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PA18-2

SMOKING CESSATION IN MENTHOL AND NON-MENTHOL CIGARETTE SMOKERS

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Background: This research assessed the relations of menthol cigarette use with measures of cessation success in a large comparative effectiveness trial (CET). **Methods:** We conducted secondary analyses of a randomized double-blind, placebo-controlled CET that enrolled 1504 adult smokers who smoked at least 10 cigarettes per day during the past 6 months and reported being motivated to quit smoking. Participants were randomized to one of six medication treatment conditions: nicotine lozenge, nicotine patch, bupropion SR, nicotine patch + nicotine lozenge, bupropion + nicotine lozenge or placebo. All participants received six individual counseling sessions. The analysis sample in the current report consisted of 1439 participants: 814 White non-menthol users, 439 White menthol users, and 186 African American (AA) menthol users. There were too few AA non-menthol smokers (n=16) to be included in the analyses. Generalized estimating equations were used to conduct longitudinal analyses of biochemically-confirmed 7-day point-prevalence abstinence assessed at 4, 8, and 26 weeks post-quit. Menthol status (no, yes) was tested along with gender and treatment (placebo vs. active). Secondary outcomes were smoking cessation milestones: initial cessation, number of days to lapse, and number of days to relapse following a lapse. **Results:** In longitudinal analyses of abstinence, menthol-smoking was associated with reduced likelihood of smoking cessation in AA and White smokers combined, odds ratio (OR)=0.72 (95% CI:0.60 – 0.87). Amongst menthol smokers, AA women were at especially high risk of cessation failure: e.g., with higher failure rates than White women, OR=2.63 (95% CI:1.75-3.96) or White or AA males (p's < .05). In milestones analyses, menthol smokers had a reduced rate of initial cessation compared to non-menthol users, 91.2% vs. 84.7%, respectively. **Conclusions:** While results do not permit strong causal inference, the current results are consistent with a causal model comprising a general risk of reduced cessation success associated with menthol-smoking. More specific risks appear to be associated with certain menthol-smoking populations, particularly AA women

FUNDING: Supported by NIH grants P50 DA019706, K05CA139871, and 3R01HL109031-02S1. Medications for the WSHS-1 CET were provided by GlaxoSmithKline.

JUSTIFICATION: The prevalence of menthol-smoking makes it imperative to determine if it places the smoker at any increased risk relative to smoking non-menthol cigarettes, thus, any added risk due to menthol-smoking could have important policy implications.

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PA18-3

FEASIBILITY, ACCEPTABILITY, AND INITIAL EFFICACY OF THE FACEBOOK "TOBACCO STATUS PROJECT" FOR YOUNG ADULTS

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Introduction: With social media's widespread appeal and adoption, we tested the feasibility, acceptability, and initial efficacy of a smoking cessation intervention for young adults delivered within Facebook. **Method:** We designed an intervention based on the Clinical Practice Guidelines and the Transtheoretical model and enrolled 79 participants into study-run secret Facebook groups matched on readiness to quit smoking. Intervention components included: daily stage-matched posts for 90 days; weekly "Ask the Doctor" interactive sessions; and for those who became ready to quit, 1 individual and 6 group cognitive-behavioral counseling sessions held over Facebook chat. We assessed program use, acceptance, and smoking outcomes at intervention end (3-mo). **Results:** We held 2 precontemplation (n=34; 43%), 3 contemplation (n=35; 44%), and 2 preparation (n=10; 13%) Facebook secret groups. Follow-up at 3-mo was 76% (n=60).

Participants reported reading most of the posts (mean usability rating=3.3/4) and interactions from the "Dr. Is In" sessions (3/4); they reported thinking about what they read (3/4) and would recommend the program to others (3.3/4). During the 90-day intervention period, 4 (5%) participants opted to change to a later stage group; 5 (6%) opted for CBT treatment and attended 6/7 chat sessions on average. CBT sessions were rated as easy to understand, useful, and helpful (all 3.3/4). At intervention end, 10% (n=6) reported 7-day abstinence, of which 4 were verified biochemically online. Most (55%, n=33) reported at least one cessation attempt during the intervention, and there was a significant reduction in median past 7-day cigarettes smoked from BL to 3-mo (70 vs. 40; W=337, p<.001). More participants were prepared to quit after the intervention (36%) than before (10%) (Bowker's X²=13.4, p=.004). **Conclusions:** Focused on young adult smokers, a challenging group to engage, the study's high retention and usability ratings suggest the Facebook quit smoking intervention is attractive and feasible to deliver. Early efficacy data are encouraging and support further investigation in a larger sample with randomized design and control group and longer follow-up.

FUNDING: National Institute on Drug Abuse K23 DA032578, P50 DA09253; National Center for Advancing Translational Sciences, UCSF-CTSI Grant Number UL1 TR000004

JUSTIFICATION: This work demonstrates the feasibility and attractiveness of a Facebook-delivered smoking cessation intervention for young adults, and early efficacy data are encouraging.

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PA18-4

REAL-WORLD EFFECTIVENESS OF E-CIGARETTES: A POPULATION STUDY

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Background: Electronic cigarettes (e-cigarettes) are rapidly increasing in popularity. Two randomised controlled trials have suggested that e-cigarettes can aid smoking cessation but there are many factors that could influence their real-world effectiveness. This study aimed to assess, using an established methodology, the effectiveness of e-cigarettes compared with nicotine replacement therapy (NRT) bought over-the-counter and with unaided quitting in the general population. **Methods:** A large survey of a representative sample of the English population. The study included 5726 adults who had smoked within the previous 12 months and made at least one quit attempt during that period with either an e-cigarette only (n=391), NRT bought over-the-counter only (n=2031) or no aid in their most recent quit attempt (n=3304). The primary outcome measure was self-reported abstinence up to the time of the survey, adjusted for key potential confounders including nicotine dependence. **Results:** E-cigarette users were more likely still to be abstinent than either those who used NRT bought over-the-counter (OR=2*23, 95%CI=1*67- 2*97, 19*9% vs. 10*0%) or no aid (OR=1*40, 95%CI=1*07-1*82, 19*9% vs. 15*1%). The adjusted odds of non-smoking in users of e-cigarettes were 1*66 (95%CI=1*17-2*36) times higher compared with users of NRT bought over-the-counter and 1*60 (95%CI=1*15-2*23) times higher compared with those using no aid. **Conclusion:** Among smokers stopping without professional support, those who use e-cigarettes appear more likely to be able to remain abstinent than those who use a licensed NRT product bought over-the-counter or no aid to cessation. This difference persists after adjusting for a wide range of smoker characteristics such as nicotine dependence.

