults. Preferred subject terms were used where appropriate. The 26 studies from previous reviews were also included. Covidence software was used to screen results and abstract data. Inclusion criteria were: studies of the association of e-cigarette use and cigarette use that employed estimates of risk (e.g., odds ratios) that could be compared in a standardized way; studies of youth (12-18 years old) or young adults (18-29 years old); original research; full-text articles, and English language articles. The present analyses included adjusted estimates of risk only (e.g., adjusted for sociodemographic variables, other substance use, and more). Meta-analyses were conducted using the metan command in STATA. Results: 4187 unique titles and abstracts were screened, of which, 222 underwent full-text review, and 53 studies were ultimately included. When pooled across 115 adjusted estimates of risk abstracted from 53 studies, e-cigarette use increased risk of cigarette use by 159% (aOR=2.59, 95% CI=2.33-2.89, I^2=94%). Sub-group analyses revealed results were similar for youth vs. young adult samples, cross-sectional vs. cohort studies, studies of poor or fair vs. good quality, study follow-up period (e.g., <12 months vs. 12 months), U.S. vs. non-U.S. samples, effect estimate type (odds ratio vs. risk ratio vs. hazard ratio), and behavior measures of cigarette use (e.g., ever vs. past 30-day use), although all findings were significant. The pooled effect of e-cigarette use on dual or poly-use of cigarettes plus other combustible tobacco (primarily cigars and/or hookah) was significantly higher (aOR=5.48; 95% CI=4.09-7.35, I^2=76%) than that on cigarette use alone (aOR=2.43; 95% CI=2.19-2.70, I^2=93%). Conclusion: Findings from 53 studies show e-cigarette use is effective in increasing risk of cigarette and other combustible tobacco use. Greater health messaging, interventions, and federal restrictions that address e-cigarette use among young people can help limit combustible tobacco use in this population.

FUNDING: Federal

POS4-86

CROFT E-LIQUID FLAVOR DATABASE: A SEARCHABLE INTERFACE FOR E-CIGARETTE USERS, SCIENTISTS AND REGULATORS

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Significance: Flavoring constituents in e-cigarette liquids are not disclosed by manufacturers and require costly techniques to ascertain. As a result, accessibility to understand ingredient formulations is limited among researchers and the public. We developed an easily searchable database for e-cigarette users, scientists, and regulators which categorizes numerous commercial e-cigarette products and liquids. The database also includes information about concentrations of 20 flavoring chemicals commonly used in e-cigarette products. Methods: Procurement of commercial flavored liquids were mostly collected from vapers or purchased online or in vape shops between 2018 and 2022. All liquids were prepared for identification of flavoring additives and quantification of twenty commonly used flavoring chemicals was performed using an Agilent 7890B/7250 GC/Q-TOF. Data was organized by compound ID (CAS number), Flavor Category following a published flavor wheel (e.g., Tobacco, Dessert) and by product brand (e.g., Blu) into an online and publicly available database. Results: Data from over 1000 commercial liquids spanning 11 flavor categories are available in the database. Several focused searches are featured on the homepage, providing ease-of-use for users, and include by compound, Chemical Abstract Service (CAS), flavor category and brand. Upon selecting the preferred search option, additional functions are offered to help users narrow the data further. For example, after selecting a compound search, data can be filtered to a single flavoring compound, flavor category, specific flavor and/or brand. Graphical charts and pivots tables are available for comprehensible visualization of filtered results. Exportation from the database is supported by either CSV or PDF and offers users additional opportunities to explore the data outside of our database. Conclusion: The database presents a useful and convenient tool to understand key ingredients found in numerous flavored e-cigarette liquids. Our online platform is accessible free-of-charge and has several customizable search functions allowing filtering of search results. The database design also allows continuous and frequent updates to ensure new product data is readily available.

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POS4-87

EXPOSURE TO IQOS ADS AND REDUCED EXPOSURE CLAIMS AND EFFECTS ON USE INTENTIONS: RESULTS FROM A WEB-BASED SURVEY

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Significance: Heated Tobacco Products (HTPs) are fairly new to the United States (US) market, receiving marketing authorization in 2019. Further, in July 2020 it was permitted to be marketed with reduced exposure claims. In an ongoing COVID-19 pandemic, there might be an increased sensitivity to reduced exposure claims leading to increased interest in the product. The study aims at assessing perceptions and intentions in response

to IQOS ads with and without claims and association with COVID-19 risk perceptions. Methods: 604 smokers and non-smokers, aged 18-45 years were recruited online via Mturk (n=302), and Prime panels (n=302). Participants were randomly exposed to one of the six IQOS ads (Ad only, Ad + Health warning, Ad + claim 1, Ad + claim 2, Ad + Health warning + claim 1, Ad + Health warning + claim 2). They answered questions about ad believability, product appeal and interest in trying and purchasing IQOS. COVID-19 risk perceptions and perceived health risk from tobacco products were also assessed. Data were analyzed using SPSS. Results: Approximately 66% of sample was ever smokers and 31% reported smoking every day. No significant differences for likelihood to try or purchase IQOS were observed between different ad groups. Never and Former smokers reported significantly greater product appeal ($F(df) = 44.68(3)$, $p<0.01$) and likelihood to try ($F(df) = 89.06(3)$, $p<0.01$) and purchase ($F(df) = 98.26(3)$, $p<0.01$) compared with current every day and someday smokers. A greater product appeal was significantly associated with higher likelihood of trying (OR= 10.17, 95% CI: 5.9-17.6) and purchasing IQOS (OR= 11.01, 95% CI: 6.07-20.0) compared with low appeal. Those less worried about contracting COVID reported greater likelihood of trying ($F(df) = 7.72(1)$, $p<0.01$) and purchasing IQOS ($F(df) = 22.43(1)$, $p<0.01$). Most of the participants did not have a prior knowledge or experience with using HTPs. Conclusion: IQOS reduced exposure claims did not show a significant association with higher intentions to try or purchase, but may increase product appeal. IQOS may have a higher appeal for never users of tobacco or former smokers compared with current smokers. This may increase its abuse liability. Self-risk perceptions associated with COVID-19 may increase interest in trying reduced harm alternatives. Findings from this study may have implications for regulation of IQOS in the future when they are more easily accessible in US.

FUNDING: Academic Institution

POS4-88

NICOTINE DELIVERY OF A HEAT NOT BURN TOBACCO PRODUCT DURING ACTIVE USE

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Introduction: IQOS, a heat not burn tobacco product, was authorized by the United States Food and Drug Administration (US FDA) as a modified risk tobacco product. While IQOS exposes users to fewer toxicants than cigarettes, it is not known whether current cigarette smokers find this product to be an acceptable alternative. To evaluate this, we conducted a pharmacokinetic study evaluating the nicotine delivery and subjective effects of IQOS use among current smokers naïve to IQOS use. Methods: Participants were adult (21+ years) current smokers of at least 5 cigarettes per day. Participants abstained from nicotine use overnight (14 hours), confirmed with an exhaled carbon monoxide (CO) <15ppm. An intravenous IV was placed and a baseline blood sample was collected. Then, participants were provided with an IQOS device and heatstick (flavor matched to cigarettes) and were asked to take a puff every 20 seconds for a total of 14 puffs (4 minutes, 20 seconds). Blood samples were collected at 1, 2, 4, 6, 8, 10, 12 and 15 minutes after the first puff. After use, participants completed a modified version of the Product Evaluation Scale adapted for IQOS. Response options for each question included not at all, very little, a little, moderately, a lot, quite a lot, extremely. Means and frequencies were used to describe the sample and outcomes. Nicotine boost was calculated by subtracting the baseline plasma nicotine level from the concentration maximum. Results: Participants (n=8) were a mean age of 43.9 years, 63% female, 88% White, and they smoked a mean of 17.1 cigarettes per day. All reported use of menthol cigarettes. At baseline, after abstaining, the mean CO was 9.5ppm (range 5-14ppm) and the plasma nicotine level was 1.29 ng/ml (range of 0.73-2.34 ng/ml), confirming abstinence. After IQOS use, the mean nicotine boost obtained was 15.74 ng/mL (SD=7.16), with a range from 7.96 to 30.55ng/ml. The mean time to maximal concentration (tmax) was 5.25 minutes. Most participants reported enjoying use of the product (75% rated a lot or greater) and half reported that use relieved their withdrawal cravings (a lot or greater). The majority of participants reported no side effects (87.5%). Conclusion: In our study, we found that IQOS delivered nicotine similarly to a cigarette. The majority of participants enjoyed use of the product and reported no side effects. IQOS has the potential to serve as a less harmful alternative for cigarettes.

FUNDING: Academic Institution

POS4-89

NICOTINE DEPENDENCE ACROSS DAYS AND ITS VAPING-RELATED CORRELATES AMONG A NATIONAL SAMPLE OF YOUND ADULTS WHO VAPE

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Background: Nicotine vaping has increased among young adults, and nicotine dependence prevalence has increased among youth who vape. Yet no research has considered day-to-day nicotine dependence, as previous research has focused almost exclusively on retrospective, past 30-day measures. Daily correlates consisting of reasons for vaping, social and physical contexts, and flavors and devices could be potential intervention targets, but research is critically needed to identify the immediate factors related to nicotine dependence symptom (NDS) days among young adults who vape. Methods: We assessed daily data that came from the Monitoring the Future (MTF) Vaping Supplement (total study N=1,244). Out of 1,244 total participants, we conducted analyses on the 150 who vaped at least once during 14 daily surveys. Regression analyses assessed the associations between aggregated vaping-related measures (reasons for use, locations, social contexts, devices, flavors, nicotine concentration, and dual product use) and percent of NDS days. Results: NDS were reported on 53.5% of vaping days. More frequent vaping to quit cigarettes, to relax, because of boredom, or being hooked; vaping at home, in a car, alone; use of a pod or mod device; and use of high nicotine concentration were associated with more frequent NDS days. Findings for flavors were mixed. Conclusions: Identifying why, how, and where young adults vape and which immediate, daily factors confer risk can indicate possible targets for prevention efforts to reduce vaping-related harm and treat nicotine dependence among young adults who vape.

FUNDING: Federal

POS4-90

SEXUAL IDENTITY DIFFERENCES IN PERCEIVED HARMFULNESS OF MODIFIED RISK TOBACCO PRODUCTS AMONG WOMEN IN THE PATH STUDY, WAVE 5

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Significance: Sexual minority women (SMW; e.g., those identifying as lesbian/gay, or bisexual) continue to smoke cigarettes at higher rates than heterosexual women. There also exist important subgroup differences in cigarette use, with for instance, bisexual women smoking at higher rates than both lesbian/gay and heterosexual women. The FDA has authorized low nicotine cigarettes (LNCs) and snus as modified risk tobacco products (MRTPs; i.e., products conferring fewer health risks than traditional cigarettes), and e-cigarettes have also been marketed as MRTPs. Prior evidence links lower harm perceptions of MRTPs with product use intentions. However, little is known about how SMW perceive MRTPs or if there are subgroup differences in harm perceptions. Methods: Data were from the Population Assessment of Tobacco and Health survey, Wave 5 (2018-2019). Using multinomial logit models, differences in the perceived harm of LNCs, e-cigarettes, and snus (vs. combustible cigarettes) were compared between women identifying as heterosexual, lesbian/gay, bisexual, and something else. Analyses controlled for sociodemographic characteristics and lifetime cigarette use. Results: Bisexual women had increased odds (vs. heterosexual women) of perceiving LNCs (OR=1.36, 95% CI=1.06-1.76), e-cigarettes (OR=1.71, 95% CI=1.32-2.20), and snus (OR=1.49, 95% CI=1.02-2.20) as less harmful than cigarettes. Women identifying as "something else" had increased odds (vs. heterosexual women) of perceiving e-cigarettes as less harmful than cigarettes (OR=2.27, 95% CI=1.39-3.72). No differences in harm perceptions were noted between lesbian/gay and heterosexual women. Conclusion: Compared to heterosexual women, bisexual women perceived MRTPs as being less harmful than cigarettes. These differences may be leveraged to lower cigarette use among bisexual women, who smoke at higher rates than both heterosexual women and other SMW subgroups. Conversely, the absence of differences noted between lesbian/gay and heterosexual women suggests a potential missed opportunity in tobacco use harm reduction efforts. Understanding how SMW view products currently or potentially authorized as MRTPs can inform regulation and public education messaging about these products. Future research is needed to identify how SMW interpret "reduced harm" messaging, and their reasons for using MRTPs (e.g., reduced addictiveness or physical harms, rate reduction, cessation).

FUNDING: Federal

POS4-91

HYPOTHETICAL PURCHASING OF TOBACCO AND MENTHOL IQOS FOLLOWING LABORATORY SAMPLING

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Background: The most recent heated tobacco product (HTP), IQOS, contains nicotine, the addictive component in tobacco that is present in HTPs at levels similar to cigarettes. Thus, use of HTPs has significant potential for the development of addiction. Methods: In this within-subjects experimental design, menthol (n=39) and tobacco (n=26) cigarette smokers, naïve to HTPs, =18 years of age, and smoking =5 cigarettes per day, sampled 'smooth menthol' and 'tobacco' flavored IQOS in the laboratory. Then they were endowed with an account balance based on weekly tobacco consumption and completed two counterbalanced Experimental Tobacco Marketplace sessions: one with 'tobacco' flavored IQOS and another with 'smooth menthol' IQOS. Results: Participants were 48% female, 70% White, 85% non-Hispanic with an average age of 49.5 years. Average account balance was $49.48. Results show no difference between purchasing of 'smooth menthol' and 'tobacco' IQOS for the entire sample, but when broken down by preferred cigarette status, we found that non-menthol cigarette smokers purchased significantly more IQOS when 'tobacco' flavor IQOS was available (Q_0=117.2, a=.01, F (6,11)=9.81, p<.0001). Substitution profiles show no effect of price, indicating that no product was a substitute for 'smooth menthol' or 'tobacco IQOS'. There was, however, a main effect of product for both conditions (tobacco: F(10, 703)=10.80, p<.0001; menthol: F(10, 703=13.35, p<.0001). Cigarettes, both menthol and tobacco, were purchased significantly more than any other constant-priced product present in the ETM. Conclusions: Current smokers will purchase IQOS following sampling. Non-menthol smokers purchased more in the tobacco IQOS availability condition. Cigarettes didn't function as a substitute for IQOS because of a large amount of purchasing across all IQOS price conditions. Nevertheless, smokers will purchase costly cigarettes even when HTP prices are low, suggesting that dual use may be common in smokers who decide to try IQOS. Statement of CTP relevance: CTP is concerned with the addictive potential of a product and how its availability on the market influences use of other products. Our research demonstrates that current smokers will purchase IQOS following sampling, indicating some addictive potential, but also continue to purchase cigarettes even when IQOS prices are low.

FUNDING: Federal

POS4-92

"WHILE I AM HIGH, I USE THE NICOTINE": HOW AND WHY YOUNG ADULTS ARE CO-USING TOBACCO AND CANNABIS - A QUALITATIVE STUDY

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Significance: Co-use of tobacco and cannabis among young adults (18-29 years old) is a complex behavior with heterogeneous patterns of co-use across individuals (e.g., co-use on the same occasion vs. on different occasions, co-use of combustible products vs. co-use of vaporized products). In addition to these patterns, little is known about the underlying contexts and reasons for patterns of tobacco and cannabis co-use among young adults. This study aimed to elucidate these factors. Methods: We conducted a qualitative study with 30 young adults (M_{age}=22years old, 32% female, 17% NH White) in California during 2017-2019. Thematic analysis was used to identify prominent reasons for different co-use patterns. Results: Young adults reported various patterns of tobacco and cannabis co-use with respect to products and timeframes. Participants used multiple combinations of products, including simultaneously smoking both tobacco and cannabis via spliff and blunt as well as alternatively vaping both substances in vaporizers. Regarding timeframes, participants reported co-use both at the same time (i.e., co-use on the same occasion) and at different times during a day (i.e., co-use on different occasions, such as using tobacco in the daytime and cannabis in the nighttime). For co-use on the same occasion, participants reported sub-patterns, including simultaneous co-use (i.e., mixing tobacco and cannabis) and sequential co-use (i.e., using cannabis right after tobacco, or using tobacco right after cannabis). Common reasons for all co-use patterns were Socialization (e.g., being with friends), Availability of tobacco/cannabis products, and Dealing with stress/anxiety. Unique reasons for co-use on the same-occasion were Leveling off the intense effect of cannabis, Getting stronger or combined effects from both substances, and Behavioral cues and habit/addiction. Unique reasons for co-use on different occasions were Satisfying different urges and feelings (e.g., using tobacco for waking up, using cannabis for sleep aid), and Substitution effects (e.g., using cannabis to reduce tobacco use or when tobacco is unavailable). Conclusion: Future research should measure and address the specific timeframes and products used in tobacco and cannabis co-use. Prevention and intervention efforts should target the unique motivations and reasons underlying different patterns of co-use to curb use among young people.

FUNDING: Federal; State

POS4-93

CONTAMINATION OF SURFACES IN CHILDREN'S HOMES WITH THE POTENT CARCINOGENIC TOBACCO-SPECIFIC NITROSAMINE NNK

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Significance: Tobacco smoke exposure (TSE) through secondhand and thirdhand smoke is a modifiable risk factor that contributes greatly to childhood morbidity. Limited research has assessed surface TSE pollution in children's environments as a potential source of thirdhand smoke exposure, and none has examined levels of the carcinogenic tobacco-specific nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) on surfaces. This study assessed surface NNK and its associations with child characteristics including sociodemographics and self-reported TSE patterns. We also assessed the correlations of surface NNK with surface nicotine, dust nicotine, and dust NNK. Methods: Data from 84 nonsmoking children who lived with smokers and had home surface wipe NNK and nicotine data available were analyzed. Environmental markers were log-transformed to address skewed distributions, and simple linear regression analyses were conducted to assess the associations of surface NNK with child characteristics. Spearman's correlations were used to assess the strength of associations between surface NNK and the other environmental markers. Results: Child mean (SD) age was 8.0 (3.9) years, and 52% were female. The majority of children were Black (66%), of non-Hispanic origin (98%), and had a family income =$15,000 (70%). Nearly half (49%) of children's home surfaces had detectable NNK and 100% had detectable nicotine. The respective geometric means (GeoMs) of surface NNK and nicotine levels were 14.0 ng/m^2 and 16.4 µg/m^2. Surface NNK positively correlated with surface nicotine (?=0.54, p<0.001) and dust NNK (?=0.30, p=0.020). Children with an income =$15,000 had higher surface NNK levels (GeoM=18.7 ng/m^2, p=0.017) compared to children with an income >$15,000 (GeoM=7.1 ng/m^2). Children without a home smoking ban had higher surface NNK levels (GeoM=18.1 ng/m^2, p=0.056) compared to children with a home smoking ban (GeoM=7.5 ng/m^2), although not statistically significant. Conclusion: This is the first study to show that the potent carcinogenic tobacco-specific nitrosamine NNK was detectable in nearly half of surfaces in children's homes, with the highest levels found in lower income homes. Surface NNK was positively correlated with surface nicotine and NNK found in dust. Detectable surface NNK levels were found in those with home smoking bans, suggesting that children can be exposed to NNK found on surfaces and in dust despite implementation of these protective measures.

FUNDING: Federal; State

POS4-94

E-CIGARETTE USE INCREASES MUTAGENICITY AMONG VAPING POPULATION IN OKLAHOMA

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Significance: Electronic cigarettes are a potential tool for smoking cessation and harm reduction, but also open a gateway for the young vaping population to smoke. Data suggest electronic cigarette use causes inflammation, oxidative stress, DNA damage, respiratory disease, and urine excretion of hazardous and potentially hazardous compounds. No study has reported the effect of electronic cigarettes on urine mutagenicity in the real-life vaping population. In the present study, we aimed to assess the potential mutagenicity present in vaper's urine. Methods: Upon ethical committee approval, 12 exclusive vapers and 10 non-vapers were recruited for this study. Exhaled carbon monoxide (CO) was checked and those CO =6 were excluded from the study. Salivary cotinine was quantified by ELISA (Salimetrics). Urine was extracted using the Amberlite XAD-2 column (Millipore-Sigma) and mutagenicity was assessed using the Ames Modified ISO Bacterial Strain Kit (EBPI). Results: Exhaled carbon monoxide confirmed all the participants were absent from smoking. Salivary cotinine levels were 11 ±14 ng/mL in non-vaper and 812±320 ng/mL in vapers. The urine of 5 out of 12 vapers, contained

compounds that caused mutations in the TA100 bacterial strain. In contrast, only 1 out of 10 non-vaper samples induced mutagenicity in TA100. Conclusion: Our data reveal for the first time, that e-cigarette use increases the mutagenicity among vapers compared to the non-vaping populations. Further studies are warranted to fully understand the impact of e-cigarette use and its health implications.