FUNDING: JB's post is funded by a fellowship from the UK Society for the Study of Addiction. RW is funded by Cancer Research UK. We are grateful to Cancer Research UK, the Department of Health and Pfizer for funding this study. This study is partly funded by Pfizer under an investigator initiated award.

JUSTIFICATION: The current study together with previous randomised trials suggests that e-cigarettes are both an efficacious and effective aid to smoking cessation.

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PA18-5

EFFECTS OF CIGARETTE PACKAGING ON NEURAL RESPONSES TO HEALTH WARNINGS

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INTRODUCTION: Previous neuroimaging studies have found that presenting smokers with smoking-related cues increases activation in brain areas related to reward. However, no neuroimaging studies have yet examined the effects of plain cigarette packaging on brain activation. Our previous research indicates that plain packaging increases visual attention to health warnings among non-smokers and weekly smokers, but not daily smokers, who appear to actively ignore health warnings. **METHODS:** The present study investigated whether there are differences in activation in brain areas related to threat (amygdala) and reward (nucleus accumbens) when viewing plain and branded packs of cigarettes, and whether this differs between non-smokers, weekly smokers and daily smokers. Participants underwent a single functional magnetic resonance imaging scan whilst viewing images of plain and branded cigarettes. **RESULTS:** A total of 72 participants were recruited from Bristol, and after exclusions due to poor quality scans, data from 19 non-smokers, 19 weekly smokers and 20 daily smokers were available for analysis. Whole-brain analyses indicated that the presentation of branded as compared with plain packs increased activation in the upper visual field around the calcarine sulcus among both non-smokers and weekly smokers. However, this activation was attenuated among daily smokers. Furthermore, bilateral region of interest analyses in the amygdala and nucleus accumbens indicated differences in brain activation in the right amygdala among non-smokers and weekly smokers when they viewed branded and plain packages of cigarettes, but this difference was not observed among daily smokers. **CONCLUSIONS:** Our findings demonstrate for the first time that viewing plain cigarette packaging as compared with branded packaging results in a different pattern of brain activation, particularly in the right amygdala, and that this difference is reduced among daily smokers. These findings extend our previous observations that daily cigarette smokers actively avoid cigarette package health warnings and lend support to the view that plain packaging might be an effective tobacco control strategy.

FUNDING: Economic and Social Research Council, Medical Research Council, Action on Smoking and Health UK.

JUSTIFICATION: Plain tobacco packaging is a tobacco control policy currently being considered by a number of jurisdictions worldwide, and this study demonstrates for the first time, the effect of plain packaging on neural responses.

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POS4-1

THERAPEUTIC SYNERGETIC EFFECTS OF THE CONSUMPTION OF PUMPKIN SEED AND AROMATHERAPY OF SPIKE LAVENDER OIL ON REDUCE OF CIGARETTE SMOKING CRAVING

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Background: Considering the especial position of Pumpkin as a rich source of tyrosine amino acid (a main precursor to dopamine) and also the potential role of Spike lavender oil as a sympatholytic agent to reduce the stress response, we hypothesized that the concurrent use of these herbal agents can be very helpful to quit smoking through reducing stress responses. **Methods:** During two months, in a randomized double blinded controlled trial, 180 heavy current smoker men (smoking ≥ 20 cigarettes daily or ≥ 20 pack-years) were randomly assigned to receive, i) pumpkin seed 300 g/day, or ii) the oil of Spike lavender, 20 min of aromatherapy, or iii) both regimens concomitantly for one month, and iv) a sex and age-matched group which received placebo (n = 60) that was considered as the control group. The data on cigarette smoking was obtained through structured interviews. The cumulative amount of cigarette consumption was expressed as the Brinkman index (number of cigarette consumed per day multiplied by the years of smoking) initially as well as the following interventions. **Results:** The groups were matched for gender and body mass index. The average of the Brinkman index was comparable across the four groups at baseline ($p = 0.789$). After the intervention period, the mean value of this index was significantly lower in the third group that received both pumpkin seed and oil of Spike lavender concurrently compared to other three groups assessed by the ANOVA test ($p < 0.001$). The difference in Brinkman index score between combined therapy group and other interventional groups was also shown by the Tukey's Post Hoc analysis ($p = 0.002$). The multivariable linear regression model showed that the concurrent consumption of the two herbal regimens resulted in significant reduction of the Brinkman index adjusted for gender and body mass index (Beta =13.649, SE = 5.177, $p = 0.009$). **Conclusion:** The role of the pharmaceutical composition consists of Pumpkin seed and Spike lavender oil on lowering the cigarette smoking craving can be due to its synergetic effects on dopamine productive and secretive system and also on lowering the sympathetic function.

FUNDING: This Study was supported by Research Department of Smoking Cessation Clinics in Tehran University of Medical Sciences.

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POS4-2

PERSONALITY CHARACTERISTICS, MOTIVATION FACTORS, AND RESTING EEG IN DAILY AND INTERMITTENT SMOKERS

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Non-daily cigarette smokers are becoming an increasingly prevalent subset of the smoking population. These intermittent smokers (ITS) represent a stable, non-dependent group that may possess personality characteristics that reduce the likelihood of transition to smoking dependence. Identifying the personality and motivational characteristics unique to ITS may suggest novel intervention targets for smoking dependence. Smoking rate, smoking dependence, CO levels, personality characteristics, and affective regulation were evaluated in dependent smokers (DS; N=22), ITS (N=31) and non-smokers (N=30). Resting EEG was also measured. Compared to DS, ITS initiated smoking later, smoked at lower rates, and had decreased drive and motivation to smoke. ITS and DS reported lower conscientiousness and greater sensation-seeking than nonsmokers, revealing shared risk factors for smoking initiation. DS reported greater motor impulsivity and showed decreased low-frequency resting EEG compared to ITS and nonsmokers, implicating risk factors for smoking maintenance and dependence. ITS reported greater enjoyment of physical sensation than DS and nonsmokers, revealing a potential neuroprotective factor in nicotine dependence. No group differences were found for affect or emotional regulation measures that may be sensitive to pathologies comorbid with smoking (e.g., other drug dependence, mood and anxiety disorders) or greater smoking dependence that were absent

from this sample. Although ITS share some features with smokers that may predict smoking initiation, they possess some unique features that may protect them from becoming daily, dependent smokers and could serve as intervention targets.

FUNDING: This work was supported by NIDA T32 DA024628-01 (PI: Rebec, G.), Indiana University, and the McNair Scholars Program Grant from the U.S. Department of Education Grant P217A80085.

JUSTIFICATION: Differences in personality, motivation factors, and psychophysiology may help identify risk factors and intervention targets for persons at risk for developing smoking dependence.

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POS4-3

ASSESSING CHANGE IN USE OF CIGARETTES AND EMERGING NON-CIGARETTE ALTERNATIVES AMONG COLLEGE STUDENTS

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Use of emerging non-cigarette alternatives, such as hookah, snus, dissolvables, and e-cigarettes continues to increase in the U.S., yet little is known about change in use of these products. This study 1) examined change in use of cigarettes and emerging non-cigarette alternative products in college students across a one-year period of time and 2) assessed factors contributing to change in use. Participants were a convenience sample of 765 students (mean age=24.8; 55.8% male; 44.2% White, 41.5% Hispanic, 7.0% Asian, 2.9% Black) from seven urban universities within a public University system. Students participated in an online survey twice; in spring 2012 and spring 2013. Past 30-day (i.e., current) use of cigarettes, hookah, snus, dissolvables, and e-cigarettes was assessed at Time 1 and Time 2. Change in use across one year was assessed using paired samples t-tests. Results indicated that only e-cigarette use increased from Time 1 (3.5%) to Time 2 (7.6%) [$t(734)=-4.13, p<.001$], while no change in use occurred among the other products. Thus, logistic regression analysis was used to determine predictors of change in e-cigarettes only. Time 1 current e-cigarette use, current cigarette use, and reasons for using e-cigarettes (i.e., when smoking is not allowed, in addition to smoking although allowed, instead of smoking although allowed, means of cutting down, and to help quit smoking) were included as predictors. Results showed that Time 1 current e-cigarette use (OR=3.8, CI=1.2-12.1), current cigarette use (OR=3.8, CI=1.5-9.3) and use of e-cigarettes to help quit smoking (OR=5.0, CI=1.2-21.4) increased the likelihood of e-cigarette use at Time 2. Increasing prevalence of e-cigarette use across a one-year period among young adults is alarming. That use of e-cigarettes to help quit smoking was a predictor of subsequent increased e-cigarette use may be due to their marketing as alternatives to cigarettes and as smoking cessation aids. More research is needed to examine young adults' reasons for using these products. Findings underscore the need to determine if e-cigarette use results in cessation for smokers or in sustained use of both cigarettes and e-cigarettes.

FUNDING: No funding

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POS4-4

WOULD BE NICOTINE REPLACEMENT THERAPY MORE EFFECTIVE TO ELDERLY SMOKERS THAN TO YOUNGER SMOKERS ?

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Smoking is an important risk factor for the development of several chronic diseases and mortality. Current evidence shows that the interruption decreases the incidence of events in all age groups. However, know if elderly patients have the same success rates or there is a better drug strategy to treat them is a great question. The aim of this work was to compare the success rates between elderly and younger patients in a smoking cessation service in a Cardiovascular Hospital.

Material and Methods: We analyzed retrospectively the PAF database Program from 2008 to 2011. Co-morbidities associated with smoking, the treatment success rate (continuous abstinence for 52 weeks), nicotine dependence (Fagerstrom score) and number of previous attempts to smoking cessation were analyzed and stratified by age. Among the smoking cessation drugs used we found nicotine replacement therapy (NRT-patches and/or gum), bupropion and varenicline. The drugs were prescribed considering nicotine dependence level, availability of the product, contra-indication, and previous experience with smoking cessation drugs. Chi-square, Student t test and logistic univariate and multivariate regression analysis were performed. **Results:** Among 940 treated patients, 239 (25.4%) were older than 60 years with a mean age of 69±6 years while 701 under the age of 60 years with mean age of 48±8 years. The elderly group had a higher incidence of hypertension, coronary heart disease and acute myocardial infarction, dyslipidemia, and chronic obstructive pulmonary disease. The success rates in smoking cessation were similar between the groups (35% vs 41%, <60y vs >60y, p=0.12). The success rate of patients using NRT was higher in the group aged ≥ 60 years (45.9%) compared to patients <60 years (27 %) (p=0.001), fact not observed with the other medications. Considering patients who received NRT (302), the age ≥ 60 years proved to be the only relevant factor to the success of patients in this group (OR 2.34, 95% CI: 1.36 to 4.04, p=0.002). **Conclusion:** NRT for elderly people with co-morbidities showed to be more effective to stop smoking than in younger patients in this group of patients.