FUNDING: Federal; State

POS4-95

NICOTINE DEPENDENCE AMONG MIDDLE AND HIGH SCHOOL STUDENTS IN THE UNITED STATES FROM 2014 TO 2020: IMPACT OF THE "JUUL ERA"

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Background: In 2020, nearly 1.3M youth used e-cigarettes on 20 or more days per month (i.e., frequent use). Brands like JUUL and Vuse increase the risk of frequent e-cigarette use. We characterize national trends in frequent e-cigarette use among adolescents from 2014 to 2020, accounting for the rise in JUUL use in 2017. Methods: We analyzed seven years (2014-2020) of NYTS data. Participants were middle and high school students who reported exclusive e-cigarette use (n=8,200) or dual/poly e-cigarette use (n=7,200). Self-reported outcomes were frequent e-cigarette use and symptoms of nicotine dependence. We applied weighted, multivariate logistic regression to compare trends in e-cigarette use frequency pre- and post-2017 across exclusive and dual/poly e-cigarette users. Analyses controlled for sex, grade level, and race/ethnicity. Results: Trends in nicotine cravings (p=0.461) and frequent e-cigarette use (p=0.471) did not differ between exclusive and dual/poly e-cigarette users from 2014 to 2016. Nicotine cravings (aOR: 2.06; p=0.009) and frequent e-cigarette use (aOR: 1.75; p=0.017) increased among dual/poly users but not exclusive e-cigarette users in 2017. From 2018 to 2020, frequent e-cigarette use odds increased approximately 10% more per year (aOR: 1.10; p=0.023) among exclusive e-cigarette users, relative to dual/poly e-cigarette users. Conclusion: Frequent e-cigarette use increased among exclusive and dual/poly e-cigarette users following 2017, though patterns of these increases differed by group. Overall, frequent e-cigarette use and nicotine dependence grew disproportionately among adolescent exclusive e-cigarette users during the "JUUL era." Implications: The rise in JUUL initially observed significant growth in frequent e-cigarette use among dual/poly e-cigarette users. Unfortunately, the "JUUL era" also corresponded with significant growth in frequent e-cigarette use among youth who did not use any other form(s) of tobacco (e.g., cigarettes). Youth-focused prevention and cessation interventions are critically needed to address the increase in behavioral indicators of nicotine dependence among adolescent e-cigarette users.

FUNDING: Other

POS4-96

DIFFERENCES IN THE IMPACT OF CIGARETTE PRICES ON SMOKING BEHAVIORS ACROSS INCOME GROUPS AMONG US ADULTS

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Significance: Raising cigarette prices through increased taxes is a highly effective tool for curbing smoking behaviors; however, in the U.S., questions remain whether low-income people are relatively more price-responsive. This study compared the price-responsiveness of smoking participation and intensity across U.S. income groups. Methods: Pooling the 2015/16 and 2018/19 Tobacco Use Supplement to the Current Population Survey data, we identified 298,630 respondents aged 18+ and classified them into quartile groups: poor (<150% of the federal poverty level (FPL)), low- (150-299% FPL), middle- (300-529% FPL), and high-income (=530% FPL) adults. We used a two-part econometric model of cigarette demand to estimate the price-responsiveness of smoking participation among adults and smoking intensity (average number of cigarettes smoked per day (CPD)) among current smokers for each income group. Cigarette price data were obtained from the Tax Burden on Tobacco Report. Additional covariates included sociodemographic characteristics, state-level clean indoor air law coverage and unemployment rate, and secular variation. Results: Smoking prevalence among the poor, low-, middle-, and high-income groups was 18.7%, 13.7%, 10.9% and 6.4%, respectively. CPD ranged from 11.5 cigarettes for high-income smokers to 12.2 for poor smokers. Price elasticity of smoking participation was statistically significant for poor, low-, and middle-income adults at -0.40, -0.29, and -0.18 but not significant for high-income adults (-0.16, P=.13). Price elasticity of smoking intensity was statistically significant, ranging from 0.18, -0.34, -0.34, and -0.25 for lowest-to-highest quartile smokers. While the poorest had the greatest price elasticity of smoking participation, the difference was statistically significant only relative to middle- (P<.01) and high-income adults (P<.01) but not to low-income adults (P<.14). While the poorest had the smallest price elasticity of smoking intensity, the difference was not statistically significant relative to any higher income group. Conclusions: While adults living in poverty were as price-responsive as other income groups in terms of reducing smoking intensity, this population was significantly more price-responsive in reducing smoking participation relative to middle- and high-income groups. This result suggests that policies that increase cigarette prices, e.g., taxation, are effective in reducing smoking disparities for those living in poverty.

FUNDING: State

POS4-97

AFRICAN AMERICAN TAILORED TOBACCO CESSATION RESOURCES: A QUALITATIVE ASSESSMENT OF NEED AND AVAILABILITY

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Significance: Minority tailored tobacco cessation resources are specialized tools aimed to support cessation amongst those of particular racial/ethnic groups, considering differing barriers to cessation based on social, environmental, economic, and cultural factors. Tailoring is beneficial in cessation with minority tobacco users. Tobacco-related illness is the leading cause of death among African Americans (AAs), who try to quit tobacco at higher rates than others but are less successful because they use fewer cessation resources. The present study evaluated the need for and availability of AA tailored information and cessation resources offered by North American Quitline Consortium (NAQC) Quitlines / Quitsites. Methods: The approach triangulated 3 data sources: 1) AA tailored resources from Quitlines and Quitsites associated with NAQC; 2) Self-reported need for smoking, vaping and cessation information from surveyed AA youth and young adults (n=181); and 3) semi-structured interviews with four Quit Coaches to assess availability and need for AA tailored information. Interviews were analyzed via open coding to identify emerging themes. Results: The audit of 47 NAQC websites supported findings from Quit Coach interviews, with 65%-85% of Quitsites not meeting the AA tailored resources inclusion criteria for any single category and 47% not meeting any criteria, suggesting an extensive lack of AA materials across most Quitsites. Interviews suggested that current non-tailored materials given to AAs are ineffective. While they think an increase in AA tailored cessation materials could be beneficial, these are unavailable due to funding and few developed materials in existence and/or provided by their Quitline. While the AA youth surveyed reflected mostly accurate knowledge of vaping and smoking, 60% or fewer had these issues addressed with their doctors. Conclusion: The study suppositions were supported by the three sources of data (current survey data, an audit of NAQC website content, and Quit Coach interviews) establishing both the need for and increased availability of AA tailored smoking resources for tobacco cessation. To address disparities in available resources, future studies should continue exploring these and other data sources to examine inequities, while also analyzing the best types of AA tailored resources/materials for better health outcomes.

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POS4-98

PREVALENCE OF MARIJUANA USE AND CO-USE AMONG TOBACCO PRODUCT USERS IN OKLAHOMA CITY METROPOLITAN POPULATION

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Significance: Tobacco smoking remains the world's largest health problem and is implicated as a gateway to cannabis use. Together, cannabis and tobacco are the most used drugs around the world. In 2019, among young adults aged 18-25, the marijuana users increased from 29.8% to 35.4% of the US population. Though, tobacco use has decreased in the past 25 years, the co-use of tobacco and cannabis increases toxicant exposure, cancer risk, and other negative health effects. In recent years, e-cigarette use also increased significantly. Yet, there is limited knowledge about the frequency of co-use of cannabis and e-cigarette, and the corresponding health effects. Aim: 1. To estimate the prevalence of marijuana/cannabis use among young adults in Okla-

homa metropolitan population. 2. To characterize the frequency and form of cannabis use among tobacco and non-tobacco product users. Methods: Upon ethical approval participants were enrolled via secured online survey. Based on the answers, they were classified as non-smokers/non-vapers (NS/NV), exclusive smokers (S), dual users of combustible cigarette and e-cigarettes (DU), and exclusive e-cigarette users (EC). Participants reported on whether they use marijuana in the past 3 months. Data were analyzed using independent t-test, ANOVA and Chi-square test. Results: 1018 participants were included for the study, of whom there were 194 (NS/NV), 165 (S), 472 (EC), and 186 (DU). Exclusive smokers (29±4 years) were significantly older than all other groups (22±4 years). The lowest prevalence of marijuana use was among non-tobacco product users (29%) and the highest was among EC users (70%). The most prevalent forms of cannabis use were smoking (88%), vaping (72%), and edibles (54%). The highest prevalence of blunts use was 42% among dual users. Conclusion: Our preliminary data shows that over 25% of non-users of tobacco products reported using marijuana. EC users had the highest prevalence of marijuana use followed by dual users and smokers. The highest prevalence of cannabis use was in the form of smoke among the surveyed population. These findings may inform the development of more effective measures to reduce the risks of substance abuse.

FUNDING: Federal; State; Academic Institution

POS4-99

FACTORS ASSOCIATED WITH E-CIGARETTE USE AMONG YOUTHS IN MALDIVES

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Background: Tobacco use has been on rise, especially among youths in the Maldives, with the prevalence of tobacco use increasing from 5.9% in 2007 to 45.7% in 2019 (GYTS, 2019). Both smoke and non-smoke tobacco consumption have increased during this period. A staggering proportion of students (23.7% students) who had smoked cigarettes ever, in fact, had tried their first cigarette before the age of 10 years (GYTS, 2019). Emerging tobacco products, especially e-cigarettes, are playing a significant role. Restricting tobacco products during adolesce is particularly important. Unfortunately, there have been limited studies on this issue in the Maldives as well as in South Asia regarding what factors contribute to using e-cigarettes. This study intends to understand the determinants of e-cigarette use among youths of Maldives. Data and methodology: The study uses Global Youth Tobacco Survey data of 2019 conducted in the Maldives. The study uses two dependent variables to understand the factors associated with e-cigarette use: i) whether the respondents have knowledge (heard about) about e-cigarettes, and ii) how many days they tried e-cigarettes. Along with common demographic controls, this study uses affordability (money they have for any purpose use), access to anti-tobacco information, social relationships (whether friends are important in their decision), and whether family members consume tobacco at home as independent variables. Preliminary findings: This study finds that male has a higher chance of hearing about e-cigarettes, and male also consumes e-cigarettes more compared to their female cohorts. Relatively older youths tend to know about e-cig as well as consume more. In addition, those who have tried smoking tobacco before consume more e-cigarettes. The same findings are observed for those who have tried non-smoke tobacco before. Those who have seen their family members smoke at home are more likely to consume more e-cigarettes. The youths who have more money at their disposal for any-purpose use consume more e-cigarettes. Surprisingly those who have seen any anti-tobacco campaigns do not seem to be effective in reducing the consumption of e-cigarettes. Conclusion: Since the increase in e-cigarette use among youths in Maldives is significant, it is important to determine what variables are associated with e-cigarette use to address the problems better. The study finds that males, older, with more money at hand, do consume more e-cigarettes. The anti-tobacco campaign does not play a significant role when controlled for other variables. Hence, a targeted approach is necessary to combat rising tobacco use among youths.

FUNDING: Unfunded; Other

POS4-100

ELECTRONIC CIGARETTES AND COUNSELING AS A HARM REDUCTION STRATEGY AMONG PATIENTS WITH COPD, ASTHMA, CAD/PAD

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Significance: Individual behavioral counseling for smoking cessation is an effective method for those with behavioral dependence. By addressing nicotine and behavioral dependence, electronic cigarettes (EC) and counseling can help smokers reduce harm from combustible cigarettes (CC). The purpose of this pilot study is to identify how counseling impacts EC use and reduction in cigarettes per day (CPD). Methods: We used data from an ongoing pilot randomized controlled trial of participants who completed the 12-week intervention (n=54). Patients with Chronic Obstructive Pulmonary Disorder (COPD), asthma, and/or Coronary Artery Disease/Peripheral Artery Disease (CAD/PAD) who currently smoke were randomized in a 1:1 ratio to either receive counseling + nicotine replacement therapy (NRT) or counseling?+?EC for a total of six counseling sessions. Behavior modification was used during counseling sessions to effectively incorporate ECs as a quit aid. Reduction in CPD among those who adhered to counseling throughout the study was collected at 12-weeks. Results: At baseline, participants in both the EC and NRT arms smoked an average of 19 CPD (Range: 2-40). Participants in the EC arm adhered to counseling more than participants in the NRT arm throughout the study. At 12-weeks, 87.5% of participants in the EC arm participated in counseling, with 40.6% completing all sessions, whereas 77% of participants in the NRT arm participated in counseling with 36% completing all sessions. Average number of CPD decreased to 9 and 6 for both EC and NRT arms, respectively (EC: 9.21, range: 0-50; NRT: 6.82, range: 0-20). Among EC participants, there was a 37% average reduction in CPD from baseline among those who completed some counseling sessions and a 60% reduction among those who completed all counseling sessions. Among NRT participants, there was a 60% average reduction in CPD from baseline among those who completed some counseling sessions and 67% reduction among those who completed all counseling sessions. Conclusions: Individual behavioral counseling combined with EC use may be a necessary component in helping smokers with COPD, asthma, and CAD/PAD reduce CPD. This pilot RCT supports existing literature indicating that counseling is an effective method to assist with smoking cessation and should be routinely incorporated with the use of behavioral quit aids such as EC.

POS4-101

DIGITAL DISSEMINATION AND PUBLIC DISCOURSE OF TOBACCO RESEARCH: AN NIH AND FDA PORTFOLIO ANALYSIS

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Introduction: Established in 2013, the Tobacco Regulatory Science (TRS) Program is an interagency partnership between the NIH and FDA Center for Tobacco Products (CTP) to foster tobacco regulatory research. Given the long history of NIH funding for tobacco control research, interest has been generated in the impact of CTP funding for tobacco regulatory research. Previous analyses have investigated the scientific focus of tobacco research supported by NIH and CTP, and recent bibliometric analyses assessed and compared the impact of publications generated by the two agencies' research portfolios measuring scientific productivity, influence and collaboration This study compares the level of dissemination and public discourse of these publications through mentions in traditional and new media, including news reports and social media postings. Methods: Tobacco research publications that cite NIH, CTP, or both as funding sources between 2011 and 2020 were evaluated using the Altmetric tool to assess and compare digital dissemination through mentions in news articles, blogs, and social media (Twitter and Facebook). Results: Between FY 2011 and 2020, there were 11,051 publications citing funding from NIH tobacco grants, 1,855 from CTP TRS grants, and 554 from both sources, with the proportion of those citing funding by CTP or by both NIH and CTP rising significantly during the time period. An analysis of media citations for these portfolios found the following number of media mentions per 100 publications citing funding from NIH only, CTP only, and both NIH and CTP, respectively: news mentions (n=182, 448, 470); blog mentions (n=24, 38, 36), twitter mentions (n=1321, 2035, 2283), and Facebook mentions (n=57, 64, 59). Findings from content analysis demonstrate research focus differences among the funded portfolios. Conclusion: These findings complement previous portfolio and bibliometric analyses which demonstrated the high impact and reach of tobacco research publications funded by both the NIH and CTP. This analysis extends the previous analyses and findings by assessing the level of dissemination and public discourse beyond simply examining publication citation rates. We found that publications citing CTP support, whether solely or jointly with NIH, resulted in greater mentions in news articles, whereas social media mentions were mixed, with more twitter mentions for CTP research, and similar blog and Facebook mentions across all funding sources.

FUNDING: Federal

POS4-102

EXAMINING THE ROLES OF NUMERACY AND EDUCATION IN PROCESSING CIGARETTE PICTORIAL WARNING LABEL MESSAGES

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Significance: Individual differences in numeracy have an impact on decision making. Warning label research has demonstrated that higher numeracy is associated with increased smoking risk perceptions and quit intentions. We examined associations of numeracy and highest education level with text and message recall of pictorial warning labels (PWLs), to determine the utility of these constructs in processing the content of warning label risk messages. Methods: Daily smokers completed a 10-day randomized, parallel design trial. Participants were randomized to 1 of 9 PWLs and received their preferred brand of cigarettes affixed with the assigned label. Recall measures were assessed after initial PWL exposure subsequently every three days. Numeracy and education were assessed during initial intake. Results: Numeracy was significantly negatively associated with age (p<.001), positively associated with education (p<.001), with men being more numerate than women (p<.001). At initial exposure, numeracy - but not education - was associated with higher odds of correct text recall after controlling for age and sex (p=0.04 vs. p=0.39). Text recall after subsequent exposures was significantly and positively associated with numeracy as well as education (p's=.001-0.03). Overall message recall was not significantly associated with either numeracy (p=0.08) or education after initial exposure (p=0.49) but was significantly associated on subsequent days (p's =.001- 0.05). Conclusion: Numeracy may be a useful construct to evaluate initial reactions to text in PWLs, though both education and numeracy can identify subgroup differences in processing of warning messages after multiple exposures. Numeracy does not perform very differently than education in the context of pictorial warnings. Future research may evaluate the application of numeracy for more numerate tobacco control messaging.

FUNDING: Federal; Other

POS4-103

AUSTRALIA'S PRESCRIPTION REQUIREMENT FOR NICOTINE VAPING FROM OCTOBER 2021: QUITLINE COUNSELLOR PERSPECTIVES

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Significance: Since 1 Oct 2021 a valid prescription is required for nicotine vaping products (NVPs) in Australia. NVPs plus behavioural counselling (eg Quitline) are recommended in national guidelines as second-line treatment for smoking cessation where first-line treatments have failed. Methods: Thematic analysis of three one-hour online focus groups conducted in May 2022 with 16 (from a total of 21) counsellors employed at a quitline that services almost half of Australia's population. Results: Impacts of the regulatory change included counsellors observing an increase in the volume of calls about vaping, clients annoyed at being required to obtain a prescription and/or unsure how to obtain a prescription. Counsellors noted frequent client reports that doctors were unwilling to prescribe NVPs either because the products are not approved by the Therapeutic Goods Administration (TGA is FDA equivalent) or because they lacked awareness about the details of prescribing NVPs. Cessation counselling issues included observations of vaping as a useful cessation aid for some clients, as fewer habits need to change: the cigarette is replaced with the NVP and the same hand to mouth action is employed. Following smoking cessation most clients were not ready to stop vaping or had not considered stopping vaping. Counsellors reported that clients' most common negative experiences were more frequent and continuous vaping and concerns about possible long term health effects of vaping. Counsellors thought that quitting vaping was as difficult as quitting smoking with more triggers to address (as people can vape in more places), that vaping is a continuous activity (versus finishing a cigarette) and the need for clients to engage new behavioural strategies. Counsellors observed that clients who had stopped vaping completely had almost always used other medications in conjunction with quitline counselling, i.e. a similar approach to smoking cessation. Conclusions: Quitline can play a vital role in increasing clients' understanding of their vaping experiences and encourage use of NVPs in ways that promote smoking cessation and facilitate cessation of NVP use following successful smoking cessation. Currently, people calling quitline in Australia report difficulties with accessing NVPs on prescription. A TGA approved NVP is needed to facilitate access.

FUNDING: Federal

POS4-104

INNOVATIVE METHODOLOGY FOR RESEARCH AND CAMPAIGN DEVELOPMENT ON SMOKING AMONG SEXUAL AND GENDER MINORITY YOUNG ADULTS IN CANADA

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Significance: Research has suggested several reasons why cigarette smoking rates are high among 2SLGBTQI+ young adults: minority stress and stigma, discrimination, targeted marketing by the tobacco industry, and normative behaviours within the communities. This presentation will outline the methods used in developing a research project and campaign aimed at changing the social climate around smoking through social marketing and tailored cessation services. Methods: The project team and community advisors embarked on a two-year, multi-pronged strategy to develop research protocols which informed the campaign development. Key informants with expertise in 2SLGBTQI+ health were interviewed to explore the key issues around smoking within this population. Focus groups were then conducted to talk directly with 2SLGBTQI+ young adults in three pilot cities: Toronto, Thunder Bay and Montreal. Insights were used to develop a detailed and thoughtful online survey with a sample of 1500 respondents. The qualitative and quantitative research findings were leveraged in a thorough brand and campaign co-creation process with a marketing agency. Young adult advisors and community partners provided invaluable guidance throughout each stage of the process. Results: The extensive research and development for this project resulted in a compelling, culturally appropriate campaign plus cessation services while also establishing a rich dataset to fill existing research gaps. Comments from research and project participants have shown a strong appreciation for the amount of effort put into the language, tone and approach to the campaign. Preliminary evaluation findings indicate a positive reception for the campaign overall. Conclusions: One size does not fit all for research and campaigns aimed at high priority populations. Lessons learned can be shared with other researchers looking to develop projects for potentially marginalized communities who have unique challenges and opportunities for smoking cessation.