FUNDING: No Funding

JUSTIFICATION: Nicotine replacement therapy would be a good choice to smoking cessation treatment in elderly patients with others comorbidities

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POS4-5 YOUNG ADULT OCCASIONAL WATERPIPE SMOKERS

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Introduction: The purpose of this study was to investigate smoking behavior, and subjective and physiological effects of using nicotine-containing waterpipe in young adult occasional smokers. **Methods:** This study utilized a 2X2 factorial design with random allocation to conditions. The two nicotine conditions were nicotine (0.75gm) and non-nicotine (placebo 0g nicotine) tobacco and the two target smoke volumes were low volume (40 liter) and high volume (80 liter). Twenty-four participants completed subjective (Acute Subjective Effects of Nicotine) and physiological measures (blood pressure, heart rate, and CO). Additional measures were used to assess for withdrawal symptoms (QSU and MNWS-R). **Sample:** The participants were young adults (22 ± 3.1 years), 71% smoked once a month in the past year and 29% smoked 1-2 waterpipe per week. In addition, 60% reported sharing waterpipe smoking with friends all the time. None of the participants reported using other forms of tobacco products. **Results:** Participants smoking nicotine condition tended to smoke longer (i.e. smoking duration, p < .05), take more puffs (p < .05), shorter puffs (p < .05), and inhale less volume at each puff (p < .05). The repeated measures analysis of the factor "headrush" revealed an effect of smoking nicotine condition (F=9.69, p<.00, partial η² = 0.33) and time (F=8.17, p<.02, partial η² = 0.30). Heart rate increased significantly across the nicotine condition (F=7.92, p=.01, partial η² =0.31) and over time (F=12.64, p<.01, partial η² =0.41) and. **Conclusions:** This study demonstrates how relative differences between nicotine and non-nicotine occasional waterpipe smoking are associated with changes in smoking behaviors, experiencing a "headrush" and increase in heart rate.

FUNDING: This investigation was supported by funds provided for medical and biological research by the State of Washington Initiative Measure No. 171 (WSU Alcohol and Drug Abuse Research Program).

JUSTIFICATION: possible policy implication: inclusion of waterpipe smoking in the family smoking prevention act 2009

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POS4-6 OUTDOOR SMOKING BANS IN SOUTH KOREA: CURRENT SITUATION AND PUBLIC HEALTH IMPLICATIONS

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Introduction Indoor smoking-free policy has strong evidence of promoting public health and has been recommended by the WHO Framework Convention on Tobacco Control. However, there is controversy on outdoor smoking bans regarding public health benefits and ethical justification. Banning outdoor smoking has become a popular tobacco control policy in South Korea since local governments were given power to legislate ordinances restricting smoking in outdoor public places in 2010. We investigated the ordinances of local governments of South Korea banning outdoor smoking. **Methods** We searched the websites of the Ministry of Government Legislation, the Ministry of Security and Public Administration and local governments with the key words of "tobacco" or "cigarette smoking". Purposes of the ordinances, time of introduction of the ordinance, kinds of public places banning smoking, amounts of fines, and the number of enforcement staff were examined. **Results** Of 246 local governments, 199 (80.9%) introduced ordinances banning smoking in outdoor public places (94.1% of higher level local governments and 79.9% of lower level local governments). The purposes of legislation were reported as; protecting health from second-hand smoking (96.5%), protection from fire (57.8%) and clean environment (29.2%). Public places covered by smoking bans are: bus stops (97.0%), public parks (95.0%), schools (94.0%), gas stations (56.3%), playgrounds (54.3%), and taxi stands (46.7%). Sixty-eight local governments had designated/ special non-smoking streets. Fines of violations ranged from 10,000 to 300,000 Korean Won (approximately 10 to 300 USD) and the mean number of enforcement staffs per local government were 1.4 (range, 1-6). **Conclusions** Despite of controversy on public health benefits and the delay in comprehensive indoor smoking bans, banning outdoor smoking in public places has been popular in South Korea. Discussions are needed on the effectiveness and priority of the outdoor smoking bans.

FUNDING: No Funding

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POS4-7 APPLICATION OF CE-MS TO A METABONOMICS STUDY OF HUMAN URINE FROM CIGARETTE SMOKERS AND NON-SMOKERS

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Introduction: Advanced analytical technologies such as 1H NMR spectroscopy and mass spectrometry (MS) are capable of measuring thousands of metabolites simultaneously in a biofluid to provide the global metabolite profile. This untargeted approach employs multivariate statistical analysis in order to identify combinations of metabolites to map molecular signatures that are characteristic of toxicant exposure and disease processes. Capillary Electrophoresis Time-of-Flight Mass Spectrometry (CE-TOF-MS) has never been used to profile the metabolome of smokers. In this study we used CE-MS to compare the urinary metabolome of non-smokers and smokers of 1 and 10mg ISO tar cigarettes. **Methods:** Positive ion electrospray CE-MS analysis was applied to the investigation of urine samples from non-smokers and from subjects who smoked cigarettes at two tar levels: 1mg and 10mg ISO tar yields. **Results:** The separation method gave well resolved electropherograms over a time period of 15 min and good sensitivity using CE-TOF-MS. Validated multivariate chemometric models using retention time, m/z and intensity as variables were able to separate smokers from non-smokers. This discrimination resulted mainly from the presence of nicotine metabolites in the data set. When these were removed, it still proved possible to discriminate the smokers from the non-smokers based on tentatively identified metabolites. The biomarkers that distinguished between the urines from smokers and non-smokers included glycine, guanidinoacetic acid, trigonelline, nicotinamide, hippuric acid and serine. Further discriminating MS peaks remain unassigned. **Conclusion:** The biochemical

Poster Session 4 • Saturday, February 8, 2014 • 11:00 a.m. – 12:30 p.m.

relevance of changes in the glycine and serine pathways are in agreement with in vivo and in vitro studies linking oxidative stress and the glutathione pathway. Trigonelline and hippuric acid have been previously identified as markers in the urine of lung cancer patients and nicotinamide as an intermediate in DNA repair. This proof-of-principle metabolomics study illustrates the value of CE-TOF-MS as part of the array of analytical platforms that can be employed to investigate novel biomarkers in urine from tobacco users.

FUNDING: This study was funded by BAT to Metabotrix Ltd. as a commercial contract.

JUSTIFICATION: Metabolomics in biofluids can be used for comparative risk assessment across the range of combustible, non combustible tobacco products, and nicotine delivery products.

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POS4-8 CHARACTERIZING NEW AND EMERGING TOBACCO PRODUCT USE AMONG HOMELESS CIGARETTE SMOKERS

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The prevalence of cigarette smoking is very high among homeless adults (>70%); however, little is known about the use of new and emerging tobacco products (NEPs) in this population. Concurrent use may impact smoking quit rates, as well as confer greater risk for tobacco related health problems. This study characterizes several types of NEP use over the last 30 days in a convenience sample of 183 homeless biochemically-confirmed current smokers. Participants (74% male) were 45.6 years old (+/-10.4) on average and largely non-white (68.3%). They smoked an average of 12 cigarettes a day, for almost 21 years, and had 2.8 discrete episodes of homelessness. Among concurrent users (n=91), 40.5% used little cigars/cigarillos/bidis (LCCB), 34.2% cigars, 31.5% self-rolled cigarettes (SRC), 11.7% e-cigarettes, 7.2% chewing tobacco, 1.9% snus, 1.8% dissolvable tobacco, 1.8% hookah, and 10.8% "other." Prevalence of daily use of LCCBs, cigars, and e-cigarettes was similar (23.1% - 24.4%). NEP use motives varied by product, with "cheaper than cigarettes" endorsed by 85.7% of SRC, 66.7% of LCCB, 55.3% of cigar, and 50% of dissolvable tobacco users. Reasons for e-cigarette use included to facilitate cutting down on cigarettes (69.2%), to quit cigarettes (53.8%), and because it was perceived less harmful than cigarettes (53.8%). Almost all LCCB (100%), cigar (97.4%), chewing tobacco (100%), and SRC users (97.1%) believed that using these products conferred some, a lot, or extreme health risks, whereas the majority of e-cigarette users (69.2%) believed that its use conferred little or no health risks. Compared with cigarette-only smokers (n=92), concurrent users were more likely to be younger, male, and non-white, and they had more homelessness episodes, higher CO levels, and higher perceived and urban stress (p values <.05). Notably, concurrent users did not differ from cigarette-only smokers on readiness to quit smoking or number of previous quit attempts. In conclusion, NEP use is common among homeless smokers. Concurrent users and cigarette-only smokers do not differ on quitting readiness, but the greater stress reported among the former may represent a hurdle for cessation.

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JUSTIFICATION: Homeless smokers who concurrently use new and emerging tobacco products (NEP) may be elevating their health risks; characterizing NEP use and differentiating concurrent users from cigarette-only smokers can highlight

the extent to which this is an issue in this population and suggest potential use motives and barriers to smoking cessation.

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POS4-9 OPINIONS ABOUT ELECTRONIC CIGARETTE (E-CIGARETTE) USE IN SMOKE-FREE AREAS AMONG U.S. ADULTS, 2012

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Introduction: In the U.S., electronic cigarettes (e-cigarettes) are currently unregulated and aggressively marketed, thereby resulting in their increased use. The purpose of this study was to explore opinions about e-cigarette use in smoke-free areas among adults in the U.S. **Methods:** Data were analyzed from 4,043 U.S. adult respondents who answered questions about e-cigarettes in the 2012 HealthStyles Survey. Opinions about allowing e-cigarette use in smoke-free public areas were assessed by respondents' characteristics using a multinomial logistic regression analysis. **Results:** Overall, 22.6% of adults were in favor to allow e-cigarette use in smoke-free public areas, 37.5% of adults were not in favor, and 39.8% of adults had no opinion; Compared to never-smokers, current smokers were more likely to say "Yes, allow" (OR=3.2, 95% CI 2.3- 4.5); than to say "Don't know." **Conclusion:** To our knowledge, this is the first study to examine the public opinions about e-cigarette use in public areas where smoking is prohibited. While the majority of respondents either had no opinion or were not supportive of allowing e-cigarette use in smoke-free areas, about one in five adults were in favor of the use of e-cigarettes in smoke-free venues. Adults who responded "Don't know" were more likely to lack awareness about e-cigarettes compared to adults who had an opinion, suggesting that their lack of opinion could be due to the novelty of the device on the market. Continuous monitoring of public opinions regarding allowing e-cigarette use in smoke-free areas is needed.

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POS4-10 SYNERGETIC EFFECTS OF THE COMBINATION OF HERBAL THERAPY INCLUDING OAT EXTRACT AND LEMON POWDER WITH MUSIC THERAPY ON SMOKING CESSATION

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Background: The consumption of oatmeal results in boosting dopamine reservation. It has been also revealed the influence of lemon power(or juice)on alkalinizing the body's environment. The potential impact of music therapy as a smoking cessation aid is another under-studied topic. The current trial was conducted to examine synergetic therapeutic effect of the combination of oat extract and lemon powder with music therapy on smoking cessation. **Methods:** 240 heavy smoker men participated in a 8-week intervention randomized, double-blind clinical trial with daily treatment of combined therapy with i) alcoholic extract of oat and lemon powder(10mg day-1),or ii) music therapy by symphony No.12 of Johann Sebastian Bach, 30minutes in the morning and evening, or iii) combination therapy with the two therapeutic regimens, or iv) none of them as the control group. The cumulative amount of cigarette consumption was expressed as the Brinkman index initially as well as the following interventions. **Results:** The four groups were similar in gender distribution and mean body mass index. The mean of the Brinkman index was similar across the four groups at baseline (p=0.669), but there was a significant decrease in this indicator following intervention with first group (p=0.002), with music therapy (p=0.012), and also by combination therapy with both protocols (p<0.001) compared with the control group examined by the one-WAY ANOVA test. The difference in Brinkman index score across each of the regimens compared with the control was also confirmed by the Tukey's Post Hoc analysis. Using a multivariate linear regression model considering changes in

Brinkman index score showed higher value of combination therapy in third group with each of these two regimens (OR=2.226, 95%CI=1.456 – 4.775, P=0.016). Conclusion: Considering a combination therapy with alcoholic extract of oat and lemon powder can effectively reduce tendency to cigarette smoking via boosting dopamine reservation and increase in alkalinity, respectively. Cigarette smoking session can be also achieved by music therapy; however the combination of these two protocols causes a synergetic effect leading higher effectiveness on smoking cessation.