FUNDING: Federal

POS4-105

NO MORE GIFTING: IDENTIFYING DESIGN FEATURES WITHIN PICTORIAL TOBACCO WARNINGS TO IMPROVE PERCEIVED MESSAGE EFFECTIVENESS AND REDUCE GIFTING INTENTIONS AMONG CHINESE MALE SMOKERS

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Significance: Efforts to encourage quitting among Chinese male smokers remain largely stagnant over the past decade, likely stymied by delayed implementation of pictorial tobacco warnings (PTWs) and a still vibrant gifting culture. Although PTWs are effective in facilitating smoking cessation in western countries, empirical evidence on what design features should be deployed to help (a) quit smoking versus (b) curb gifting among Chinese male smokers remains scarce. To fill this gap, we report promising PTW content and format features identified from a unique dataset combining (a) extracted content and format features on a largest set of PTWs (N = 510) studied to date, (b) evaluation of these PTWs by Chinese male smokers (N = 2306) from an online experiment, and (c) ratings of PTWs' textual labels from a separate online sample (N = 1206). Methods: Participants were recruited from Qualtrics. Each viewed a random selection of six PTWs. After each, they reported perceived message effectiveness for quitting (PME, 5-point Likert scale, M = 3.58, SD = 0.73, alpha = .82) and intentions for gifting (IFG, 4-point Likert scale, M = 2.33, SD = 0.93, alpha = .89). Then, PTW evaluation data were matched with 25 manually extracted content features (Krippendorf's alphs = [.83, .99]), 7 machine-coded format features, and rated argument strength of textual labels (5-point Likert scale, M = 3.62, SD = 0.22, alpha = .91) from a separate sample. Cross-classification multilevel models were fitted to predict PME and IFG, respectively, from PTW features and person-level attributes (e.g., demographics, stage of change). Results: Male smokers who were elder, unmarried, with lower socioeconomic status, and highly valued collectivism, reported higher intentions for gifting overall. PTWs depicting diseased body parts, death, damaged teeth, and medical equipment (bs = [0.07-0.16], all ps <.01) consistently reduced gifting intentions, and those using digitally created imagery or depicting children and diseased body parts improved PME (bs = [0.03-0.07], all ps <.05). Interestingly, the textual labels' argument strength predicted PTW (b = 0.18, p <.001) but not gifting intentions. Conclusion: Our findings suggest the need to prioritize

identifying promising design features (e.g., depicting diseased body parts) to improve PTWs and curb cigarette gifting among Chinese male smokers. Such evidence base is critical to bolstering the case for wide implementation of PTWs in China.

FUNDING: Academic Institution

POS4-106

METAL EXPOSURE FROM E-CIGARETTE USE: CHARACTERIZATION AND COMPARISON OF BIOMARKERS AMONG EXCLUSIVE E-CIGARETTE USERS, CIGARETTE SMOKERS, DUAL USERS, AND NON-USERS

Angela D. Aherrera[1], Anna Tillery[2], Rui Chen[3], Joyce Lin[3], Andrew Schultze[4], Mina Tehrani[3], Donia Moustafa[5], Jana Mihalic[3], Ana Navas-Acien[6], Ana M. Rule[3]. [1]Johns Hopkins University, School of Medicine, Baltimore, MD, USA, [2]Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD, USA, [3]Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA, [4]Ithaca College School of Humanities and Sciences, Ithaca, NY, USA, [5]Northwestern University, McCormick School of Engineering and Applied Science, Evanston, IL, USA, [6]Columbia University, Mailman School of Public Health, New York, NY, USA.

Significance: Metals have been detected in electronic cigarette (e-cigarette) aerosol that is inhaled by the user. A growing number of studies have looked at metal biomarkers from e-cigarette use, but few have drawn comparisons between e-cigarette users of different types of devices (i.e., MODs, PODs) as well as comparisons to dual users (users of both e-cigarettes and combustible tobacco cigarettes), smokers, and non-users (non-smokers and non-e-cigarette users). The objective was to assess metal concentrations in blood, urine, saliva, and exhaled breath condensate (EBC) across the different types of users and non-users of e-cigarettes. Methods: We recruited 95 participants from April 2019 to March 2020 (41 e-cigarette users (24 POD, 17 MOD users), 15 dual users, 9 smokers, 30 non-users). Sociodemographic characteristics, e-cigarette/tobacco use and device characteristics were collected by survey. Bio-specimen samples were collected and analyzed for heavy metals using ICP-MS. Data was corrected for background and limit of detection. ANOVA and linear regression models on log-transformed metal biomarkers to calculate geometric mean ratios (GMR) were used. Results: E-cigarette users were found to have significantly higher Ni and Cr metal concentrations in urine compared to non-users, dual users, and cigarette smokers. According to the two types of e-cigarette devices (MOD vs. POD), POD e-cigarette users had higher urine Ni and Cr GMRs compared to non-users (GMR Cr: 1.56 (95%CI 1.41, 1.73), GMR Ni: 1.37 (95%CI 1.12, 1.68)); higher Fe in urine (p = 0.03) and in blood (GMR: 1.11 (95%CI 1.04, 1.19) was also observed. Conversely, MOD e-cigarette users were found to have the higher Ni (p <0.001) and Cr (GMR: 1.34 (95% CI 1.11, 1.63)) metal concentrations in blood. E-cigarette users, dual users, and cigarette smokers were all found to have significantly higher As concentrations in saliva and EBC compared to non-users, with cigarette smokers having the highest concentrations (GMR saliva: 6.03 (95%CI 2.23, 16.3); GMR EBC: 1.96 (95%CI 1.20, 3.19)). Cigarette smokers were also found to have the highest Cd concentrations in urine and blood. Conclusion: E-cigarette use represents a relevant contribution to metal exposure as exclusive e-cigarette users had statistically significantly higher metal biomarkers levels compared to non-users, and even to cigarette smokers and dual users. Differences in device type also determine exposure to certain metals. With the rapid evolution of e-cigarette products, constant surveillance of differences in metal exposure as well as establishing metal level standards are warranted to prevent involuntary metal exposure.

FUNDING: Federal

POS4-107

EFFECTIVENESS OF A HOSPITAL-INITIATED TOBACCO CESSATION COUNSELING INTERVENTION FOR PROMOTING TOBACCO ABSTINENCE AFTER DISCHARGE IN INDIA: A PRE-POST OBSERVATIONAL STUDY OF THE LIFEFIRST PROGRAM

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Significance and Aims: Hospitalization provides a key opportunity to deliver tobacco cessation treatment, but little is known about the impact of hospital-initiated interventions in low- and middle-income countries and on smokeless tobacco (SLT) use in any country. We measured tobacco abstinence rates after hospital discharge among individuals in India before and after implementation of a cessation counseling program that began in hospital and continued post-discharge. Methods: Observational longitudinal pre-post intervention study conducted at Prince Aly Khan Hospital, Mumbai, pre (11/2015-10/2016) and post-implementation (02/2018-02/2020) of LifeFirst, a multisession cessation counseling intervention that began in the hospital and offered 6 telephone calls over 6 months after discharge. Patients ≥15 years old who reported smoking tobacco, using SLT, or both in the 30 days before hospital admission, regardless of interest in quitting, were eligible. We compared abstinence in pre- and post-implementation groups using an intent-to-treat approach that includes all patients offered LifeFirst. Self-reported tobacco use was measured 1 week, 1, 3, and 6 months after discharge. The primary outcome was continuous tobacco abstinence 6 months post-discharge. Independent variables include demographics, socioeconomic status, tobacco type, nicotine dependence, self-efficacy, motivation, admitting diagnoses, mental health, and health beliefs about tobacco. Multiple imputation was conducted for all missing follow-up responses. Results: We enrolled 437 individuals pre-implementation (8.7% dual use, 57.7% SLT, 33.6% smoking; 22.1% female, median age 52.0 years [interquartile range (IQR) 40.0-61.0]) and 561 post-implementation (8.6% dual use, 64.3% SLT, 27.1% smoking; 20.9% female, median age 51.0 years [IQR 40.0-60.0]). Post-implementation, 490 patients (87.3%) accepted =1 counseling session. Continuous abstinence from all tobacco 6 months post-discharge was higher after LifeFirst implementation than before in adjusted models accounting for factors that differed between groups (41.6% vs. 20.0%, adjusted odds ratio [aOR]: 2.91, 95% confidence interval [CI] 1.97-4.29). The odds of continuous abstinence at 6 months were also higher post-implementation by tobacco type among those reporting baseline use (continuous abstinence from SLT: 42.9% vs. 27.7%, aOR: 1.92, 95% CI 12.6-2.92; continuous abstinence from smoking: 47.0% vs. 25.6%, aOR: 2.27, 95% CI 1.34-3.85). Conclusions: Tobacco abstinence after a hospital admission in Mumbai, India, was higher following implementation of a multisession tobacco cessation counseling intervention. This work shows that the effectiveness of hospital-initiated cessation interventions is evident in LMIC settings, where most tobacco users live, and for both smoked and smokeless tobacco.

FUNDING: Other

POS4-108

COMPARISON OF THREE DIFFERENT APPROACHES TO MEASURE SMOKELESS TOBACCO DEPENDENCE AMONG AMERICAN INDIANS

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Introduction: American Indians (AI) have the highest prevalence of smokeless tobacco (ST) use compared to all other racial/ethnic groups in the US. However, there is a lack of research focused on studying ST dependence among this population, which is a determinant of unsuccessful tobacco cessation attempts. Tobacco dependence measures have been traditionally categorized into three different types; measures based on clinical definition of dependence; variants of Fagerström Test for Nicotine Dependence (FTND); and multidimensional measures of tobacco dependence. The aim of this study was to examine ST dependence among adult AI males using three different types of ST dependence scales. Methods: Data from 120 male AI exclusive ST users were obtained through phone surveys. ST dependence was evaluated by the Tobacco Dependence Screener (TDS), FTND for ST users (FTND-ST), and Oklahoma Scale for Smokeless Tobacco Dependence (OSSTD), a multidimensional measure. Sociodemographic characteristics and information related to tobacco use were also collected. Statistical analyses were performed to calculate descriptive statistics and examine reliability and validity of the scales. Results: Mean (± standard deviation) age of study participants was 41.72±13.19. The majority (95%) were everyday ST users, with a mean age of ST use onset of 13.85±5.48 years. 62.5% had TDS based ST dependence. There was no floor or ceiling effect in the scores of any of the dependence scales. Mean (± SD) score for TDS was 6.1±2.36, FTND-ST was 4.7±2.24 and OSSTD was 28.3±9.40. The internal consistency assessed by Cronbach's alpha indicated that both TDS and OSSTD had acceptable reliability (a=0.729, a=0.928, respectively). Item-total correlations and Cronbach's alpha showed inadequate reliability of FTND-ST. OSSTD and its subscales were significantly correlated with other ST dependence measures. Conclusion: Adult AIs have high ST Dependence. Both TDS and OSSTD demonstrated acceptable reliability and concurrent validity; however, our findings of FTND-ST were not consistent with the results of previous studies.

FUNDING: Academic Institution

POS4-109

FLAVORED TOBACCO PRODUCT USE AND TRANSITIONS TO OTHER TOBACCO PRODUCTS BY SEX, RACE/ETHNICITY, AND AGE GROUP IN U.S. ADULTS

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Introduction: Menthol cigarettes are the major flavored tobacco product followed by flavored electronic nicotine delivery system (ENDS). Although flavored tobacco product users have higher risk for multiple tobacco product use, there are lack of evidence. This research longitudinally examines the transitions between menthol cigarettes and flavored ENDS use among U.S. adults. Methods: We applied a Markov multistate transition model to the Population Assessment of Tobacco and Health Study waves 1-4 (2013-2018). We examined transition rates between menthol cigarette use, non-current use, ENDS and dual use states and estimated hazard ratios for age, sex, and race/ethnicity. Results: Menthol cigarette use was persistent among adults, with 61.8% (95% CI 59.2% to 63.9%) of exclusive menthol cigarette users and 19.4% (95% CI 17.6% to 21.1%) of dual users remaining menthol cigarette users (either exclusive or dual) after one wave. The one-wave transition probability was 6.3% (95% CI 5.4% to 8.9%) switching from menthol cigarettes to flavored ENDS. Among ENDS users, 74.7% (95% CI 62.7% to 76.8%) of exclusive ENDS users and 12.0% (95% CI 10.4% to 14.2%) of dual users remained ENDS user (either exclusive or dual) after one wave. Dual users of menthol cigarettes and ENDS were less likely to stop using menthol cigarettes than exclusive menthol cigarette users (HR 12.5, 95% CI 11.1 to 14.0). Transition rates varied among sociodemographic groups. Conclusion: A substantial proportion of menthol smokers transitioned across flavored tobacco use states over the course of 4 years. Findings suggest health disparity should be considered in menthol cigarette smoking transitions among U.S. adults.

POS4-110

EVALUATION OF AN INTEGRATED SMOKING, VAPING, AND CANNABIS PREVENTION PROGRAM IN MIDDLE SCHOOL STUDENTS BEFORE AND AFTER THE PEAK OF THE COVID PANDEMIC

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Significance: Adolescents who use tobacco and cannabis at younger ages are at an increased risk for addiction. Most prevention programs in adolescent substance use have targeted one substance. Our goal was to evaluate a youth prevention program for several substances delivered in school and assess if students' response to the program changed prior to the COVID pandemic versus the post-pandemic peak. The program included scientific information, peer norms, and media manipulations and integrated use of cigarettes, e-cigarettes, and cannabis. Methods: The 30-minute program was delivered by PhD-level tobacco researchers to middle school students in 2019 (N=138) and 2022 (N=164). Students used audience response system technology ("clickers") to provide confidential, real-time responses to questions on substance use awareness and knowledge. Two weeks later, they provided anonymous feedback on the program. Chi-square analyses compared responses between the two program intervals. Results: During both periods, most students endorsed that the program provided new information (58%) and they learned how media manipulates them (86%). In 2022 (vs. 2019), fewer students had a positive impression about using the clickers [65% vs. 82.6%, $X^2(1)=11.7$, $p<.001$] or endorsed that they considered the risks of smoking and vaping [47.5% vs. 59%, $X^2(1)=3.84$, $p=.05$]. In 2022, most students (64%) incorrectly perceived a high rate of smoking in peers. The majority endorsed the Internet as their main source of information on these substances (50.8%) versus all other sources (ps<.001). However, receiving information from parents was more often endorsed than friends, siblings (p<.001) or school (p<.05). Qualitative data showed that open-format comments were less positive about the program in 2022 than in 2019. Conclusions: A 30-minute program integrating prevention of adolescent smoking, vaping and cannabis use was well-received with most students reporting learning new information, particularly about media targeting youth. In 2022, students were less favorable of clickers and less likely to report the program helped them consider the harms of these substances than those examined pre-pandemic. As much of their information on substance use comes from online sources, with potentially greater use of those forums due to the pandemic, future programs could capitalize on newer interactive modalities to capture the attention of teenagers to educate and prevent youth tobacco and cannabis use.

FUNDING: Federal

AUTHOR INDEX

SRNT Author Index

A

Aarvig, Kathleen POS1-62, POS2-59, POS2-69, POS4-36
Abadi, Melissa POS3-45
Abdullah, S. M. PPS16-2
Abraham, Olufunmilola POS4-83
Abrams, David POS1-104
Abroms, Lorien POS1-99, POS2-32
Acharya, Pawan POS4-98
Addy, Nii PPS8-3
Adetokun, Adewole POS3-60
Adkins-Hempel, Melissa POS1-16
Adler, Jessica POS4-110
Adolfo, Amanda B. POS2-89
Adrover, Juan E. POS3-93
Adsit, Robert T. PPS12-2
Aekplakorn, Wichai POS3-49
Agterberg, Silvana POS1-2
Aherrera, Angela D. POS4-74, POS4-106
Ahluwalia, Indu POS4-81
Ahluwalia, Jasjit SYM10-1, SYM10-2, SYM12-4, SYM17-3
Ahmad, Noah POS3-101
Ahuja, Nikhil A. POS1-25, POS3-51
Ait Ouakrim, Driss SYM13-4
Ajith, Aniruddh POS2-30, POS3-25, POS3-30
Akbar, Maham PPS26-1
Alalwan, Mahmood A. POS3-65, PPS4-4, PPS7-1, PPS7-5
Alaniz-Cantu, Edgar POS1-28
Alarabi, Ahmed POS3-48, PPS15-5, PPS15-6
Alawam, Khaled A. PPS4-4
Albanese, Ariana POS3-14
Alberg, Anthony PPS8-6
Alcheva, Aleksandra POS1-48, POS2-51
Alemán, Alexandria M. POS3-20, POS4-7
Alexander, Allison POS3-96
Alexander, Kerryn POS4-103
Alexeeff, Stacey PPS12-6
Alfaro-Velez, Kassandra POS3-27
Ali, Amna POS3-40
Ali, Fatma R. PPS5-2
Ali, Fatma Romeh M. POS3-88
Ali, Hamdy POS3-48, PPS15-5
Alicea, Ailyn POS1-44
Alicia, Ailyn POS3-74
Aligne, Andy POS1-46
Alivi Fili, Atefeh SYM6-1
Allen, Alicia POS2-82, SYM3-3, SYM17-4
Allen, Hannah POS3-55
Allen, Sharon POS3-2, POS4-1
Allen, Sophia PPS19-5
Allen, Sophia I. POS4-16
Al-Mahdi, Al-Assyia POS2-22
Alshbool, Fatima Z. POS3-48, PPS15-5, PPS15-6
Alzaghari, Omar POS3-104
Amalia, Beladenta POS2-44
Amato, Michael S. SYM11-4
Amin, Adhip POS1-36
Ammar, Maram POS2-97
Ammu, Meera POS3-98
Amstadter, Ananda B. PPS19-2
Anastas, Paul T. POS1-56
Anbil, Akansha POS3-59
Anderson, Jason A. POS3-101
Anderson, Stephanie SYM7-6
Andrean, Kevin POS4-28
Andrews, Judy A. SYM6-4
Andridge, Rebecca PPS4-4
Anesetti-Rothermel, Andrew SYM15-1
Annabathula, Arati POS3-40
Ansari, Saeed PPS16-2
Anthenelli, Robert POS2-11, POS2-12, POS2-13, PPS13-4
Anton, Linda POS3-60
Apostol, Michael R. PPS8-2
Arana-Chicas, Evelyn POS4-18
Araújo Rabello, Luane POS3-107
Arillo-Santillan, Edna Judith POS1-102, POS2-81, POS2-88, POS4-69, PPS16-3
Arnott, Deborah PPS23-2
Arora, Monika POS1-36, POS2-61, PPS14-7
Arora, Srishty POS2-99
Arouni, Nadia POS3-40
Arterberry, Brooke POS4-89
Asare, Samuel POS1-42, POS3-21, POS3-32
Aseltine, Madeleine POS2-66
Asfar, Taghrid PPS23-1
Ashare, Rebecca L. POS1-17, PPS3-4, PPS13-1
Ashford, Kristin POS2-8
Ashley, David L. POS1-109, POS2-97, POS2-109, POS3-103
Aslam, Faiza POS2-62
Assanangkornchai, Sawitri POS3-49
Aston, Elizabeth POS1-47
Atella, Lara POS2-33, PPS14-5
Atkins, Michael POS1-4
Atkinson, Leanne PPS7-1
Attaluri, Saisantosh POS2-13, PPS13-4
Attia, John POS4-13, SYM13-1
Atwell, Leah POS1-30, POS2-107
Audrain-McGovern, Janet POS2-84, POS4-23, POS4-55
Auer, Reto POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Aung, Ther SYM15-1
Aurouet, Philémon POS4-38
Avila, Jaqueline PPS22-7
Awadalla, Josephine PPS1-2
Ayedi, Yosr POS1-108, POS2-108
Ayers, John W. POS4-39
Ayo-Yusuf, Lekan O. POS4-31
Azagba, Sunday POS2-39