FUNDING: this study has supported by Research and Development Department of Smoking Cessation Clinics.

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POS4-11

WHAT IS THE EVIDENCE FOR HARDENING? TRENDS IN NICOTINE DEPENDENCE IN THE U.S., 2002-2011

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There has been considerable interest in determining whether declines in cigarette smoking in the U.S. have resulted in a hardened population of "hardcore" smokers." We analyzed data from the National Survey on Drug use and Health (2002-2011) to study changes in nicotine dependence levels over this time period. We used generalized non-linear factor analysis and items from the Nicotine Dependence Syndrome Scale (NDSS) to generate an indicator for dependence that was psychometrically equivalent across years in the study. This approach also allowed us to use Item Response Theory to evaluate changes in the performance of specific NDSS symptoms over time. All analyses were stratified by gender. As expected, the prevalence of cigarette smoking declined from 2002-2011. The proportion of smokers consuming >25 cigarettes per day also declined. NDSS-based nicotine dependence declined among male smokers, but remained steady among female smokers. However, when the sample was categorized by daily cigarette consumption (0-15, 16-25, >25) we found slight increases in dependence among both male and female smokers who reported consuming 16-25 cigarettes per day. We also found this trend among women who smoked 0-15 cigarettes per day. Smoking to reduce irritability/restlessness became a more accurate marker of severe dependence among men, and smoking to relieve craving became a marker of more severe dependence, and a more accurate marker of dependence, among women. Overall, we found that dependence may be declining among male smokers, likely due to reduced consumption. However, there may have been increases in dependence among both male and female "pack-a-day" smokers, and dependence itself may have changed to be better identified by withdrawal-related symptoms, suggesting a harder to treat smoking population.

FUNDING: NIDA, P50DA03394502 (PI: Sherry McKee); NIMH, T32MH01423539 (PI: Heping Zhang)

JUSTIFICATION: Trends for hardening in "pack-a-day" smokers and changes in the nature of nicotine dependence are relevant across the translational spectrum.

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POS4-12

CHEMICAL AND HEALTH ASSESSMENT OF THE CHARCOALS USED IN HOOKAH

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Charcoals are used as a heating source to generate smoke in hookah (i.e. waterpipe). They are reported to be the source of toxic compounds such as PAHs and carbon monoxide in smoke. Most of the analytical methods used to characterize PAHs are based on trapping them from smoke on specific filters

followed by solvent extraction then specific analysis. In this work, screenings of the chemical composition of several synthetic and natural charcoals were conducted. Analysis were performed on several raw charcoals and on the smoke generated from their burning. For the raw charcoals, acid digestion and solvent extraction were applied for the analysis of toxic metals and organic compounds respectively. Several analytical techniques were used for analysis. They are: Gas Chromatography-Mass spectrometry (GC-MS), Inductively Coupled Plasma (ICP) and Atomic Absorption Spectroscopy (AAS). For the smoke analysis, the smoke was generated and controlled using pulsed sinusoidal pneumatic flow via a robotic machine developed by "IREADYCo LLC". The compounds in the smoke were collected using Tenax and activated carbon traps. Thermal Desorption-Gas Chromatography-Mass spectrometer (TD-GC-MS) was used for thermal desorption of the smoke compounds from the traps followed by analysis. A comparison of the chemical composition results of the charcoals from multiple sources is made. Our results revealed that charcoal is the source of hundreds of compounds which could be just as harmful as PAHs. Such compounds belong to different chemical functional groups such as aldehydes, amines and ketones in addition to aromatics. Examples of possible carcinogenic compounds found in various types of charcoal are benzene and its alkyl and chlorinated derivatives, pyridine, 1,4-dioxane, furfural, 2-chlorophenol, benzofuran, dodecane, quinoline and many others. It is important to note that some of these compounds are natural ingredients of raw charcoal while many of them are formed during the processes of combustion and pyrolysis. Furthermore, the raw charcoal showed the presence of traces of heavy metals.

FUNDING: Faculty Research Grant, American University of Sharjah

JUSTIFICATION: In this study, identification of wide range of chemical compounds and their potential impact on health will be described.

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POS4-13

FINANCIAL INCENTIVES INCREASE SMOKING CESSATION IN HOMELESS SMOKERS: A PILOT STUDY

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BACKGROUND: Smoking prevalence has declined to 19.3% in U.S. adults, yet over 70% of homeless adults are current smokers. Although smoking prevalence functions as a major contributor to poor health outcomes in the homeless, few studies have examined the effectiveness of smoking cessation interventions in this vulnerable population. The purpose of this pilot study was to compare the effectiveness of shelter-based smoking cessation clinic usual care (UC) to an adjunctive contingency management (CM) treatment that offered UC plus small financial incentives for smoking abstinence. METHODS: Sixty-eight homeless individuals were recruited between January and October 2012 from a homeless shelter in Dallas, Texas. Eligible participants smoked ≥ 5 cigarettes per day and had a carbon monoxide level of ≥ 8 parts per million at baseline. Participants were assigned to UC (n=58) or UC plus financial incentives (CM; n=10) groups and were followed for 5 consecutive weeks (1 week pre-quit through 4 weeks post-quit). A generalized linear mixed model regression analysis was conducted to compare biochemically-verified abstinence rates between groups. An additional model examined the interaction between time and treatment group. RESULTS: Participants were primarily male (61.8%) and African American (58.8%), and were 49 years of age on average. There was a significant effect of treatment group on abstinence overall after controlling for time, age, gender, race/ethnicity, and insurance status. These effects varied over time. Follow up logistic regression analyses indicated that CM participants were significantly more likely than UC participants to be abstinent on the quit date (50% vs. 19% abstinent) and at 4 weeks post-quit (30% vs. 1.7% abstinent). On average, those assigned to the CM group earned \$42 for biochemically confirmed abstinence across all study visits. CONCLUSIONS: This study is the first to demonstrate the utility of adjunctive

financial incentives for smoking abstinence in homeless smokers seeking cessation treatment. Small incentives may help sheltered homeless smokers to overcome the overwhelming barriers to cessation that are commonly experienced by this group.