B

Baban, Sana POS2-1
Babu, Anagha POS4-4
Badejo, Precious POS3-48
Bagdas, Deniz PPS8-3
Baggett, Chris SYM7-1, SYM7-2
Baggio, Stéphanie POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Baig, Sabeeh SYM15-1
Bailey, Beth A. PPS9-2
Bailey, Jennifer A. POS1-81
Bailey, Steffani POS1-33
Baiocchi, Michael POS4-78
Baird, Donita POS4-103, SYM13-1
Bajwa, Harlean POS1-41, POS3-33
Baker, Amanda POS4-13
Baker, Amanda L. PPS4-3, SYM13-1, SYM13-2
Baker, Kelsey POS1-5
Baker, Nathaniel POS1-11, POS2-17
Baker, Nathaniel L. POS1-12
Baker, Timothy POS2-16, POS2-63, PPS3-1, POS3-4, PPS12-5
Baker, Timothy B. PPS12-2
Baldassarri, Stephen PPS7-3
Baliunas, Dolly POS3-61
Ball, Jude POS1-40
Balletto, Brittany POS2-3
Balwicki, Lukasz POS3-86
Bandi, Priti POS3-21, POS3-32
Bansal-Travers, Maansi POS4-87, POS4-91, PPS5-1, PPS7-2, SYM15-1
Barker, Daniel POS4-13
Barker, Hannah E. PPS1-5, POS3-71, POS4-46, PPS14-4
Barnard, Gabriel POS1-101
Barnes, Andrew POS1-22, POS1-41, POS2-41, POS3-33, PPS25-4
Barnett, Janine M. POS2-8
Barnoya, Joaquin PPS12-1
Barrientos-Gutiérrez, Inti POS1-102, POS2-81, POS2-88, POS4-69, PPS16-3
Barrington-Trimis, Jessica L. POS2-59, POS3-46, POS3-102, POS4-12 POS4-59, PPS23-4
Bars, Matthew SYM3-4, SYM17-1, SYM17-1
Barton, Garry POS2-55
Bar-Zeev, Yael POS1-99, POS2-32, POS3-77
Baskerville, Bruce POS2-110, POS4-104
Baskerville, N. Bruce PPS20-5
Bassi, Shalini POS1-36
Bastian, Joseph POS4-3, PPS13-3
Bataineh, Bara POS1-55, POS1-60, POS2-57, POS3-83
Bates-Pappas, Gleneara E. PPS3-2
Baty, Florent POS3-5
Bauer, Anna-Marika POS4-3, PPS13-3
Bauld, Linda POS2-15, POS2-78
Bautista Rojas, Maria Valeria POS1-28
Beard, Emma POS1-76
Becker, Sara POS1-16
Beckham, Jean C. POS2-25, POS2-28
Bednarek, Callie J. PPS9-3
Beebe, Laura A. POS4-108, PPS20-6
Begh, Rachna PPS10-7
Bell, Ashlynn PPS25-4
Bello, Mariel S. POS4-12, PPS9-4
Beneventi, Diane PPS4-6
Ben Fredj, Nizar POS1-108, POS2-108
Benjamin, Emelia J. POS3-36
Bennett, Melanie POS1-10, POS3-3, PPS3-7
Benowitz, Neal PPS11-1, PPS18-2, PPS26-7
Benson, Adam F. SYM15-1
Benson, Stacey POS3-55
Berg, Carla J. POS1-27, POS1-99, POS2-32, POS2-83, POS3-42, SYM4-1
Bergeron, Caroline D. POS2-29
Berlin, Ivan POS3-5
Bernd, Karen POS4-84
Berthet, Aurélie POS3-5, POS3-8, PPS14-6
Bertrand, Adrian PPS6-1, PPS21-4
Betts, Jennifer M. POS3-9, POS4-2, PPS13-2

Bhardwaj, Nancy PPS3-3
B. Harrell, Melissa POS3-70
Bhat, Tariq A. PPS15-3
Bhatikar, Nina PPS21-7
Bhatnagar, Aruni PPS25-5
Bhattacharya, Paramita POS2-36, POS3-63
Bhojani, Upendra POS1-36
Bialous, Stella A. PPS14-1
Bickel, Warren POS3-37
Bierut, Laura POS2-7, POS2-16, PPS3-1
Billingsley, Benjamin PPS22-6
Binns, Steven POS3-35
Bitzer, Zachary T. POS3-85, POS4-33
Bizier, Andre POS2-19, POS3-15
Blakely, Tony SYM13-4
Blakney, Aaron M. POS2-23
Blalock, Ed PPS15-1
Blalock, Janice PPS4-6
Blank, Melissa D. POS1-18, POS1-70, POS1-107, POS3-97
Block, Ashleigh C. POS2-104, POS3-93, POS4-61, SYM14-1, PPS25-2
Bloom, Erika L. SYM6-1
Bluestein, Meagan A. POS2-45
Blumenstein, Brent PPS18-2
Blutcher-Nelson, Glenda PPS14-3
Bodinayake, Kasuni PPS17-3
Boeckmann, Melanie PPS16-2
Boehnke, Jan POS2-62
Boland, Veronica PPS22-2
Bolaños-Casarín, Alejandra POS4-54
Bold, Krysten POS1-72, POS2-70
Bold, Krysten W. POS1-37, POS2-52, POS3-50, POS3-64, POS4-8, POS4-35, PPS10-3
Bolkovac, Emma POS2-43
Bondarenko, Irina POS3-109
Bondy, Susan POS1-93, POS3-92, PPS10-2
Bonevski, Billie POS3-24, POS4-13, SYM13-1, SYM13-2
Bono, Rose POS1-22, POS2-41
Bonomo, Yvonne POS4-13
Bordner, Candace R. POS4-16, POS4-88, PPS19-5
Borek, Nicolette SYM15-1
Borges, Luciana POS2-100
Borland, Ron POS2-6, SYM13-1
Borowiecki, Mateusz POS2-24
Boss, Nicole PPS20-4
Bostic, Chris SYM2-4
Boudreau, Christian SYM14-2
Bourdon, Jessica POS2-7
Bover Manderski, Michelle T. POS1-68
Brandon, Brianna POS1-9
Brandon, Karen O. PPS18-4
Brandon, Thomas H. POS1-6, POS1-59, POS1-78, PPS13-1, PPS18-4
Branston, Robert PPS24-3
Brecht, Mary-Lynn POS2-89
Breland, Alison POS1-7, POS2-97, POS3-47, POS3-59
Brennan, Sinead PPS3-3
Brett, Emma PPS8-4
Brewer, Noel T. POS1-49
Bricker, Jonathan B. POS2-72, SYM8-2, PPS18-3
Brinkman, Marielle PPS7-1
Britton, Maggie POS1-24, POS2-54, POS2-60, POS3-23, POS3-26, PPS19-3
Brobst, Daniel POS4-94, POS4-98, PPS15-4
Brooks, Julia POS4-67
Brophy, Lisa SYM13-1
Brose, Leonie S. POS2-58, POS4-61, PPS22-1
Brossert, Laura SYM7-6
Brouwer, Andrew F. POS1-65, POS2-63, POS3-109
Brouwer, Kimberly POS3-74
Brown, Amanda POS4-13
Brown, Anthony W. POS4-86
Brown, Jamie POS1-76, PPS2-7, PPS5-5, PPS6-3, PPS10-4, SYM10-4, PPS22-1
Brown, Leticia SYM11-2
Brown, Richard A. PPS22-4
Brown, Tracey POS2-15
Bruggmann, Philip POS3-5
Brunette, Mary PPS22-5
Brutsche, Martin POS3-5, PPS10-5, PPS10-6
Buch, Keegan POS1-83
Buchanan-Lunsford, Natasha SYM15-1
Buckley, James PPS26-7
Budenz, Alex POS2-21
Budsock, Trish D. PPS22-6
Buettner, Sarah A. PPS1-6, POS2-90
Buettner-Schmidt, Kelly POS1-32
Bui, Thanh C. POS3-67
Bullen, Chris SYM13-2
Bullen, Christopher PPS10-7
Burkhalter, Robin POS2-58
Bursac, Zoran POS1-77, PPS23-1
Busch, Andrew M. POS2-3
Bush, Kenneth POS1-20
Businelle, Michael POS2-40, POS3-67
Buszkiewicz, James H. PPS26-4
Buta, Eugenia POS1-51, POS2-22, PPS11-1
Butler, Ailsa R. PPS10-7
Buu, Anne POS1-50
Buu, Yuh-Pey POS4-49

C

Cadham, Christopher J. POS1-61, POS3-72, PPS25-1, PPS26-3
Cagan, Rick POS3-84
Cahn, Rael POS1-8
Cai, Xueya POS3-108, POS4-18
Cain, Dan PPS18-2
Cajas, Jonathan O. POS4-7, POS4-11
Calac, Alec J. POS2-64
Calhoun, Patrick S. POS2-25, POS2-28
Calixte-Civil, Patricia POS1-59
Calo, William A. POS4-16, PPS19-5
Camenga, Deepa R. POS1-72, POS2-52, POS2-74, POS4-35
Cameron, Sarah POS2-3
Campbell, Megan C. PPS4-2
Cannon, Julie POS4-27
Cantrell, Jennifer POS3-94, PPS4-5
Cao, Pianpian POS4-48
Caouette, Justin D. POS1-79, POS3-73
Carey, Michael P. POS2-3
Carll, Alex PPS25-5
Carmody, Thomas PPS22-3
Carpenter, Kelly SYM6-5
Carpenter, Kelly M. SYM11-3, PPS22-4
Carpenter, Matthew POS1-11, POS2-17, POS2-18, PPS8-6
Carr, Sinclair POS3-101
Carreno, Vanesa POS1-59
Carrillo, Hanzell PPS18-6
Carter, Brian J. POS1-24, POS2-54
Carter-Bawa, Lisa M. PPS3-2
Cartujano, Francisco POS4-18
Cartujano-Barrera, Francisco POS1-28, POS1-100, POS3-108, POS4-54, POS4-97, PPS18-6
Casagrande Tango, Rodrigo POS3-5
Casas, Laura POS1-59
Casey, Kathleen POS1-24, POS2-54
Cassidy, Rachel POS1-47, POS4-12, PPS9-4
Castele, Madeline PPS19-1
Castellano, Yolanda POS2-73
Castle, David SYM13-1
Cataldo, Alana PPS13-5, PPS13-6
Catley, Delwyn POS1-1, POS4-18
Catz, Sheryl POS3-68
Cephas, Chellee SYM15-1
Cervenka, Iris POS4-38
Cha, Sarah SYM11-4
Chaffee, Benjamin W. POS2-91, POS2-92, PPS12-4
Chaitan, Veronica SYM7-5
Chaiton, Michael POS1-93, POS1-106, POS2-101, POS2-110, POS3-92, POS3-105, POS4-104, PPS10-2, PPS18-1, PPS20-5
Chaloupka, Frank PPS24-1
Cham, Bai POS1-34
Chan, Gary POS1-67
Chander, Geetanjali POS2-9
Chang, Cindy POS2-23
Chang, Cindy M. PPS21-1
Chang, Joanne T. POS2-23, PPS21-1
Chang, Yoonhoo POS2-7
Chang, Yuchiao POS4-107
Chan Nhu, Huynh Ba PPS14-4
Chariyalertsak, Suwat POS3-49
Chartier, Karen PPS19-2
Chau, Siu Long POS3-69
Chavez, Jonathan POS3-45
Chávez-Iñiguez, Arlette POS3-108, PPS18-6
Cheeseman, Hazel PPS23-2
Chehab, Sarah PPS23-1
Chen, Baojiang POS2-57, POS3-46, POS3-70, POS3-83, POS4-95
Chen, Hong POS4-43
Chen, Jarvis T. POS4-14
Chen, Jian PPS20-3
Chen, Li-Shiun POS2-7, POS2-16, PPS3-1
Chen, Rui POS4-74, POS4-106
Chen, Sarah POS4-41
Chen, Shi POS4-84
Chen, Tzuan A. POS1-24, POS2-54, POS3-23, POS3-26, PPS19-3
Chen, Yen-Chu PPS17-5
Cheney, Marshall POS1-20, POS3-45, POS4-34, POS4-70
Cheng, Jing POS2-91, PPS12-4
Chen-Sankey, Julia PPS1-2, POS1-74, POS2-30, POS2-86, POS3-25, POS3-30
Chern, Jing-Yi POS1-78
Cheromiah Salazar, Maredyth B. POS1-37
Cheung, Derek Yee Tak POS2-2, POS4-43

SRNT Author Index

Cheung, Yee Tak Derek POS3-80, POS3-82, POS3-106
Chichester, Lou-Anne E. PPS3-2
Chieng, Amy SYM7-4
Childers, Margaret POS1-18
Childers, Margaret G. POS1-70, POS1-107, POS3-97
Childs, Ellen PPS6-2
Chinnaiyan, Mayilvanan POS4-94, POS4-98, PPS15-4
Chissoe, Geraldine POS4-94, POS4-98
Cho, Junhan POS4-12
Cho, Sung-il PPS5-3
Choi, Briana SYM17-4
Choi, Kelvin POS1-26, POS2-30, POS3-25, POS3-29, POS3-30, POS4-73, SYM15-1
Choi, Seung Hee POS4-42
Choi, Won SYM8-4
Chopra, Mansi POS1-36, POS2-61, PPS14-7
Choudhury, Asiful H. POS2-62
Chowdhury, Pranesh P. POS4-81
Christian, W. Jay POS4-21
Christofferson, Dana E. POS2-25, POS2-28
Chugh, Aastha POS1-36, PPS14-7
Chukwudi, Keke POS1-104
Cinciripini, Paul PPS4-6, PPS13-2
Clair, Carole POS3-8
Clark, Melissa A. POS2-3
Clark, Sonia PPS26-2
Clark, Sonia A. POS1-73, PPS23-3
Clark, Sonia O. POS2-47
Clarke, Anthony PPS18-2
Claudio, Tracy POS1-5
Clausen, Bryce POS2-19
Clausen, Bryce K. POS3-15
Clegg Smith, Katherine PPS23-6
Cleland, Charles PPS21-5
Clendennen, Stephanie POS1-82
Clendennen, Stephanie L. PPS1-1, POS2-57, POS3-83, POS4-82, POS4-85
Cobb, Caroline POS1-22, POS1-41, POS2-41, POS3-33, PPS25-4
Cofer, Jennifer PPS4-6, SYM7-6
Cohen, Anne L. PPS6-7
Cohen, Joanna PPS1-5, POS1-93, POS2-33, POS2-44, POS3-34, POS3-59, POS3-63, POS3-92, POS4-45, POS4-52, PPS5-4, PPS10-2, PPS14-4, PPS14-5
Cohen, Joanna E. POS1-35, POS1-38, POS1-52, POS2-36, POS2-68, POS3-57, POS3-71, POS4-46, PPS7-4, PPS23-6
Cohen, Julia F. POS1-10
Cohen, Joanna E. POS3-53
Cohn, Amy M. POS1-27, POS2-83, POS3-18
Colby, Suzanne POS1-47, POS4-12, PPS9-4
Colder, Craig R. PPS13-1, PPS13-2
Cole, Eileen POS4-103
Coleman, Lois POS4-70
Coleman, Tim POS2-55
Coleman-Cowger, Victoria POS3-18
Coles, Tristan POS4-94
Colon, Jonathan POS3-27
Colston, David PPS2-6, PPS6-7
Combs, Madison POS1-7, POS3-59
Combs, Todd SYM7-1, SYM7-5, SYM7-6
Compton, Wilson M. PPS12-3
Conner, Karen L. PPS12-2, PPS12-5
Conquest, Parker POS4-84
Cook, Benjamin POS1-21
Cook, Steve PPS1-3
Cook, Steven PPS26-4
Coombs, Vivien POS1-69
Cooper, Robert K. POS3-13
Cooper, Skylar Y. POS4-65, PPS17-4
Cornacchine-Ross, Jennifer POS2-47
Cornacchione Ross, Jennifer PPS23-3
Correa-Fernández, Virmarie POS1-24, POS2-54, POS3-107
Correia Borges, Luciana POS4-32
Corsetti, Danielle POS4-61
Cottrell-Daniels, Cherell PPS3-5
Couch, Elizabeth T. POS2-91, POS2-92, PPS12-4
Coulter, Robert W. PPS20-4
Courtney, Ryan PPS22-2
Cox, Lisa S. SYM12-4, SYM17-3
Cox, Lisa Sanderson POS4-18
Cox, Sharon SYM4-4, PPS10-4, PPS22-1
Crane, David POS2-55
Crane, Elisha POS3-88, PPS5-2
Crankshaw, Erik POS2-21
Crawley, Matthew PPS11-4
Creamer, MeLisa R. PPS12-3, SYM15-1
Crespi, Elizabeth POS1-35, POS1-38, POS2-68, POS3-53, POS4-45
Cristol, Benjamin A. POS4-95
Crockett, Lisa POS3-28
Croker, J. A. POS2-92
Cropsey, Karen POS3-10, POS4-6
Crosbie, Eric POS3-44, POS4-32, PPS14-2
Crouch, Maria C. POS1-37
Croucher, Ray POS2-78
Cruse, Summer POS4-78
Cruvinel, Erica SYM12-4
Cruz-Jiménez, Lizeth POS2-81, POS2-88, POS4-69, PPS16-3
Cui, Mandy POS1-94
Cui, Yuxian PPS1-5, POS3-34, POS4-46
Cummings, K. Michael POS1-67, SYM14-2, SYM14-3, SYM14-4
Cummings, Michael POS2-6, PPS5-1, PPS24-2, PPS24-5
Cuomo, Raphael POS1-94, POS2-64
Cuomo, Raphael E. POS2-5, POS4-56, PPS16-6
Cupertino, Ana Paula POS1-28, POS3-108, POS4-18, POS4-54, PPS18-6
Curran, Hayley PPS7-1
Cuthbertson, Aubrey A. POS1-73
Cwalina, Samantha POS2-23
Czaplicki, Lauren PPS1-5, POS1-53, POS3-71, POS4-46, POS4-51, PPS14-4

D

Da Costa, Mariana POS4-63
Daglish, Mark SYM13-2
Dahne, Jennifer POS1-17, SYM3-2
Dai, Hongying Daisy PPS26-7
Dallanoce, Clelia PPS17-3
Dallery, Jesse SYM6-1
D'Angelo, Heather PPS19-4
Danzo, Sarah POS1-79, POS3-73
Dark, Michael PPS4-1
Das, Shivangi POS1-36
Datta, Santanu K. POS2-34
Dauchy, Estelle P. POS4-24, PPS24-4
David, Sean PPS18-3
Davie, Morgan POS1-57
Davine, Jessica PPS6-2
Davis, Danielle POS2-22, POS2-52, POS4-35
Davis, Danielle R. POS1-72
Davis, James PPS3-4
Davis, Jordan P. POS1-83
Davis, Robert E. POS1-66, POS3-58
Davis Lynn, Brittny C. PPS21-1
Dawkins, Katie H. POS1-73
Dawkins, Lynne SYM10-4, PPS10-4
D'Costa, Marina POS2-77
de Almeida, Claudia POS3-10
Dean, Anna POS4-81
Dean, Emma POS4-103
DeAtley, Teresa POS4-23, POS4-55
Decena Soriano, Ritsel PPS18-6
Deelen, Tessa v. POS2-20
Deepak, Janaki PPS18-7
deFilippi, Chris PPS3-7
De Genna, Natacha M. POS3-22, PPS20-4
DeJesus, Jose POS3-27
Delamater, Paul PPS19-4
Delnevo, Cristine D. POS1-74, POS1-88, POS2-39, POS2-71, POS4-30
DeLucia, Alexandra POS4-39
DeLucia, Angela POS2-70, POS3-64
Demuro, Angelo PPS17-5
Denlinger-Apte, Rachel L. POS3-36, POS4-15, SYM16-1
Deocampo, Jelina POS4-62
de Oliveira, Claire POS3-61
de Oliveira, Nayara POS3-10
Derakhshandeh, Ronak PPS25-6
Desai, Manisha SYM7-3
Deshmukh, Chetana POS1-85
Devereux, Paul POS2-100
DeVito, Anthony PPS3-4
DeVito, Elise E. POS1-51, POS2-82
Devkota, Janardan POS3-17
Deyo, Alexa G. POS3-11
Diaz, Francisco POS4-18
Diaz, Megan PPS21-4, PPS24-6
Diaz, Megan C. PPS24-1, PPS26-1
Dick, Danielle M. PPS19-2
Dickson, Samantha PPS9-2
DiFrancesco, Gary POS3-99
Dillon, Patrick J. POS1-25, POS3-51
Dimaya, Brenda S. POS1-90
Ding, Zheng-Ming PPS17-2
Ditre, Joseph W. POS3-7, POS3-11
Diviak, Kathleen POS4-67
Do, Elizabeth K. POS1-62, POS1-63, POS2-59, POS3-54, POS4-36, POS4-59
Do, Vuong POS3-103
Do, Vuong V. POS1-109, POS2-109, POS4-64
Dobbs, Page D. POS1-66, POS3-58
Dockrell, Martin PPS5-5
Dodder, Nathan G. POS4-93
Dodge, Phoebe A. PPS9-2
Donny, Eric POS4-29, SYM17-2
Donovan, Emily POS1-62, POS2-59, POS3-54, PPS6-6, PPS24-1, PPS26-1

Doucette, John PPS9-6
Douglas, Ashley POS1-18
Douglas, Ashley E. POS1-70, POS1-107, POS3-97
Dove, Melanie POS3-62
Dove, Melanie S. PPS2-3
Dowd, Ashley N. POS3-9, POS4-2, PPS13-2
Dragonetti, Rosa POS4-66
Dredze, Mark POS4-39
Drehmer, Jeremy POS1-100
Driezen, Pete POS1-67, POS4-80, PPS23-2
D'Souza, Gail C. POS4-16, POS4-53, PPS19-5
Duan, Zongshuan POS1-99, POS2-32, POS3-42
Dubray, Jolene POS1-93, POS3-92, PPS10-2
Ducas, Letitia POS2-8
Duneclift, Sharon POS2-15
Dunlap, Christopher POS3-45
Dunlop, Adrian POS4-13, SYM13-2
Dunsiger, Shira POS1-16
Duren, Michelle POS2-33, PPS14-5

E

East, Katherine POS2-58, POS4-80, PPS5-1
East, Katherine A. POS1-67
East, Katie PPS23-2
Ebrahimi Kalan, Mohammad POS1-49
Edwards, Ann L. POS4-62
Edwards, Giselle SYM11-4
Edwards, Richard POS1-40, SYM13-4, PPS16-4, PPS24-3
Egbe, Catherine O. PPS14-1
Ehlke, Sarah J. POS3-18
Eid, Tore POS2-22
Eissenberg, Thomas POS1-7, POS1-71, POS2-97, POS3-47, POS3-59
Elf, Jessica L. POS1-104
Elhabashy, Maryam PPS1-2
El-Hage, Rachel POS3-47, POS4-71, PPS25-4
El Hajj, Dana POS3-104
El-Hellani, Ahmad POS4-71, PPS7-1, PPS25-3
El Hourani, Mario POS2-97, POS4-71
Elias, Maria de Jesus PPS19-2
Elias, Ryan J. POS4-33
Ellerbeck, Edward POS4-18, SYM17-3
Elmasry, Hoda POS3-18
El Shahawy, Omar PPS4-5
Emery, Sherry POS2-24, POS2-103, POS3-35, POS3-100
Emmons, Karen POS4-25, SYM12-2, PPS21-3
England, Kelli POS4-62
Enyioha, Chineme POS2-47, PPS23-3, PPS26-2
Epstein, Marina POS1-79, POS1-81, POS3-73
Erath, Tyler G. POS2-40, POS3-6
Erinoso, Olufemi PPS1-4, POS1-77, POS1-91, POS2-4, POS2-100, POS3-39, POS3-44, POS4-22, POS4-32, PPS14-2
Erythropel, Hanno C. POS1-56, POS2-22
Estrada, Bianca PPS18-6
Estrada, Brianna PPS18-6
Evans, Mark PPS4-6
Evans-Polce, Rebecca POS1-23
Everard, Colm D. PPS12-3, SYM15-1
Everhart, Robin POS1-22
Eversole, Alisha POS1-7
Everson-Rose, Susan POS1-29
Evins, A. Eden POS1-16, POS3-1
Ezard, Nadine SYM13-2

F

Fabbricatore, Jessica PPS21-6, PPS21-7
Fagan, Pebbles SYM2-6
Fahey, Margaret C. POS2-18
Fairman, Robert T. PPS12-7
Fakhfakh, Radhouane POS1-108, POS2-108
Fallah, Sacha POS3-47, PPS25-4
Fan, Kunjie POS4-47
Fanshawe, Thomas PPS10-7
Faraji, Maryam POS1-43
Farhan, Sarah PPS8-4
Faro, Jamie M. POS4-76
Farrington, Julie PPS22-4
Farsi, Mishma POS1-71
Faseru, Babalola SYM11-5
Felicione, Nicholas J. POS1-18, POS1-70, POS1-97, POS1-107, POS3-97, PPS7-2
Feller, Martin POS3-5
Feng, Miao POS3-35
Feng, Zilu POS2-76, POS3-81
Fenske, Timothy POS1-4
Ferketich, Amy PPS4-4
Ferkin, Adam C. POS2-105
Fernández, Esteve POS2-73
Ferrell, Anastasiya POS3-104
Ferron, Joelle PPS22-5
Figueroa, Carla POS4-44
Filia, Sacha SYM13-1
Filippidis, Filippos T. POS4-80
Finley, Eric POS1-87
Fiore, Michael C. POS3-76, PPS12-2, PPS12-5
Fish, Laura POS4-63
Fish, Laura J. POS2-87
Fisher, Derek PPS8-5
FIsher, Mariana POS2-87
Fitzpatrick, Patricia PPS3-3
Fix, Brian POS4-87
Flannagan, Kerry S. PPS12-3, SYM15-1
Fleischer, Nancy L. PPS1-3, PPS2-6, POS2-35, POS2-53, PPS6-7, PPS26-4
Fleming, Morgan POS3-89
Flor, Luisa S. POS2-49, POS3-101
Flores, Michael POS1-21
Fogelberg, Renee PPS12-6
Fong, Geoffrey T. POS1-40, POS1-67, POS2-6, POS2-73, PPS5-1, PPS5-3, PPS6-4, SYM7-4, SYM14-1, SYM14-2, SYM14-3, SYM14-4, PPS24-2, PPS24-5
Foster, Madeline PPS10-1
Foucaud, Jerome POS4-38
Fougere, Chantal POS4-66
Foulds, Jonathan POS4-16, POS4-88, PPS19-5
Fowler, Christie PPS17-3, PPS17-5
Fox, Erica N. POS4-3, PPS13-3
Fox, Patricia PPS3-3
Frank-Pearce, Summer PPS20-6
Frazer, Kate PPS3-3
Fredericks, Michelle POS4-25
Freedman, Neal D. POS2-80
Frei, Anja POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Freitas-Lemos, Roberta POS3-37
Fresquez, Sarah POS1-69
Freudenheim, Jo L. POS1-95, POS4-47, POS4-79
Freudenstein, Frederik POS2-79
Frings, Daniel PPS10-4
Frisbee, Suzanne POS4-75
Froeliger, Brett PPS8-6
Fronheiser, Jack POS1-57
Fryer, Craig POS4-19, PPS26-5
Fu, Longdi POS3-61
Fu, Marcela POS2-73
Fu, Steven POS1-16, PPS4-2
Fucito, Lisa POS4-5, PPS7-3, PPS10-1
Fulton, Hayden J. POS1-78
Funk, Olivia SYM10-2, SYM12-4
Furgal, Allison POS3-109
Fuss, Caroline PPS14-2

G

Gaber, Jennifer POS2-21
Gaggar, Amit PPS15-1
Gaiha, Shivani POS2-96
Gaitan, Nicoleta POS1-7
Gajendra, Sangeeta POS3-95
Gakidou, Emmanuela POS2-49, POS3-101
Galimov, Artur POS1-64, POS2-93
Gallegos-Carrillo, Katia POS1-102, POS2-81, POS2-88, POS4-54, POS4-69, PPS16-3
Gallopel-Morvan, Karine POS4-38
Ganapathy, Vengatesh POS4-94, POS4-98, PPS15-4
Ganesan, Deepa POS1-15
Ganz, Ollie POS1-39, POS1-74, POS1-75, POS1-88, POS3-94
Gao, Yankun POS1-84
Garcia-Cazarin, Mary POS3-36, POS4-101
Gareen, Ilana POS1-4
Garey, Lorra POS2-19, POS3-15
Garg, Suneela POS1-85
Garrison, Kathleen POS3-45
Gartner, Coral E. POS3-38, SYM13-3, PPS16-5
Gaynor, Adam PPS4-1
Gee, Kevin PPS2-3
Geller, Alan PPS6-2
Gendall, Katherine PPS24-3
Gendall, Philip PPS24-3
Genschmer, Kris PPS15-1
Gentzke, Andrea SYM11-1
George, Tony PPS13-2
Gex, Kathryn POS1-14
Ghimire, Ramesh POS2-24
Giannini, Jillian PPS13-4
Gibbons, Frederick X. PPS11-1
Gittens, Olivia E. PPS9-6
Giummo, Ryann POS4-10
Glantz, Stanton POS1-54
Glasser, Allison POS2-43
Glassman, Sharon POS1-57
Glynn, Alexia POS3-1
Goden, Akira POS1-41, POS3-33
Godino, Job POS3-74
Godleski, Stephanie POS2-105, POS3-99
Gogineni, Anish POS1-69
Goidel, R. K. POS2-29
Gold, Emily POS1-69
Golden, Sara POS1-33
Golden, Shelley D. PPS2-5, SYM7-1, SYM7-2, SYM7-5
Goldschmidt, Lidush PPS20-4
Goldstein, Adam O. POS2-47, PPS23-3, PPS26-2

Gollan, Jacqueline K. POS4-3, PPS13-3
Golshahi, Laleh POS2-97
Golub, Johnathan E. POS1-104
Goniewicz, Maciej POS1-32, POS3-86, POS4-9, POS4-61, PPS5-1, PPS5-3, SYM10-4, PPS15-3, PPS25-2
Goniewicz, Maciej J. POS2-106
Goniewicz, Maciej L. POS1-98, POS2-102, POS2-104, POS3-93, POS4-86, PPS7-2, SYM14-1
Gonzalez, Lidia POS3-74
Gooneratne, Chrismarie POS1-94
Gordon, Bob POS4-14
Gordon, Judith S. SYM6-4
Gordon, Talya R. PPS20-2
Gorzkowski, Julie SYM11-2
Gottlieb, Mark PPS21-3
Gould, Gillian POS4-13
Goulette, Michelle POS1-67
Grace, Daniel POS2-110, PPS20-5
Graham, Amanda L. POS2-9, SYM11-4
Graham-DeMello, Anna PPS2-4, PPS16-1
Gramann, Morgan W. POS1-73
Grant, Kelly POS2-55
Gratale, Stefanie K. POS1-39, POS1-68, POS1-74, POS2-86
Gravely, Shannon POS1-67, POS2-6, PPS5-3, PPS6-4, SYM14-2, SYM14-3, SYM14-4
Graves, Kristi POS4-18
Gray, Kevin M. POS1-14
Greaves, Felix POS2-55
Green, Barry POS2-22
Green, Molly POS2-66
Greenhalgh, Elizabeth POS4-103
Greiner, K. Allen SYM17-3
Gribben, Valerie POS2-56
Grilo, Graziele POS2-36, POS3-63, POS4-52, PPS5-4
Grutman, Aurora POS3-45
Gu, Dian POS2-27, POS3-76, POS4-96
Guderson, Daniel SYM12-2
Gueorguieva, Ralitza POS1-37, POS1-51, POS2-22, PPS11-1
Guerra, Darcy PPS18-6
Guillaumier, Ashleigh POS3-24, PPS4-3
Guillemin, Anne-Fleur POS4-38
Guillot, Casey R. POS3-12, POS3-16, POS3-20, POS4-7, POS4-11
Gummmidipundi, Santosh SYM7-3
Gundersen, Daniel A. POS4-25, PPS21-3
Gundle, Kenneth POS1-33
Gunzler, Douglas POS4-19, PPS26-5
Guo, Ziqiu POS1-96
Gupta, Amrita POS2-61
Gupta, P. C. POS1-36
Gupta, Shilpi POS2-77
Gupte, Himanshu A. POS1-86, POS2-77, POS3-78, POS4-107
Gupte, Nikhil POS1-104
Guri-Sherman, Anne-Laure SYM6-2
Gutierrez Sacasa, Natalia POS1-16
Gutierrez Sacasa, Nathalia POS2-3
Güttinger, Eva PPS14-6
Güttinger, Eva Magdalena PPS10-5
Guy, Kyra M. PPS3-6
Guy, Mignonne POS1-41, POS3-33
Gwambe, Siphesihle PPS14-1

H

Ha, Patrick POS3-76
Haber, Paul POS4-13
Hacker, Kiana J. POS2-30, POS3-25, POS3-30
Haddad, Linda POS3-104
Hagedorn, Hildi PPS4-2
Hair, Elizabeth POS2-66, POS2-69, POS2-103, POS3-56
Hair, Elizabeth C. POS1-62, POS1-63, POS1-90, POS2-59, POS3-54, POS3-98, POS4-36, POS4-59, PPS21-4
Hajek, Peter PPS10-7
Haller, Moa POS3-5
Haller, Moa Lina PPS10-5
Hallinan, Jayme PPS18-7
Halpern-Felsher, Bonnie POS2-56, POS2-91, POS2-92, POS2-96, POS4-78, PPS12-4
Halvorson-Fried, Sarah M. PPS2-5, PPS19-4
Hamlett-Berry, Kim POS2-25, POS2-28
Hammal, Fadi POS4-26
Hammond, David POS1-67, POS2-58, SYM4-3, POS4-61, POS4-80, PPS5-1, PPS6-4, PPS23-2
Han, Dae H. POS1-13
Han, Dae-Hee POS1-8, PPS11-2
Han, Eileen POS2-93
Han, Gang POS3-90, PPS9-5
Hanby, Elaine POS4-14
Hanby, Elaine P. PPS21-3
Handby, Elaine POS4-25
Handley, Tonelle POS3-24
Handy, Jessica POS4-51
Hardesty, Jeffrey J. POS1-35, POS1-38, POS2-68, POS3-53, POS3-59, POS4-45
Hardin, James POS4-27
Hardy, James POS4-84
Harizi, Chahida POS1-108, POS2-108
Harrell, Melissa POS3-46, POS4-95
Harrell, Melissa B. PPS1-1, POS2-57, POS3-83, POS4-82, POS4-85
Harrell, Paul POS4-62
Harris, Andrew POS1-48, POS2-51
Harrison, Katherine POS3-2, POS4-1
Hart, Joy L. POS3-31, POS4-37
Hartmann-Boyce, Jamie PPS10-7
Hasan, Afsheen POS1-15, PPS20-6
Hassmiller Lich, Kristen POS1-89
Hatteberg, Sarah POS1-105
Hauser, Cindy POS2-98, POS4-84
Hawk, Ernest PPS4-6
Hawk, Larry W. POS3-13, PPS13-1, PPS13-2
Hawkins, Allison POS1-57
Hayes-Birchler, Todd POS2-63
He, Yanyun PPS2-1, PPS24-2, PPS24-5
Heath, John POS3-103, POS4-64
Heath, John W. POS1-109, POS2-109
Hébert, Emily T. POS2-45
Hecht, Jacki PPS22-4
Hedeker, Donald POS4-67
Heffner, Jaimee POS1-5, POS2-11, POS2-12, POS2-13, POS3-68, PPS13-4
Heffner, Jaimee L. SYM5-2
Heggeness, Luke F. POS2-19, POS3-15
Helal, Alissa POS3-47, PPS25-4
Heldwein, Scott D. POS3-93
Helseth, Sarah POS1-16
Henderson, Brandon J. SYM1-4, POS4-65, PPS17-4
Henderson, Katherine POS3-103, POS4-64
Henderson, Katherine C. POS1-109, POS2-109
Henderson, Patricia SYM8-1
Hendricks, Peter POS4-6
Hennon, Meredith POS1-30, POS2-107
Henriksen, Lisa PPS2-6, POS3-40, POS3-42, SYM7-3, SYM7-4, SYM7-5
Henry, Tilicea POS4-16
Hensel, Edward POS3-99, PPS25-7
Herbert, Lily PPS2-5
Herman, Benjamin POS1-4
Hernandez, Ashley POS3-55
Hernandez, Cindy PPS19-2
Hernández-Torres, Ruthmarie POS1-28, POS3-108
Hershberger, Pamela PPS7-2
Hertzberg, Jeffrey S. POS2-25, POS2-28
High, Juliet POS2-55
Hilton, Shona POS2-37
Himelhoch, Seth S. POS1-10, POS3-3, PPS3-7
Hinds, Josephine T. PPS20-1, PPS20-2
Hinds III, Josephine T. POS4-90
Hinton, Alice POS2-40, POS3-6, PPS7-1
Hirschtick, Jana L. POS2-53, PPS26-4
Hiteman, Kristin PPS26-6
Hitsman, Brian PPS4-3, POS4-3, PPS13-3
Hnasko, Thomas PPS17-5
Ho, Sai Yin POS3-82
Ho, Sai Yin Daniel POS3-106
Hoang, Minh V. POS2-42
Hoang, Van Minh POS2-85, POS3-75, POS4-57
Hobkirk, Andrea POS4-88, PPS19-5
Hobkirk, Andrea L. POS4-16
Hodi, Frank S. POS1-4
Hoe, Connie POS3-34
Hoek, Janet POS1-40, PPS2-2, PPS2-4, PPS16-1, PPS16-4, PPS24-3
Hoetger, Cosima POS1-22
Hogan, Alexis POS4-22
Hoh, Eunha POS4-93
Hole, Anita POS4-3, PPS13-3
Holford, Theodore POS4-48
Holland, Alice SYM13-3
Holland, Richard POS2-15
Holtz, Kristen POS3-89
Homish, Gregory POS4-60
Homish, Lynn POS4-60
Hood, Kristina POS1-22, POS1-41, POS3-33, PPS19-2
Hoopsick, Rachel A. POS4-60
Hope, Aimie POS2-55
Hopf, Nancy B. POS3-5
Hoque, Sharia POS1-106, POS3-105
Hossain, Fahmida PPS20-4
Hosseini, Sana POS2-97
Houser, Kenneth R. POS4-16
Howard, Gregory POS2-15
Howard, Sam POS2-51
Hrabovsky, Shari POS4-88
Huang, Jidong POS1-31, POS1-109, POS2-48, POS2-109, POS4-99
Huang, Kevin POS4-84
Huffman, Mark D. POS4-3, PPS13-3

Humair, Jean-Paul POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Hummon, Amanda B. POS4-47
Hunsberger, Monica POS2-42
Hunt, Jane Alyce POS1-1
Huque, Rumana POS2-62
Hurst, Alex PPS4-6
Huynh Ba, Chan Nhu POS3-71
Hyland, Andrew POS1-17, POS1-67, POS4-87, PPS5-1, PPS6-4, SYM14-2, SYM14-3, SYM14-4, SYM15-1, PPS24-2, PPS24-5

I

Imran, Rabia POS2-41
Inoue-Choi, Maki POS2-80
Islam, Farahnaz PPS14-4

J

Jabba, Sairam PPS17-1
Jackson, Asti POS2-22, PPS11-1
Jackson, Melissa POS4-13
Jackson, Sarah E. POS1-76, PPS5-5
Jacobs, Cindy PPS18-2
Jacobs, Megan A. SYM11-4
Jacobs, Wura POS3-91, POS4-77, SYM12-3
Jacot-Sadowski, Isabelle POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Jacques, Nerline POS3-60
Jaffri, Mohammed POS4-48, PPS26-3
Jafry, Midhat Z. POS2-60
Jagiasi, Dinesh POS1-86, POS4-107
Jakob, Julian POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Jamal, Ahmed SYM11-1
Jandarov, Roman A. POS1-26, POS4-93
Jao, Nancy C. POS3-14, POS4-12, PPS9-3
Japuntich, Sandra J. POS1-16, POS2-3, SYM6-1
Jarman, Kristen L. PPS23-3
Jarman, Kristen O. POS2-47
Jayasekera, Shehan POS3-99
Jebai, Rime PPS23-1
Jensen (nèe King), Jessica POS1-80
Jeon, Jihyoun POS1-65, POS2-80, POS3-109, POS4-48, PPS21-2
Jeong, Michelle POS1-88, POS2-86
Jewett, Bambi POS2-30, POS3-25, POS3-30
Jewler, Kay POS1-53
Jia, Xiaocen POS3-34
Jiang, Nan PPS21-5
Jiang, Yu POS3-51
Jimenez-Mendoza, Evelyn POS1-65, POS3-109
John, Lovina POS4-2, POS4-91
John, Rijo M. PPS14-7
Johns, Michelle POS3-60
Johnson, Adrienne L. POS4-20
Johnson, Andrea C. SYM16-5
Johnson, Dawn POS1-9
Johnson, Kaprea PPS19-2
Johnson, Louisa POS2-49
Johnson, Marie PPS3-3
Johnson, Trent POS3-40, SYM7-4
Jones, Erin PPS21-6, PPS21-7
Jones, Jamal T. SYM15-1
Jones, Sarah R. PPS3-5
Jones, Staryn POS4-97
Jones, Stephanie PPS8-6
Jordan, Timothy PPS8-2
Jordt, Sven-Eric PPS17-1
Jorenby, Douglas POS3-4, SYM17-2
Jorenby, Douglas E. POS2-63
Joseph, Melina POS4-8
Joseph, Skylar POS4-97
Judd, Lucy POS3-24