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POS4-14
NATIONAL AND STATE COST SAVINGS ASSOCIATED WITH PROHIBITING SMOKING IN U.S. SUBSIDIZED AND PUBLIC HOUSING

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Secondhand smoke (SHS) exposure causes disease and premature death among nonsmokers. Although progress has been made adopting indoor smoke-free laws in public areas, millions of Americans, including children, remain exposed at home. Multiunit housing residents are especially susceptible to SHS exposure, which can infiltrate smoke-free units from units and shared areas where smoking is permitted. Nearly 80 million Americans live in multiunit housing, including 7 million in subsidized or public housing. We calculated national and state costs that could be averted by prohibiting smoking in U.S. subsidized housing in 2012, including: 1) SHS-related direct health care; 2) renovation of units where smoking is permitted; and 3) smoking-attributable fires. Annual cost-savings were calculated using residency estimates from the Department of Housing and Urban Development and previously reported national and state cost data. Previously published data were adjusted for inflation and a price deflator was used to account for varying state living costs. Health care costs did not include indirect costs such as lost productivity. National and state estimates were calculated overall and by cost type for all subsidized housing and public housing only. Alaska and the District of Columbia were excluded due to limited data. The findings reveal that prohibiting smoking in all U.S. subsidized housing would yield annual savings of \$518 million (\$256-\$848 million), including \$351 million (\$162-\$587 million) in SHS-related health care, \$117 million (\$66-\$184 million) in renovation expenses, and \$49 million (\$28-\$77 million) in smoking-attributable fire losses. By state, annual savings for subsidized housing ranged from \$649,000 (\$334,000-\$1 million) in Wyoming to \$90 million (\$44-\$148 million) in New York. Prohibiting smoking in public housing alone would yield savings of \$159 million (\$79-\$260 million); by state, annual savings ranged from \$159,000 (\$79,000-\$260,000) in Wyoming to \$42 million (\$20-\$69 million) in New York. These findings suggest that efforts to prohibit smoking in U.S. subsidized and public housing would protect health and generate substantial cost-savings to society.

FUNDING: No Funding

JUSTIFICATION: The findings from this study have the potential to inform the adoption of smoke-free policies in subsidized and public housing across the United States.

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POS4-15
FACTORS AFFECTING PUBLIC SUPPORT FOR TOBACCO CONTROL POINT OF SALE POLICIES

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The Family Smoking Prevention and Tobacco Control Act (FSPTCA) of 2009 provided new opportunities to regulate tobacco products at the point-of-sale (POS). We assessed support among a national sample of smokers and non-smokers in the US for 10 POS policies in five domains (1) minors' access to tobacco, (2) regulating promotion, (3) product bans (menthol, flavored cigarettes), (4) advertising restrictions, and (5) labeling changes (graphic warnings). We surveyed a nationally representative sample of 17,507 respondents using linear regression to calculate weighted point estimates and factors associated with support for POS policies among adult respondents and smokers only. For smokers we also examine the interaction of intention to quit and policy self-interest on support for specific POS policies. Overall, non-smokers had more support than smokers. African-Americans, Hispanics, and those of other races, had more support than Whites. Women expressed more support than men. We found higher levels of support with older age. Education level and income were unrelated to level of support. Among smokers, those patterns also held. Additionally, those who wanted to quit and those who had made a quit attempt in the past year also had higher levels of support. Policy support varied by provision with the highest support for minor's access restrictions (over 80%) and the lowest for advertising restrictions like black and white text advertising (23%). A large minority (45%) of respondents had support for graphic warnings on packs and ads. Only 11% of the sample had support for all 10 provisions. However, the largest proportion of respondents was neutral rather than disapproving of these provisions. Among smokers, policy self-interest moderated the relationship between intention to quit and support for specific provisions. This study provides new information on public support and support among subgroups for a range of provisions that are or could be implemented under the Tobacco Control Act at point of sale. Tobacco control advocates and the FDA can build on existing levels of public support to promote and maintain controversial policy changes in the retail environment.

FUNDING: Tobacco Control in Rapidly Changing Media Environment (Grant Number: 1U01CA154254) UNC Lineberger Cancer Control Education Program (R25 CA57726)

JUSTIFICATION: State and localities can use information about public support to identify how to promote tobacco control policies affecting the point of sale.

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POS4-16
BATTLING TOBACCO USE AT HOME: AN ANALYSIS OF HOME SMOKING BANS AMONG U.S. VETERANS FROM 2001 TO 2011

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Background: Smoking is a significant health problem within the U.S. military. Home bans help reduce tobacco use and prevent secondhand smoke exposure. Veteran and military populations use tobacco at higher rates than civilians but there has been no research examining the presence of home smoking bans among veterans. This study examined national trends in home smoking bans among U.S. veterans compared to non-veterans from 2001 to 2011. Methods: Data from the 2001-2002 and 2010-2011 Tobacco Use Supplement to the Current Population Survey (TUS-CPS) was used to estimate prevalence and multivariable logistic regression model of home smoking ban reports by adults who reported ever serving on active duty in the U.S. Armed Forces. We also compared the

prevalence of home bans among veterans with adults who did not serve in the military. Results: A total of 40,062 U.S. veterans provided valid responses regarding the home smoking ban status for the two survey periods. Overall, the prevalence of complete home smoking bans increased from 64.0% in 2001-02 to 79.7% in 2010-2011 among veterans ($p < 0.01$). The prevalence rates of home bans were consistently lower among veterans compared to non-veterans ($p < 0.01$), with the prevalence among the latter increasing from 67.6% to 84.4% over time. Disparities between the two groups increased significantly over time ($p < 0.05$). Veterans who were current or former smokers, unmarried, with older age, less than high school education, lower household income, no children living in the household were less likely to report a complete home smoking ban ($p < 0.05$). Conclusions: In spite of the general increase in the adoption of complete home smoking bans, veterans lagged behind the rest of the U.S. population and disparities persisted over time. Interventions promoting the adoption of complete home smoking bans are necessary to protect veterans and their family and reduce disparities in tobacco-related diseases, especially among veterans who were current or former smokers, unmarried, older, with lower education and income level, and without children living together.