K

Kaai, Susan C. POS1-40, POS2-73
Kahler, Christopher W. PPS22-4
Kahn, Linda S. POS4-60
Kaiser, Lisa POS4-9, PPS7-2, PPS25-2
Kaiser, Lisa M. POS1-98, POS2-102
Kakade, Narendra POS2-61
Kalan, Mohammad E. POS1-77
Kale, Dimitra POS1-76, SYM10-4
Kali, Kgomotso POS4-31
Kamzabek, Arailym PPS25-6
Kanaan, Mona POS2-78
Kanel, Moana SYM15-1
Kapka, Anne POS1-15
Kaplan, Bekir POS1-52, POS2-68, POS3-57
Karam, Ebrahim POS4-71
Karam-Hage, Maher PPS4-6
Karan, Anup PPS14-7
Karanja, Mercy POS1-10
Karaoghlanian, Nareg POS1-7, POS3-47, POS3-59, PPS25-3, PPS25-4
Karekla, Maria POS1-5
Karen Scherr, Karen POS4-63
Kasza, Karin POS1-97, PPS6-4
Katanoda, Kota SYM14-2, SYM14-3, SYM14-4
Katz, David POS1-33
Kauffman, Brooke POS2-19
Kauffman, Brooke Y. POS3-15
Kaufman, Annette POS4-68
Kaufman, Pamela POS1-93, POS3-92, PPS10-2
Kaur, Manpreet POS3-95, POS4-97
Kavanagh, Paul PPS3-3
Kaye, Jesse POS3-76
Kcomt, Luisa POS1-23
Kedia, Satish K. POS1-25, POS3-51
Keeler, Courteny POS4-96
Keeton, Kara A. POS3-55
Kelder, Steven H. POS3-46
Keller-Hamilton, Brittney POS3-65, PPS7-1, PPS7-5, SYM10-3, PPS11-3
Kelley, Dannielle POS4-51
Kelly, Brian C. PPS2-6
Kelly, Deanna L. PPS3-7
Kelly, Megan POS1-5
Kelly, Peter J. PPS4-3, SYM13-1
Kendall, Ashley POS4-67
Kendzor, Darla E. POS1-15, POS1-57, SYM3-1, POS3-18, POS3-67
Kennedy, Chris J. POS1-64
Kennedy, Ryan D. POS1-35, PPS7-4
Kennedy, Ryan David POS1-38, POS2-33, POS2-36, POS3-34, POS3-53, POS3-63, POS4-45, POS4-51, PPS14-5
Kernan, Colleen PPS4-1
Kessomboon, Pattapong POS3-49
Ketchem, Justin POS1-71
Ketcher, Dana POS2-1
Khan, Ali PPS26-7
Khan, Amina PPS16-2
Khan, Arshima PPS14-1
Khan, Jasmine POS4-82, POS4-85
Khan, Sadiya S. POS4-3, PPS13-3
Khanna, Niharika PPS4-1, PPS18-7
Khasawneh, Fadi T. POS3-48, PPS15-5, PPS15-6
Khatib, Bushraa PPS24-6
Khayat, Amal POS1-99, POS2-32
Khokhar, Jibran Y. SYM1-2
Kienen, Nadia POS3-10
Kierstead, Elexis POS3-35, POS3-43, PPS24-6
Kim, Jaewhan POS2-39
Kim, Minji POS2-46, POS2-93, POS2-94, POS2-95
Kim, Ryung S. POS2-9
Kim, Su Young PPS5-3
Kim, Yeol PPS5-3
Kim, Yong PPS9-1
Kim, Yoonsang POS3-100
Kimber, Catherine PPS10-4
Kimmel, Heather L. PPS12-3, SYM15-1
Kim-Mozeleski, Jin PPS19-1
King, Andrea POS4-110, PPS8-4
King, Jaelen POS2-70
King, Jaelen I. POS3-64
King Jensen, Jessica L. POS2-39
Kirby, Carrie POS3-74
Kirkpatrick, Matt POS1-8, POS3-66
Kirkpatrick, Matthew G. POS2-93
Kirksey Jones, Candace POS3-60
Kirsch, Julie PPS12-5
Kirsch, Julie A. PPS12-2
Klawans, Michelle R. POS2-10
Klein, Elizabeth POS2-43
Klein, Elizabeth G. SYM6-5, PPS11-4
Kleinjan, Marloes PPS18-4
Klemperer, Elias POS1-75
Klyushnenkova, Elena PPS4-1
Knoeppel, Jennifer POS2-25, POS2-28
Knoll, Marie PPS25-1
Knott, Verner PPS8-5
Kock, Loren PPS2-7, PPS5-5, PPS6-3, PPS22-1
Koech, Emily POS1-10, POS3-3
Koenig, Lauren A. POS3-93
Koester, Kimberly POS4-92
Kofie, Justina N. PPS21-1
Koh, Howard POS4-36
Kollath-Cattano, Christy POS1-105
Kong, Amanda SYM7-1, SYM7-2
Kong, Amanda Y. SYM2-2, PPS2-5, PPS19-4
Kong, Grace POS1-72, POS1-92, POS2-52, POS2-74, POS3-27, POS4-35
Kopkau-Janis, Haley E. PPS9-2
Kosterman, Rick POS1-79, POS1-81
Kostygina, Anna POS2-103
Kostygina, Ganna POS3-100
Kotsen, Chris PPS3-2
Kouplen, Kate POS4-108
Kouzoukas, Erika POS4-66
Kowitt, Sarah D. POS1-73, POS2-47, PPS23-3
Krakauer, Chloe POS3-68
Kramer, Renee POS2-23
Krebs, Nicolle PPS19-5

Krebs, Nicolle M. POS4-16
Kreslake, Jennifer POS2-69, POS2-103, POS3-56
Kreslake, Jennifer M. POS1-63, PPS21-4
Kresovich, Alex SYM9-4
Krishnan-Sarin, Suchitra POS1-56, POS1-72, POS2-22, POS2-52, POS2-74, POS4-35, PPS7-3, PPS10-3, PPS11-1, SYM11-6
Krueger, Evan A. POS4-90, PPS20-1
Kruse, Gina POS4-107
Kucera, Cory PPS25-5
Kucherlapaty, Padmini POS3-43, PPS6-1
Kue, Donald POS4-22
Kuipers, Mirte A. POS2-20, POS4-58
Kuklinski, Margaret R. POS1-79, POS1-81, POS3-73
Kulkarni, Shweta POS3-67
Kumar, Anika POS1-21
Kumar, Shaji POS1-4
Kundu, Anasua POS2-101, POS4-66
Kunst, Anton POS2-20
Kuo, Tzy-Mey SYM7-1, SYM7-2
Kuramoto-Crawford, Janet PPS12-3, SYM15-1
Kurdyak, Paul POS3-61
Kurien, Jasmin POS1-57
Kurka, Jonathan PPS13-6
Kute, Nikita POS1-109, POS3-103, POS4-64
Kwan, Jonathan POS3-36
Kyburz, Bryce POS1-24, POS2-54, POS2-60, POS3-23, POS3-26, PPS19-3
Kypriotakis, George PPS8-1
Kyriakopoulos, Christos POS1-4
Kyriakos, Christina N. POS4-80

L

Labarbe, Benoît POS4-38
Laestadius, Linnea I. POS2-46
LaFrance, Amy PPS6-6
Lahti, Adrienne POS4-6
Lai, Julia PPS20-4
Lai, Vienna Wai Yin POS1-96, POS2-2, POS3-79
Lai, Wai Yin, Vienna POS3-80
Lakkis, Issam POS2-97
Lal, Pranay POS1-36
Lallai, Valeria SYM1-3, PPS17-3
Lam, Tai Hing POS1-96, POS2-2, POS3-79, POS3-80, POS3-82, POS3-106, POS4-43
Lambart, Leah SYM10-1, SYM10-2, SYM12-4
Land, Stephanie POS1-4, POS1-65
Lappin, Julia PPS22-2
Lara, Daimarelys POS1-28
LaRowe, Lisa R. POS3-7, POS3-11
Larsen, Meng Zhen PPS16-6
Lathen, Lorraine POS4-20
Lawson, Schuyler C. POS4-60
L. Clendennen, Stephanie POS3-70
Le, Chuong P. POS3-67
Le, Nicolette POS1-94
Le, Tina N. POS3-67
Leahey, Tricia SYM6-1
Leas, Eric POS1-44
Leavens, Eleanor L. SYM10-1, SYM10-2, SYM11-5, SYM17-3
Leavens, Elly SYM12-4
Lebina, Limakatso POS1-104
Lee, Donghee SYM10-3
Lee, Donghee N. POS2-45, POS3-52, POS4-76, PPS11-3
Lee, Jay Jung Jae POS3-82
Lee, Jennifer POS1-100
Lee, Jeong Kyu POS2-76, POS3-81
Lee, Jerry W. POS1-19, POS3-19
Lee, Jonathan PPS6-2
Lee, Ju-Whei POS1-4
Lee, Juhan POS1-92, POS2-74, SYM9-1
Lee, Sarah POS2-93
Lee, Sujin PPS5-3
Lee, Sungkyu PPS5-3
Lee, Terrence POS2-23, PPS21-1
Lee, Zoe POS4-110
Leigh, Noel SYM14-1, PPS15-3
Leigh, Noel J. POS1-98, POS2-106, POS3-93, PPS7-2, PPS25-2
Leischow, Scott SYM8-5, PPS13-5, PPS13-6, PPS18-2
Leleck, Olivia POS3-55
Lempert, Lauren POS2-96
Lenza, Brianna POS4-22
Leone, Frank T. POS4-3, PPS13-3
Lerner, Jenn POS4-41
LeSage, Mark POS1-48
LeSage, Mark G. POS2-51
Leung, Wei Lin POS4-43
Leventhal, Adam POS1-8, POS4-12, PPS11-2
Leventhal, Adam M. POS1-13
Levin, Jacob POS2-26
Levine, Hagai POS1-99, POS2-32
Levine, Michele POS3-22
Levy, David POS1-65, POS3-109, POS4-48, PPS21-2
Levy, David T. POS3-72, PPS25-1, PPS26-3
Levy, Douglas E. PPS22-4
Levy, Sera POS4-6
Li, Dongmei POS1-84, POS2-46, POS2-50, POS2-93
Li, Jenny S. POS4-83
Li, Le PPS21-5
Li, Wei POS1-72, POS1-77
Li, William Ho Cheung POS3-82
Li, Yajie POS3-79
Li, Zhuoran POS1-45, POS2-64, POS4-56
Li, Zhuroan PPS16-6
Liber, Alex PPS1-4, POS2-58, POS3-109
Liber, Alex C. POS1-43, POS3-72, SYM4-2, PPS26-3
Lien, Rebecca POS2-66
Liggins, Charlene POS4-101
Lin, Crystal POS2-96
Lin, Hsien-Chang POS1-50, POS4-49
Lin, Joyce POS4-74, POS4-106
Lin, Meng-Yun POS4-15
Lindson, Nicola PPS10-7
Ling, Meng PPS20-3
Ling, Pamela POS1-103, POS2-56, POS3-17
Ling, Pamela M. POS4-92
Lipato, Thokozeni POS1-7
Lipkus, Isaac POS4-75
Little, Melissa SYM12-1
Liu, Jessica POS4-41, PPS6-2, SYM10-3, PPS11-3, SYM12-2, PPS21-3
Liu, Jiaying POS2-94, POS2-95, POS4-105, PPS21-6, PPS21-7
Liu, Michael POS4-59
Liu, Shiyang POS2-69, POS3-56
Liu, Sixiao POS4-14
Liu, Yuhan SYM7-3, SYM7-4
Liu-Savolainen, Jie POS3-74
Livelsberger, Craig POS4-16, PPS19-5
Llanes, Karla POS4-92
Lockhart, Darcy E. POS4-15
Logie, Carmen POS2-110, PPS20-5
Long, Lauren POS3-65, PPS7-5
LoParco, Cassidy POS2-54
Lopez, Erick POS3-27
Lopez-Galvez, Nicolas POS4-93
Lotfipour, Shahrdad SYM1-1
Loukas, Alexandra POS1-55, POS1-60, POS1-82, POS2-75, POS2-99
Love, Jesper POS2-42
Lowe, Alexander POS4-44
Lu, Rong SYM7-3, SYM7-4
Lu, Wenhua SYM12-3
Lu, Yu POS1-20, POS1-66, POS4-34, POS4-70
Lubitz, Su Fen POS4-3, PPS13-3
Ludwig, Katelyn R. POS4-47
Lui, Camillia POS3-91, POS4-77
Lui, Michelle PPS3-2
Luk, Tzu Tsun POS2-2, POS3-79, POS3-80, POS4-43
Luke, Doug SYM7-5, SYM7-6
Lukowski, Jessica K. POS4-47
Lunn, Mitchell R. POS4-14
Luo, Xianghua POS1-29
Lur, Gyorgy PPS17-5
Lyons, Ailsa PPS3-3

M

Ma, Shaoying POS2-38, PPS20-3
MacDonald, Catherine POS2-110
Machado, Nathalia M. POS3-84, POS4-72
Maciosek, Michael PPS6-6
Mackey, Tim K. POS1-94, POS2-5
Mackey, Timothy K. POS1-45, POS2-64, POS4-56, PPS16-6
Mackintosh, Eleanor POS4-84
Maconi, Melinda L. POS1-78
Madar, Alena POS2-36, POS3-63
Madar, Alena E. PPS23-6
Madhankumar, Savita PPS17-2
Madison, Matthew C. PPS15-1
Magaroli, Camilla PPS15-1
Mahabee-Gittens, E. Melinda POS1-26, POS2-29, POS2-67, POS4-93, PPS9-5, PPS9-6
Mahabee-Gittens, Melinda POS3-90
Mahmud, Kazi M. SYM10-2
Mahoney, Martin C. POS3-13, PPS13-1, PPS13-2
Majeed, Ban A. POS1-71
Majmundar, Anuja POS1-42, POS3-21, POS3-32, POS3-45
Majumder, Nabanita POS1-86, POS2-77
Maki, Alexander POS4-44
Maldonado, Gabby POS1-22
Maldonado, Gabrielle POS2-41
Maley, Grace E. POS3-93
Mallahan, Stephanie SYM17-4
Mallock, Nadja POS2-79
Malterud, Andie POS2-21
Mandal, Gauri POS1-86, POS3-78
Mandal, Rachel J. POS4-101
Manely, Hiela POS1-44, POS3-74

Manning, Victoria PPS4-3
Mantey, Dale POS4-95
Mantey, Dale S. POS2-31, POS3-46
Manyanga, Jimmy PPS15-4
Marcelletti, Anthony POS3-40
Margaritis, Whitney POS3-18
Marrero, Rebecca PPS7-3
Marshall, Daniela PPS12-3, SYM15-1
Marshall, Lynne P. POS3-55
Marti, C. Nathan POS2-99
Marti, Nathan POS1-55, POS1-60, POS1-82
Martin, Connor POS4-9, PPS7-2
Martin, Connor D. POS1-98, POS2-102, PPS25-2
Martin, Jim D. POS1-73
Martin, Nadia POS1-40
Martinez, Bianca POS4-22
Martinez, Chabeli PPS18-6
Martinez, Marisol PPS13-5
Martinez, Sydney POS1-15, PPS20-6
Martinez, Ursula POS1-6, POS1-59, POS1-78
Martinez, Marisol PPS13-6
Martinez Leal, Isabel POS1-24, POS2-54, POS2-60, POS3-23, POS3-26, PPS19-3
Martinson, Neil POS1-104
Marynak, Kristy SYM2-5, POS4-51
Masalkhi, Mouayad PPS3-3
Mascolo, Cecilia POS2-55
Mason, Emily POS4-82, POS4-85
Mason, Tyler POS1-8, PPS11-2
Masonbrink, Abbey R. POS1-1
Masyn, Katherine POS1-109, POS2-109, POS4-19, PPS26-5
Matera, Carlo PPS17-3
Matson, Nate D. SYM11-3
Matt, Georg E. POS4-93, PPS9-6
Matthews, Eva POS3-74
Mavreles Ogrodnick, Michelle POS4-64
Max, Wendy POS4-96
Maxton, Olivia PPS1-2
Mayer, Ingrid POS1-4
Mayer, Margaret POS2-23
Mayers, Elizabeth SYM6-5
Mayo, Matthew SYM10-2, SYM17-3
Mayo, Matthew S. SYM12-4
Mays, Darren POS1-75, POS3-65, PPS7-1, PPS7-5
Maziak, Wasim PPS23-1
Mazzella, Matthew PPS9-6
Mbulo, Lazarous POS4-81, PPS14-3
McCabe, Sean E. POS1-23
McCann, Amanda PPS3-3
McCarter, Kristen PPS4-3, SYM13-1
McCarther, Kristen POS3-24
McCarthy, Danielle E. PPS12-2
McCauley, Devin M. POS4-78
McClernon, Joe PPS3-4, POS4-10
McClure, Erin POS1-14
McClure, Erin A. POS1-17, POS1-67, SYM6-3
McClure, Jennifer POS3-68
McCubbin, Andrea POS2-8
McDonald, Andrea SYM12-3
McElroy, Joseph P. POS1-95, POS4-47, POS4-79
McIntosh, Scott POS1-28, POS1-46, POS3-95, POS4-97, PPS18-6
McKay, Dean POS2-65
McKay, Tatum POS3-54, PPS21-4
McKeganey, Neil POS1-101
McKenna, Benjamin POS2-11, POS2-12, POS2-13, PPS13-4
McLaughlin, Victoria POS4-22
McLeish, Alison C. POS4-37
McMahon, Lance PPS17-6
McMains, Joshua PPS21-6, PPS21-7
McMann, Tiana POS1-94, POS4-56
McNeel, Timothy POS2-80
McNeill, Ann POS2-58, POS4-61, PPS22-1, PPS23-2
McQuoid, Julia POS3-17, SYM5-1
McRae-Clark, Aimee POS1-17
McRobbie, Hayden PPS10-4, PPS10-7, PPS22-2
Mdege, Noreen D. PPS14-7
Meciar, Isabel POS3-38, PPS16-5
Medina-Ramirez, Patricia POS1-59
Medoff, Deborah R. POS1-10
Meester, Noah G. POS4-62
Mehta, Toral POS2-40, POS3-6
Mehta Kircher, Sheetal POS1-4
Meissner, Helen I. POS4-101
Melamed, Julia PPS18-7
Melzer, Anne PPS4-2
Mendez, David POS1-58
Meng, Gang SYM14-2, SYM14-3, SYM14-4
Mengesha, Deborah POS3-2
Mengist, Abraham PPS26-7
Menkevich, Madison PPS1-2
Mercincavage, Melissa POS2-71, POS2-84, POS4-22, POS4-102, SYM16-4
Merianos, Ashley L. POS1-26, POS2-29, POS2-67, POS3-90, POS4-93, PPS9-5, PPS9-6
Mermelstein, Robin POS1-75, POS4-67
Mermelstein, Sarah POS1-1
Merrill, Regina POS1-94
Merzianu, Andreea D. POS2-106, POS4-86
Mestre, Luis POS3-87
Metrik, Jane POS1-47
Meza, Rafael POS1-61, POS1-65, POS2-53, POS2-63, POS2-80, POS3-109, POS4-48, PPS21-2
Middleton, Tanya J. PPS19-2
Mihalic, Jana POS4-74, POS4-106
Miller, Connor SYM14-1
Miller, Donald POS1-32
Miller, Felicia POS4-22
Miller, Melissa K. POS1-1
Miller, Sierra POS2-12, POS2-13, PPS13-4
Mills, Sarah POS2-103, POS4-36
Mills, Sarah D. POS1-89, PPS2-5
Milstred, Andrea POS1-18
Milstred, Andrea R. POS1-70, POS1-107, POS3-97
Min, Jung-Yun PPS20-2
Minami, Haruka POS2-65, PPS22-4
Mistry, Ritesh POS1-65, POS3-109
Mitsopoulos, Eve POS4-103
Mocniak, Leanne POS4-33
Mocniak, Leanne E. POS3-85
Mohn, Paloma POS3-74
Mohr, David C. POS4-3, PPS13-3
Mok, Yoonseo POS2-80, POS4-48, PPS21-2
Montemayor, Benjamin N. POS2-29, PPS19-2
Montgomery, LaTrice POS2-31
Monzon, Jose Carlos PPS12-1
Moodie, Crawford PPS23-5
Moore, Graham PPS2-7
Mooring, Ronald POS1-69
Morales, Jackie PPS13-5, PPS13-6
Moran, Meghan POS1-53, POS4-51
Morean, Meghan POS2-70, POS3-50, POS3-64, POS4-8, POS4-35, PPS10-3
Morean, Meghan E. POS1-72, POS2-52
Moreno, Oswaldo PPS19-2
Morgan, Tucker POS4-100
Mori, Kellie M. POS1-95
Morphett, Kylie A. SYM13-3
Morris, James D. SYM12-1
Morse, Aura Lee SYM15-1
Morton, Jeremy POS4-81
Mosalpuria, Kavita POS1-80
Moseley, Kristen POS3-25
Mosimann, Angela PPS14-6
Mosimann, Angela Flavia PPS10-5
Motlhaoleng, Katlego POS1-104
Motschman, Courtney POS3-9
Moustafa, Donia POS4-74, POS4-106
Moyer, Jonathan POS4-101
Moyer, Margo POS1-21
Muelken, Peter POS1-48
Mukerjee, Richa PPS26-4
Mukherjee, Nirmalya POS2-36, POS3-63
Mull, Kristin PPS18-3
Mull, Kristin E. POS2-72
Mullany, Erin POS2-49, POS3-101
Muller, Hope POS1-90, POS2-103, POS4-36
Mullin, Brian POS1-21
Mullis, Kristina SYM6-5, SYM11-3
Mun, Sophia POS3-68
Muñoz, Geovani PPS19-2
Murka, Jonathan PPS13-5
Murphy, Cara SYM3-5
Murthy, Dhiraj POS1-92, POS3-27, SYM9-2
Murthy, Pratima POS2-62
Mus, Sophia PPS12-1
Mushtaq, Nasir POS4-108
Musyoki, Helgar POS1-10
Muthumala, Charika PPS2-2
Muthumalage, Thivanka PPS15-2
Muzasizi, Ezekiel PPS3-6

N

Nadim, Haleh POS2-22
Nadolski, Katherine N. PPS9-2
Nakkash, Rima PPS23-1
Nali, Matthew POS1-45, POS1-94, POS4-56, PPS16-6
Nam, Joon Kyung POS4-49
Nana-Sinkam, Patrick POS1-22
Narayanan, Pradeep POS1-36
Nargis, Nigar POS1-42, POS3-21, POS3-32
Naughton, Felix POS2-15, POS2-55, PPS10-4
Navarro, Mario POS4-39
Navas-Acien, Ana POS3-57, POS4-74, POS4-106
Nazar, Gaurang P. POS1-36, PPS14-7
Neal, Joel POS1-4
Neal, Kirstie SYM15-1
Neelapaichit, Nareemarn POS3-49
Neff, Linda SYM15-1
Nelson, Anna POS1-19, POS3-19
Nelson, Carlin POS1-63, PPS21-4
Nelson, Carlin D. POS3-54, POS4-59
Nemeth, Julianna POS2-43

Nemeth, Julianna M. SYM6-5
Neslund, Elizabeth PPS17-2
Netzer, Seraina PPS14-6
Neumark, Yehuda SYM6-2
Newcombe, Kyra POS4-70
Newton, Annabelle POS4-84
Ng, Nawi POS2-42
Ngcobo, Zinhle PPS14-1
Ngobese, Senamile P. PPS14-1
Ngunu, Caroline POS1-10
Nguyen, Anna POS3-67
Nguyen, Nhung POS1-103, POS4-92
Nguyen, Phuong T. POS2-42
Nguyen, Quincy POS1-94
Nguyen, Thi Ngoc Phuong POS2-85, POS3-75, POS4-57
Nian, Qinghua POS1-35, POS1-38, POS3-34, POS3-53, POS4-45
Niaura, Raymond POS1-104, POS4-3, PPS9-3, PPS13-3, PPS21-5
Nicholson, Andrew POS4-100
Nides, Mitchell PPS13-5, PPS13-6, PPS18-2
Niranjan, Vikram PPS3-3
Nizami, Asad POS2-62
Niznik, Taylor POS3-18
Njie, Gibril J. POS3-60, POS4-81
Nkosi, Lungile POS4-31
Noble, Bishop POS1-57
Nollen, Nicole SYM10-1, SYM10-2, SYM12-4
Nollen, Nikki SYM17-3
Noonan, Devon POS2-87, POS4-63
Norris, Andrew POS3-100
North, Caroline POS2-75
Northrup, Thomas PPS22-3
Northrup, Thomas F. POS2-10
Notley, Caitlin POS2-14, POS2-15, POS2-55, PPS10-7
Nottage, Matilda POS2-58
Ntansah, Charity A. SYM16-2
Nurhasana, Renny POS4-28

O

Obedin-Maliver, Juno POS4-14
O'Brien, Maureen G. PPS3-2
O'Connell, Erin POS3-101
O'Connor, Richard POS1-68, POS4-61, POS4-87, POS4-91, PPS5-3
O'Connor, Richard J. POS1-97, POS2-86, PPS7-2, SYM14-1
O'Crowley, Erin POS2-11, PPS13-4
O'Donnell, Rachel PPS23-5
O'Donovan, Bernadette PPS17-1
Odour, Patience POS3-3
Oduor, Patience POS1-10
Oesterle, Sabrina POS1-79, POS1-81, POS3-73
Ogden, Erin PPS19-1
Ogedegbe, Chinwe POS4-18
Ogretmen, Ari POS4-5
Ogrodnick, Michelle POS3-103
Ogrodnick, Michelle M. POS1-109, POS2-109
Oh, Hayoung PPS1-3, PPS26-4
Oh, Jin-Kyoung POS2-85, POS3-75, POS4-57
Ohman-Strickland, Pamela POS1-39
Ojoo, Sylvia A. POS1-10
Okereke, Chukwuma POS3-101
Okitondo, Christian POS3-32
Okuyemi, Kolawole POS1-29
Oliver, Jason A. POS4-10
Olszewski, Nathan A. PPS17-4
O'Malley, Stephanie POS1-37, POS2-22, PPS7-3, PPS10-3
O'Malley, Stephanie S. POS1-56
Omega-Njemnobi, Onyinye POS2-31, POS4-95
Omoussa, Oumaima POS4-58
O'Neal, Riley POS2-18
Onigbogi, Olanrewaju POS1-29
Orfin, Rafael H. PPS18-6
Ornstein, Joseph SYM7-5
Orr, Megan POS1-32
Osborn, Catherine PPS11-4
Osibogun, Akin POS1-77
Osibogun, Olatokunbo POS1-77, POS2-4, POS3-39
Osoba, Moyosoore POS2-4, POS3-39
Ossip, Deborah POS1-28, POS1-100, POS3-108, POS4-97, PPS18-6
Ossip, Deborah J. POS3-95
Ostroff, Jamie POS1-4, PPS3-2
Ouimet, Janine SYM14-3, SYM14-4
Ouyang, Wenyi PPS17-1
Owens, Ashlyn POS3-60
Oyapero, Afolabi POS2-4, POS3-39
Ozga, Jenny E. POS2-9, POS2-46, POS2-93, POS3-31, POS3-45

P

Page, Michelle SYM14-1
Page, Michelle K. POS1-98, POS2-102, POS2-106, POS3-93, POS4-86
Palipudi, Krishna M. PPS14-3
Palmer, Amanda POS1-11, POS2-17, POS4-5, SYM6-3, PPS10-1
Palmer, Amanda M. POS1-12
Pan, Liping POS3-60
Pang, Raina POS2-82, POS3-66, POS4-12
Pang, Raina D. POS1-3
Panico, Jared M. POS4-7
Papandonatos, George D. POS4-3, PPS13-3
Parasuraman, Sulabha POS2-77
Paris, Kate POS4-84
Park, Elyse POS1-4, POS1-100, POS3-1
Park, Hyejin POS4-109
Parker, Maria POS3-87
Parks, Michael J. POS4-89
Pasch, Keryn E. PPS1-6, POS2-90
Patanavanich, Roengrudee POS1-54, POS3-49
Patel, Dhruva POS1-53
Patel, Mayuri POS2-60, POS3-23, POS3-26
Patel, Minal POS1-42
Patev, Alison J. PPS25-4
Patrick, Megan POS4-89
Patrick, Megan E. POS2-35, PPS6-7
Patterson, Joan POS3-65
Patterson, Joanne SYM10-3
Patterson, Joanne G. POS4-90, SYM5-3, PPS7-5, PPS11-3, PPS20-1
Patton, Andrea POS1-101
Patton, Caroline D. PPS20-2
Paulson, Amy POS4-62
Pbert, Lori POS4-76
Pearce, Jamie PPS2-7
Pearson, George POS3-35
Pearson, Jennifer PPS1-4, POS1-39, POS1-91, POS2-100, POS4-22, POS4-32, PPS13-5, PPS13-6
Pebley, Kinsey SYM12-1
Pechacek, Terry POS1-109, POS2-38, POS2-109, POS3-103, POS4-64
Pedersen, Eric POS1-83
Pei, Di POS4-50
Pender, Jack POS1-69
Peraza, Natalia POS1-8, POS1-13
Perez, Sara POS3-44
Perry, Natasha POS4-13
Perski, Olga POS1-76
Pesko, Michael PPS24-1
Peters, Priscilla POS3-95
Petersen, Anne B. POS1-19, POS3-19
Petersen, Nicole POS2-82, PPS8-2
Peterson, Emily B. POS2-21
Pfund, Christine POS3-36
Phan, Liliana POS3-30
Phan, Lilianna POS2-30, POS3-25, POS3-29, POS4-73
Philipps, Nicole POS4-1
Phillips, Bethany A. POS2-98
Phillips, Serena PPS24-1
Pia, Tyler POS4-40
Pianin, Stephen POS4-55
Piasecki, Thomas M. POS3-4, PPS12-2, PPS12-5
Pichon, Latrice C. POS3-51
Pickworth, Wallace PPS26-6
Pierce, John POS1-44
Pierre, Fabiola POS1-100
Pike, Stephanie PPS26-5
Pike Moore, Stephanie POS4-19
Piper, Megan E. POS1-50, POS2-63, POS3-4, SYM17-2, SYM17-2
Pisoni, Angela POS4-10
Pitts, Stephanie R. POS4-39
Planinac, Lynn POS2-110, POS4-104, PPS20-5
Pohle, Susanne POS3-8, PPS14-6
Poliak, Adam POS4-39
Pollak, Kathryn POS4-63
Pollak, Kathryn I. POS2-87
Pomichter, Emily POS1-75
Pope, Ian POS2-14
Popova, Lucy POS1-34, POS3-31, POS4-50, PPS12-7
Potter, Jennifer POS4-14
Potts, Wendy POS1-10, POS3-3, PPS3-7
Powell, Sean T. POS1-78
Powers, Jessica M. POS3-11
Prabhu, Prital POS3-85
Pradhan, Sultan POS4-107
Pranesh, Chowdhury PPS14-3
Prasad, Krishna POS2-62
Pratt, Rebekah POS1-16, POS1-29
Pratt, Sarah PPS22-5
Pravosud, Vira POS2-56
Prevost, A. Toby POS2-55
Price, Lawrence H. PPS22-4
Price, Sarah PPS10-1
Prochaska, Judith PPS12-6, PPS18-2
Prochaska, Judith J. POS3-40, SYM7-4
Puljevic, Cheneal POS3-38, PPS16-5
Purushothaman, Vidya POS1-45, POS4-56
Purushothaman, Vidya L. POS2-5

Q

Qi, Fei POS3-34
Qiu, Huiliang PPS25-6
Qu, Xiao Jie POS2-76
Quah, Anne PPS5-3
Quah, Anne C. POS1-40, POS2-73
Quah, Anne C.K. SYM14-1, SYM14-3, SYM14-4
Queen, Tara POS2-47
Queimado, Lurdes POS4-94, POS4-98, PPS15-4
Quinn, Seamus PPS3-3
Quintana, Penelope J. POS4-93
Quisenberry, Amanda J. POS2-43, POS4-87, POS4-91, PPS11-4

R

Rabenstein, Andrea POS2-79
Rafferty, Henry POS2-27
Rahman, Irfan POS2-50, PPS15-2
Rajan, Sukanya POS2-62
Rakowski, Samantha POS1-57
Ramalingam, Anand PPS25-5
Ramírez-Palacios, Paula POS4-54
Rammaha, Thue POS2-7
Ramsey, Alex POS2-7, POS2-16
Randazza, Michael POS2-65
Randell, Kimberly A. POS1-1
Ranney, Leah POS2-47
Ranney, Leah M. POS1-73, PPS23-3
Raskind, Ilana SYM7-4
Rath, Jessica M. POS1-90, POS3-98
Ratih, Suci P. POS4-28
Rayens, Mary Kay POS4-21
Recinos, Amanda SYM7-3
Reece, Scott POS1-5
Reed, Jenna POS4-84
Rees, Vaughan POS4-41, PPS6-2
Regan, Susan POS3-1
Regmi, Sanjaya POS1-25
Reid, Jessica POS2-58, POS4-61, POS4-80, PPS5-1, PPS6-4
Reidy, Dennis E. PPS12-7
Reilly, Erin D. POS1-5
Reimold, Alexandria E. PPS2-5
Reinhardt, Colin PPS6-5
Reisinger, Sarah A. POS1-95, POS4-47, POS4-79
Reitzel, Lorraine POS2-19, POS3-23, POS3-26, PPS19-3
Reitzel, Lorraine R. POS1-24, POS2-54, POS2-60
Reuven, Sean M. POS2-60
Reyes, Eduardo M. POS3-27
Reyes-Guzman, Carolyn M. POS4-38, PPS21-1
Reynolds, Matthew POS4-25, SYM12-2, PPS21-3
Reynolds, Reed M. SYM16-3
Rezk-Hanna, Mary POS2-89
Ribeiro, Marcos POS3-10
Ribisl, Kurt M. SYM7-1, PPS19-4
Rich, Jane SYM13-2
Richardson, David SYM7-2
Richardson, Montana R. POS4-65
Richie, John P. POS4-88
Richie, Jr., John P. POS3-85, POS4-33
Richter, Kimber POS4-72
Richter, Kimber P. POS3-84
Rigotti, Nancy POS3-1, POS4-107, PPS10-7, PPS18-3
Rigotti, Nancy A. PPS18-2, PPS22-4
Rihs, Anna PPS10-6
Rindner, Daniel J. PPS17-5
Ring, Colin POS1-83
Rivard, Cheryl PPS6-4
Rivera, Patricia POS4-18
Roberts, Jane PPS21-3
Roberts, Megan POS3-65, PPS4-4
Roberts, Megan E. PPS7-5
Robichaud, Meagan O. PPS7-4
Robinson, Risa POS3-99
Robinson, Risa J. PPS25-7
Robson, Debbie PPS22-1
Robson, Deborah POS4-61
Rodnay, Maya POS2-32, SYM6-2
Rodondi, Nicolas POS3-5, PPS10-6
Rodríguez-Bolaños, Rosibel POS2-81, POS2-88, POS4-54, POS4-69, PPS16-3
Rogan, Eleanor PPS26-7
Rogers, Kelly POS1-57
Rogova, Anastasia POS1-24, POS2-54, POS2-60, POS3-23, POS3-26, PPS19-3
Rojewski, Alana M. POS1-11, POS1-12, POS2-17, POS4-5
Romero Acosta, Eliany PPS18-6
Romm, Katelyn POS1-18, POS2-32, POS3-42
Romm, Katelyn F. POS1-27, POS2-83
Romm, Katlyn POS1-99
Rosario, Carrie SYM2-1
Rose, Shyanika W. POS3-40, POS4-21
Rosella, Laura POS3-61
Rosen, Jamie SYM6-1
Rosen, Rachel POS1-4, POS3-4, POS4-4
Rosen, Rachel L. POS1-88, PPS22-6
Rosen, Rochelle K. POS2-3
Ross, James POS3-60
Ross, Tara POS1-57
Rostron, Brian L. PPS21-1
Rozon, Ivelisse POS4-100
Rubin, Matine POS2-12, PPS13-4
Rudolph, Jacqueline SYM7-2
Rudy, Alyssa POS1-41, POS3-33, POS3-59
Rule, Ana POS4-74
Rule, Ana M. POS3-57, POS4-106
Rüther, Tobias POS2-79

S

S., Divya PPS21-7
Saba, Nabil POS1-4
Sabo, Patricia PPS3-4
Sachdeva, Kyran POS1-106, POS3-105
Sadasivam, Rajani S. POS3-52, POS4-76
Sadhasivam, Balaji POS4-94, POS4-98, PPS15-4
Saenz-de-Miera, Belen POS4-52, PPS5-4
Safi, Zeinab POS1-74
Saini, Shobhna POS4-97
Sakoda, Lori PPS12-6
Salamba, Thom POS3-77
Salazar, Zenén POS4-17
Saleh, Rawad POS2-97
Salem, Eman M. POS3-93
Saliba, Najat POS3-47, POS4-71, PPS25-4
Salim, Anikah H. SYM15-1
Salisbury, Amy L. PPS9-3
Salman, Rola POS3-47, POS4-71, PPS25-3, PPS25-4
Saloner, Brendan POS1-21
Salyer, Patricia POS2-7
Salzman, Gary SYM17-3
Sambiagio, Nicolas POS3-5, PPS10-5
Sanchez, Sherald POS1-106, POS3-105
Sánchez Pájaro, Andrés POS1-102
Sánchez-Romero, Luz M. POS3-109, POS4-48, PPS25-1
Sanders, Camilla POS2-87, POS4-63
Sanders, Emily C. POS2-21
Sanders-Jackson, Ashley POS4-14
Sandi, Su L. POS3-90, PPS9-5
Sanford, Brandon POS2-17, PPS10-1
Sankey, Julia POS3-45
Santana, Arlenis PPS19-2
Santiago, Angel L. POS1-98, POS2-102
Santiago-Torres, Margarita POS2-72, SYM8-6, PPS18-3
Santoro, Sofia POS2-93
Sargent, James PPS22-5
Sarles, Emma POS3-99, PPS25-7
Satchell, Karryn POS1-79
Satrya, Aryana POS4-28
Savage, Hannah POS4-62
Sawyer, Ashlee POS3-59
Sawyer, Leslie E. PPS18-4
Saykao, Amy POS2-51
S. Bataineh, Bara POS3-70
Scarinci, Isabel POS3-10
Schaeffer Fraase, Kolby POS1-32
Schafer, Melissa POS1-100
Scharf, Tamara PPS10-6
Schillo, Barbara POS3-35, POS3-43, POS3-88, PPS5-2, PPS6-6, PPS24-1, PPS24-6
Schillo, Barbara A. PPS6-1, PPS26-1
Schisler, Eric POS1-66, POS3-58
Schlam, Tanya SYM17-2
Schlecht, Nicolas F. PPS7-2
Schleicher, Nina POS3-42, SYM7-3, SYM7-4
Schleicher, Nina C. POS3-40
Schlienz, Nicolas J. POS1-17
Schmidt-Owens, Mary POS3-28
Schmitz, Joy POS2-10, PPS18-3, PPS22-3
Schneller, Liane M. PPS7-2
Schnoll, Robert A. POS4-3, PPS13-2, PPS13-3
Schoeni, Anna POS3-5, POS3-8, PPS10-5, PPS10-6, PPS14-6
Schrimshaw, Eric POS3-28
Schroll, Monica M. POS4-47
Schroth, Kevin POS4-30
Schuler, Lucy POS3-66
Schuler, Megan POS1-23
Schulte, Alison POS4-12
Schultze, Andrew POS4-106
Schulz, Jonathan POS2-40, SYM10-3
Schulz, Jonathan A. POS3-6
Schulz, Thomas POS2-79
Schurr, Bradley POS4-61, SYM14-1
Schurr, Bradley E. PPS25-2
Schwartz, Robert POS1-93, POS2-101, POS2-110, POS3-92, POS4-66, POS4-104, PPS10-2, PPS20-5
Seaman, Elizabeth POS3-88, PPS5-2
Sebrié, Ernesto POS3-44

Sebrié, Ernesto M. PPS14-2
Sedaille, Jennifer PPS8-3
Segan, Catherine SYM13-1
Segan, Catherine J. POS4-103
Seidenberg, Andrew POS4-68
Selby, Peter POS3-61, POS4-66
Seltzer, Ryan PPS13-5, PPS13-6
Seng, Elizabeth K. POS1-2
Seo, Hong Gwan PPS5-3
Seo, Young Sik PPS6-4
Septiono, Wahyu POS4-28
Sequeira, Dapheny POS1-27
Serfozo, Edit POS1-5
Serrantino, Alison PPS7-3
Severson, Herb POS2-87
Severson, Herbert POS4-63, PPS18-5
Seyl, Christen E. POS4-73
Shafie-Khorassani, Fatema POS2-63
Shah, Hina SYM11-5
Shahab, Lion PPS2-7, PPS6-3, SYM10-4, PPS22-1
Shaikh, Sadiya POS2-50
Shamblen, Steve POS3-45
Shanafelt, Tait POS1-4
Shang, Ce PPS2-1, POS2-38, POS2-109, POS3-65, POS4-19, PPS7-5, PPS20-3, PPS24-2, PPS24-5, PPS26-5
Shanks, Denton SYM17-3
Sharma, Akash D. POS1-85
Sharma, Akshika POS1-97, POS4-87
Sharma, Eva SYM15-1
Sharma, Kriti POS4-101
Sharma, Nitika PPS14-7
Sharp, Amanda POS1-21
Sheeran, Paschal PPS23-3
Sheeran, Paschal O. POS2-47
Shelley, Donna PPS4-5
Shen, Rachel PPS1-5, POS4-46
Shepherd, Justin POS2-19
Shepherd, Justin M. POS3-15
Shepstone, Lee POS2-55
Sherman, Ledric D. POS2-29
Sherman, Scott POS4-100
Shi, Hanxu POS3-106
Shi, Jing POS4-81
Shields, Peter G. POS1-95, POS4-47, POS4-79
Shih, Ya-Chen Tina PPS3-5
Shihadeh, Alan POS2-97, POS3-47, POS4-71, PPS25-3, PPS25-4
Shimul, Shafiun N. POS1-31, POS2-48, POS4-99
Shoben, Abigail B. SYM6-5
Shojaie, Sharareh POS4-39
Shorey Fennell, Bethany PPS3-5
Short, Etta SYM11-3
Shortt, Niamh PPS2-7
Shrestha, Sundar POS2-24
Shumake, Jason D. PPS22-4
Shuter, Jonathan POS1-2, POS1-10, POS2-9, POS3-3, PPS3-7
Siddiqi, Ammar D. POS1-24
Siddiqi, Kamran POS2-62, POS2-78, PPS16-2
Siddiqi, Najma POS2-62
Siddiqui, Faraz POS2-78
Sideropoulos, Vassilis PPS10-4
Sidhu, Anupreet POS4-102
Siegel, Leeann N. PPS1-3
Siegele-Brown, Chloë POS2-55
Silakov, Alexey POS4-33
Silinski, Peter PPS17-1
Silva, Susan POS4-63
Silveira, Marushka L. PPS12-3
Silver, Nathan POS3-35, POS3-43
Silver, Nathan A. PPS6-1
Simkus, Andrew POS3-89
Simmons, Leigh Ann POS4-63
Simmons, Leigh Anne POS2-87
Simmons, Vani POS1-6, POS1-59
Simmons, Vani N. POS1-78
Simon, Patricia PPS11-1
Simonavicius, Erikas POS2-58
Sinamo, Joshua POS3-53, POS4-45
Sinamo, Joshua K. POS1-35, POS1-38
Singh, Amarnath POS4-79
Singh, M. Meghachandra POS1-85
Singh, Pramil N. POS1-19, POS3-19
Skelton, Eliza POS3-24
Skiri, Afef POS1-108, POS2-108
Skolnick, Sarah POS1-61
Slama, Natalie PPS12-6
Slutske, Wendy S. PPS12-2, PPS12-5
Smell, Adrianna PPS19-1
Smiley, Sabrina L. POS3-31
Smith, Carson PPS26-6
Smith, Dana PPS18-5
Smith, Danielle M. POS1-17, POS1-67
Smith, Marissa J. POS2-37
Smith, Matthew L. POS2-29
Smith, Michael A. POS3-18
Smith, Stevens S. PPS12-2, PPS12-5
Smith, Tracy POS2-18
Smits, Jasper A. PPS22-4
Smoot, Charles POS3-74
Snell, Morgan PPS22-7
Snyman, Tracy POS1-104
Son, Yeongkwon POS4-22
Sonawane, Vinayak POS2-77
Song, Hairong POS4-34
Song, Min-Ae POS1-95, POS4-47, POS4-79
Soulakova, Julia POS3-28
Soule, Eric POS1-69, POS1-93, POS3-92, PPS10-2
Souprountchouk, Valentina POS4-102
Sousan, Sinan POS1-69
Souza, Mirian C. POS4-48
Sparrock, Lindsey POS2-30
Spears, Claire POS2-109, POS4-64, PPS12-7
Spears, Claire A. POS1-109
Specker, Sheila POS1-29
Spellman, Mackenzie POS2-10
Spillane, Torra E. PPS23-6
Springer, Matthew L. PPS25-6
Sriraman, Natasha POS4-62
Srivastava, Rishab POS3-74
Stanley, James POS1-40
Stanton, Cassandra POS3-45, SYM15-1
Stanton, Cassandra A. POS1-2, POS2-9, POS2-46, POS2-93, POS3-31, POS3-36
Staples, Ann H. POS1-73
Stark, Debra SYM15-1
Steadman, Kathryn J. SYM13-3
Stefanovics, Elina PPS11-1
Stein, Jeff POS3-37
Steinberg, Marc POS4-4
Steinberg, Marc L. POS1-88, PPS22-6
Stepanov, Irina POS1-48, POS2-51
Sterling, Kymberle POS2-31, POS4-19, PPS26-5
Stern, Esther POS2-82
Stevens, Elise SYM10-3
Stevens, Elise M. POS2-45, POS3-52, POS4-76, PPS11-3
Stevens, Elizabeth R. POS4-100
Steward, Katherine POS1-32
Stoll, Yvonne POS2-79
Stone, Matthew POS1-44, POS4-23, POS4-55
Stone, Matthew D. POS2-84
Stone, Timothy POS1-26, POS4-93
Stotts, Angela PPS18-3, PPS22-3
Stotts, Angela L. POS2-10
Strasser, Andrew POS2-71, POS2-84, POS4-23, POS4-55, POS4-102
Strassmann, Alexandra POS3-5
Streck, Joanna POS1-4
Streck, Joanna M. POS3-1
Strong, David POS1-44, POS3-74
Stroud, Laura R. POS3-14, PPS9-3
Stroup, Andrea M. POS3-36, POS3-45
Stubbs, Thomas POS3-41
Stuber, Mirah POS3-5, POS3-8
Suchting, Robert POS2-10, POS2-57, POS3-83
Suhadi, Dollaris R. POS2-44
Sullivan, Brianna B. PPS18-3
Sullivan, Brianna M. POS2-72
Sumbe, Aslesha PPS1-1, POS2-57, POS3-70, POS3-83
Sumibcay, Jake Ryann POS4-36
Summers, Jennifer SYM13-4
Sun, Christina POS1-33
Sun, Dennis SYM7-3
Sun, Ruoyan POS1-58
Sung, Hai-Yen POS4-96
Suraapaneni, Sriya PPS7-1
Suresh, Kalathil PPS15-3
Sutherland, Emma POS3-55
Sutradhar, Rinku POS3-61
Suttiratana, Sakinah C. POS3-27
Sutton, Stephen POS2-55
Sutton, Steven K. PPS18-4
Swan, Sunaina PPS1-1
Swanson, Ayrianna POS1-57
Sweeney, Rohan SYM13-1
Sweet, Lawrence H. PPS21-6, PPS21-7
Sweitzer, Maggie POS4-10
Syed, Shiraz PPS3-3
Szklo, André S. POS4-48
Szpilzinger, Marc POS2-82

T

Tabuchi, Takahiro SYM14-2, SYM14-3
Tackett, Alayna POS1-8, PPS11-2
Tackett, Alayna P. POS1-13, POS2-45
Tadesse, Lidya POS4-51
Tai, E Shyong POS3-81
Takahiro, Tabuchi SYM14-4
Tal, Kali POS3-5, POS3-8, PPS10-5, PPS14-6
Talih, Soha POS2-97, POS3-47, POS4-71, PPS25-3, PPS25-4
Talukder, Saki R. PPS22-2

Tam, Jamie POS4-48
Tamayo, Edward PPS18-6
Tamí-Maury, Irene POS3-107
Tan, Andy POS4-41, SYM12-2
Tan, Andy S. POS2-71, POS2-84, POS4-14, POS4-25, SYM5-4, PPS21-3
Tan, Chuen Seng POS2-76, POS3-81
Tan, Marcia M. PPS19-6
Tan, Xiaoying PPS17-2
Taneepanichskul, Surasak POS3-49
Tao, Ran POS4-105
Tattan-Birch, Harry PPS5-5, PPS22-1
Tauras, John PPS24-1, PPS24-6
Tautolo, El-Shadan POS1-40
Taylor, Eve V. POS2-58, PPS23-2
Taylor, Kristie SYM15-1
Tegge, Allison POS3-37
Tehrani, Mina POS4-74, POS4-106
Tempany, Clare POS1-4
Templin, Thomas POS4-42
Tetteh-Quarshie, Samuel POS4-65
Thakur, Roma POS1-57
Thanavala, Yasmin M. PPS15-3
Thaper, Sanjana POS4-4
Thaxton-Wiggins, Amanda POS2-8
Theodoulou, Annika PPS10-7
Thomas, Luke POS1-69
Thompson, Mark SYM11-5
Thompson, Mary E. SYM14-2, SYM14-3
Thrasher, James POS2-81, POS2-88, POS4-27, PPS5-1, PPS12-1, PPS16-3, PPS26-2
Thrasher, James F. POS1-102, POS2-47, POS4-69, PPS23-3
Thrul, Johannes POS1-103, POS3-17
Tidey, Jennifer POS1-16, POS2-40, POS3-6, PPS9-4, PPS22-7
Tiet, Alex POS1-69
Tiffany, Stephen POS3-9
Tiffany, Stephen T. POS3-13, POS4-2, PPS13-1
Tigova, Olena POS2-73
Tillery, Anna POS4-74, POS4-106
Titus, Andrea PPS2-6
Tiunn, Hong Lun POS1-46
Toll, Benjamin A. POS1-11, POS1-12, POS2-17, POS4-5, PPS10-1
Tolliver, Eric A. SYM15-1
Tong, Elisa POS3-62
Tong, Elisa K. PPS2-3
Tong, Henry Sau Chai POS1-96, POS2-2, POS3-79
Tong, Sau-chai, Henry POS3-80
Tonkin, Sarah PPS13-2
Torres Alvarez, Rossana POS1-61
Tosakoon, Sararat POS1-99
Tozzi, Joseph POS4-84
Tran, Denise D. POS1-83
Tran, Hy POS3-100
Tran, Thao T. POS2-42
Tran, Thi Phuong Thao POS2-85, POS3-75, POS4-57
Trapl, Erika POS2-43, POS4-19, PPS11-4, PPS26-5
Travis, Nargiz PPS25-1
Treadaway, Hailey POS1-71
Trigg, Joshua POS3-24, SYM13-2
Triplett, Cheryl PPS26-6
Trivedi, Madhukar PPS22-3
Trivers, Katrina POS2-24
Trushin, Neil POS3-85, POS4-88
Tsai, MuChun POS4-47
Tseng, Tuo-Yen POS4-52, PPS5-4
Tsoh, Janice POS3-76
Tsuei, Jeannette SYM6-1
Tucker, Joan S. PPS3-6
Tulsiani, Shreya POS2-66, POS3-56
Tung, Wai POS2-50
Turner, Alyna SYM13-1
Turner, Kea L. POS1-78
Turner, Tari PPS10-7
Twombly, Eric POS3-89
Tyndale, Rachel F. PPS13-1, PPS13-2
Tyrańska-Fobke, Anna POS3-86

U

Unger, Jennifer POS1-64
Unger, Jennifer B. POS2-46, POS2-93, PPS23-4
Unrod, Marina POS2-1
Uriarte, Caitlin PPS1-2
Usidame, Bukola PPS2-6

V

Vallone, Donna POS2-66, POS2-69, POS3-56, PPS21-4
Vallone, Donna C. POS1-90, POS3-98
Vallone, Donna M. POS1-62, POS2-59, POS4-36, POS4-59
van den Putte, Bas POS2-20
Van der Weg, Mark POS1-33
Vander Woude, Catherine A. POS2-35
van de Venne, Judy G. POS3-40
VanFrank, Brenna SYM11-1
Variava, Ebrahim POS1-104
Vassey, Julia POS1-64, POS2-46, POS2-93, SYM9-3, PPS23-4
Vassileva, Jasmin PPS19-2
Vazquez-Otero, Coralia SYM10-3, PPS11-3
Veazie, Peter J. POS1-46
Veilleux, Jennifer C. POS1-66, POS3-58
Veldhuizen, Els POS2-20
Veluz-Wilkins, Anna PPS19-6
Veluz-Wilkins, Anna K. POS4-3, PPS13-3
Venugopal, Dilip POS4-44
Versace, Francesco PPS8-1
Viana, Andres POS2-19
Viana, Andres G. POS3-15
Vickerman, Katrina A. SYM6-5, SYM11-3
Vidaña-López, Dèsirée POS2-88, POS4-69
Vidaña-Pérez, Desirée POS2-81
Vidaña-Pérez, Dèsirée PPS12-1, PPS16-3
Vidrine, Damon J. PPS3-5
Vidrine, Jennifer I. POS1-78, PPS3-5
Vijayaraghavan, Maya POS2-27
Vilardaga, Roger PPS3-4, SYM3-6
Vilches, Joseph R. POS3-12, POS3-16
Villalobos-García, Daniel POS3-48
Villanti, Andrea POS1-75, POS2-84, POS3-1, POS4-30, SYM10-3
Villanti, Andrea C. POS2-40, POS3-6, POS3-36
Villarreal, Yolanda PPS22-3
Villarreal, Yolanda R. POS2-10
Vinci, Christine POS2-1, PPS18-4
Vishwakarma, Monica SYM7-3
Vishwakarma, Monika POS3-40
Vityananan, Patriya POS3-49
Voci, Sabrina POS3-61
Vogel, Erin POS1-8, POS1-64, SYM7-4
Vogel, Erin A. PPS23-4
Vojjala, Mahathi POS4-100
Vollmer, Jacklyn POS3-40
Volz, Sarah C. POS4-68
V. Wilkinson, Anna POS3-70

W

Waa, Andrew M. POS1-40, SYM2-3
Wackowski, Olivia POS1-39, POS1-74, POS3-97
Wackowski, Olivia A. POS1-68, POS1-88, POS2-58, POS2-86
Waddell, Madison L. PPS9-2
Wagener, Theodore POS2-40, POS3-65, SYM10-1, SYM10-2, SYM10-5
Wagener, Theodore L. POS3-6, PPS7-1, PPS7-5
Wagner, Lynne POS1-4
Wagner, Sheri POS1-100
Wahlquist, Amy POS2-18
Wakeman, Sarah POS3-1
Walaska, Kristen A. POS2-3
Walker, Kandi L. POS4-37
Walker, Natalie SYM13-2
Wall, John PPS3-3
Wallace, Kristin PPS8-6
Walsh, David POS1-71
Walters, Kyle POS1-14
Wang, Hongyue POS1-100
Wang, Ke POS4-41
Wang, Lijun POS3-106
Wang, Man Ping POS1-96, POS2-2, POS3-69, POS3-79, POS3-80, POS3-82, POS3-106, POS4-43
Wang, Nan POS3-62
Wang, Rui POS3-34
Wang, Ruixuan POS2-34
Wang, Shirlene POS3-66
Wang, Shu-Hua PPS4-4
Wang, Xi PPS19-5
Wang, Xiaojing POS3-34
Wang, Xiaoyin PPS25-6
Wang, Xinyi POS4-105
Wang, Xu POS2-24
Wang, Yan POS1-27, POS2-83, POS3-42
Wang, Yidi POS2-94, POS2-95, POS4-105, PPS21-7
Wang, Yingning POS4-96
Wangari Walter, Angela POS1-4
Wanke, Kay POS4-101
Wanty, Nicole POS3-89
Ward, Kenneth D. POS3-51
Ward, Stephanie SYM13-3
Warda, Umme S. POS2-89
Warfelli, Sawsan POS3-16
Waring, Joseph POS1-103
Warner, Kenneth E. POS1-58, SYM14-5
Warren, Graham POS1-6
Weant, Marianne H. POS1-73
Weaver, Michael PPS22-3
Weaver, Scott POS1-31, POS2-38, POS2-48, POS3-103, POS4-64, POS4-99
Weaver, Scott R. POS1-34, POS1-109, POS2-109
Wedel, Amelia SYM10-3
Wedel, Amy PPS11-3

Weiger, Caitlin POS2-86
Weinberger, Andrea POS2-26
Weinberger, Andrea H. POS1-2, POS1-3, POS1-10, POS2-82, POS4-40, PPS20-2
Welding, Kevin POS1-35, POS1-38, POS2-33, POS2-36, POS3-34, POS3-53, POS3-63, POS3-71, POS4-45, POS4-51, POS4-52, PPS5-4, PPS14-4, PPS14-5, PPS23-6
Weng, Daniel Y. POS1-95, POS4-47, POS4-79
Weng, Xue POS1-96, POS2-2, POS3-80
Werner, Michael POS3-1
Werts, Samantha SYM17-4
Wesdorp, Carline L. POS4-58
West, Julia C. POS1-75
West, Madeline G. POS3-16
West, Robert POS1-76
Westling, Erika SYM6-4
Westneat, Susan POS3-40
Wetter, David W. POS2-1, PPS3-5
Wewers, Mark D. POS1-95, POS4-47, POS4-79
Whaley, Reid POS1-13
Whaley, Reid C. POS3-102
Whelan, Lindsay POS4-103
White, Augustus POS1-22, POS1-41, POS2-41, POS3-33
White, Cassidy POS4-29
White, Sarah POS4-103, SYM13-1
Whitlock, Charles PPS3-2
Wicke, Rebekah PPS21-6
Wiesen, Christopher A. POS1-89
Wiles, Stacey D. POS1-19, POS3-19
Wiley, Paige POS1-109, POS3-103, POS4-64
Wileyto, E. Paul POS2-84, POS4-3, PPS13-3
Wilker, Olivia G. POS4-100
Wilkerson, Jenny PPS17-6
Wilkinson, Anna V. POS1-55, POS1-60, POS2-57, POS3-83
Williams, Chelsea D. PPS19-2
Williams, Edwina SYM13-2
Williams, Jill M. SYM13-1, PPS22-6
Williams, Kenneshia N. POS1-90, POS3-98
Williams, River POS1-27
Williams, Teresa POS1-24, POS2-54, POS2-60, POS3-23, POS3-26, PPS19-3
Willingham, Kelly G. POS1-87
Wilson, Fernando POS1-80
Wilson, Karen M. POS1-100
Wilson, Nick SYM13-4, PPS16-4, PPS24-3
Wilson, Tim SYM13-4
Wilson, Zane A. POS1-104
Wiltenburg, Thais POS3-10
Winickoff, Jonathan POS1-100, SYM12-2, PPS21-3
Winter, Tiffany PPS4-6
Wipfli, Heather L. POS2-46, PPS3-6
Witkiewitz, Katie POS2-1
Wolf, Bethany PPS8-6
Wong, Carlos King Ho POS3-82
Wong, Melissa POS1-8, PPS11-2
Wong, Yiu Cheong POS3-69
Woodward, Honor M. PPS3-5
Woodward, Jennifer SYM17-3
Worawattanakul, Methavee POS1-54
Worsdale, Allison PPS21-6, PPS21-7
Worthen, Meredith POS1-20
Wray, Jennifer M. PPS13-1
Wright, Kathy POS3-34
Wu, Ran POS2-22
Wu, Shiwen POS4-105
Wu, Wensong PPS23-1
Wu, Yongda POS2-2, POS3-69, POS3-79, POS3-80, POS3-82
Wyatt, Riley POS3-18
Wysota, Christine POS1-99

X

Xie, Lu POS3-51
Xie, Marn PPS1-5, POS4-46
Xie, Yanmei PPS2-6, POS2-35, PPS6-7
Xie, Zidian POS1-84
Xiong, Liyan POS4-27
Xu, Kathleen SYM11-3
Xu, Kerui POS2-23, PPS21-1
Xu, Shaowei PPS5-3
Xu, Shu PPS21-5
Xu, Steve S. SYM14-4
Xu, Steve Shaowei SYM14-2, SYM14-3
Xue, Ashley POS1-42, POS3-32
Xue, Siyu POS1-84
Xue, Zheng POS3-21

Y

Yammine, Luba PPS22-3
Yan, Mi POS1-40, POS2-73, PPS5-3
Yang, Chengwu POS4-76
Yang, Chih-Hsiang POS4-27
Yang, James POS1-50
Yang, Joshua POS1-94, POS4-56, SYM12-3, PPS16-6
Yang, Joshua S. POS3-91, POS4-77
Yang, Min-Jeong POS1-78, POS2-1, PPS18-4
Yang, Qian PPS2-1
Yang, Qinghua POS1-82
Yang, Sijia POS4-105
Yao, Tingting POS4-96
Yao, Ying POS3-82
Yazzie, Alfred SYM8-3
Yingst, Jessica POS4-16, POS4-88, PPS19-5
Ylioja, Thomas PPS19-5
Yong, Hua POS2-6
Yoon, Jin PPS22-3
Yoon, Stephanie N. PPS26-1
Yoshimi, Itsuro SYM14-2, SYM14-3, SYM14-4
Young, William POS2-71
Young Wolff, Kelly PPS12-6
Yu, Xinhua POS3-51

Z

Zale, Emily L. POS3-7
Zapp, Daniel POS2-66
Zappi, Christopher POS2-19
Zarei, Kasra POS2-30, POS3-25
Zarndt, Anh (Bao) SYM15-1
Zatloff, Jesse P. POS4-49
Zavala-Arciniega, Luis POS2-53
Zavala Gomez, Gerardo A. POS2-62
Zawertailo, Laurie POS3-61, POS4-66
Zeev, Yael B. SYM6-2
Zhang, Na SYM10-1
Zhang, Yu POS1-89
Zhao, Daniel POS4-98
Zhao, Shengzhi POS1-96, POS2-2, POS3-80
Zhu, Shu-Hong POS3-74
Zhu, Zechariah POS4-39
Zimmerman, Julie B. POS1-56
Zingg, Taylor POS4-70
Zvolensky, Michael POS2-19
Zvolensky, Michael J. POS2-72, POS3-15
Zwar, Nicholas SYM13-3

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