FUNDING: No funding.

JUSTIFICATION: This study may inform future intervention opportunities targeting veterans and their families to reduce cigarette smoking, SHS exposure, and tobacco-attributable diseases.

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POS4-17 SMOKING AND SECONDHAND SMOKE EXPOSURE AT HOME WERE ASSOCIATED WITH POOR PERCEIVED FAMILY WELL-BEING: FINDINGS OF FAMILY PROJECT

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Background: The harms of smoking and secondhand smoke (SHS) are well established but the impact on family relationships is unknown. This study investigated the associations of smoking status and SHS exposure at home with family well-being among Chinese adults in Hong Kong. Methods: As a part of the FAMILY Project (A Jockey Club Initiative for a harmonious society), telephone surveys were conducted among 3043 randomly selected adults in 2010 and 2012 to monitor family and health information use in Hong Kong. Family well-being was measured using three questions of perceived family harmony, happiness and health (3Hs) with scales ranging from 0-10 with a higher score indicating better family well-being. Smoking status was categorised as current smokers, ex-smokers and never smokers (reference). Nicotine dependence and quitting behaviours were also recorded. SHS exposure at home was recorded as yes and no (reference). Multiple linear regressions were used to calculate β -coefficients for family 3Hs adjusting for potential confounders. Results: Compared with never smokers, current smokers reported lower levels of family harmony (adjusted $\beta = -0.28$, $p < 0.001$), happiness (adjusted $\beta = -0.25$, $p < 0.05$) and health (adjusted $\beta = -0.28$, $p < 0.05$). Number of cigarettes smoked, quit attempt and intention to quit were not associated with family 3Hs. SHS exposure at home was associated with lower levels of family harmony (adjusted $\beta = -0.28$, $p < 0.01$), happiness (adjusted $\beta = -0.29$, $p < 0.01$) and health (adjusted $\beta = -0.23$, $p < 0.05$). Conclusion: Current smoking and SHS exposure at home were associated with lower levels of perceived family 3Hs. Our findings, if replicable in prospective studies, suggest tobacco use in addition to disease causation also affects family well-being calling for urgent intervention to reduce tobacco use and promote smoke-free homes.

FUNDING: The Hong Kong Jockey Club Charities Trust

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POS4-18 PREDICTORS OF ELECTRONIC CIGARETTE USE AMONG A SAMPLE OF NEW YORK CITY ADOLESCENTS

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BACKGROUND: Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver vaporized nicotine that is often flavored. The product is designed to strongly resemble the look and feel of a traditional cigarette. There is currently little research examining factors associated with e-cigarette use among youth. This study examines the relationship between e-cigarette experimentation, tobacco use behaviors and environmental, social, and demographic variables among a sample of adolescents in New York City (NYC). METHODS: We surveyed 504 adolescents as they were leaving one of 50 randomly selected small grocery stores or pharmacies in NYC. The survey measured ever use of e-cigarettes, ever and current use of tobacco cigarettes and current use of cigars. Measures capturing exposure to, and awareness of, retail tobacco marketing, having friends who smoke, living with a smoker, and perceived social norms about e-cigarette and tobacco cigarette use among peers and adults were also included. The data were weighted for probability of store selection and post-stratified to the sex, age, race/ethnicity and borough population totals of 13 to 17 year-olds in NYC. RESULTS: Overall, 13% of respondents had tried e-cigarettes. Ever smoking cigarettes; being a current cigarette or cigar smoker; living with a smoker; having at least one friend who smokes cigarettes; frequently noticing tobacco products in retail settings; perceptions of e-cigarette use among peers; and age were all associated with e-cigarette use in bivariate analyses. In logistic regression models, the odds of e-cigarette use were highest among ever smokers, 17 year-olds (compared to 14/13 year olds) and those having at least one friend who smokes cigarettes. CONCLUSIONS: This study is one of the first to examine whether e-cigarette use shares common correlates with cigarette smoking in a diverse sample of adolescents. Experimenting with tobacco and exposure to peers who smoke appear to be important variables associated with openness to experimenting with e-cigarettes. This finding suggests that cigarette smoking and e-cigarette use might share common risk factors.

FUNDING: No funding

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POS4-19 EVALUATING ENVIRONMENTAL TOBACCO SMOKE EXPOSURE BY HOUSING TYPE

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Background: Environmental tobacco smoke (ETS) exposure significantly declined in the past decade due to smoking prevalence reductions and workplace and public smoke-free air laws. Population-based studies have observed declines in measured cotinine levels among the non-smokers. However, ETS is still a significant health concern, particularly in urban settings. One study found higher elevated cotinine levels among non-smoking adults in New York City (NYC) than among adults nationally, despite NYC having a lower smoking prevalence. Another study found that children of non-smoking parents living in multiunit housing (MUH) had higher mean serum cotinine levels than those living in detached houses. The high prevalence of NYC MUH may explain the elevated cotinine levels among non-smokers, but associations between housing type and cotinine levels have not been evaluated among adults. Methods: We used 2004 NYC Health and Nutrition Examination Survey data to examine the association between living in a MUH structure (versus single family homes) and having an elevated cotinine level among 1324 adult non-smokers, adjusting for socio-demographics (gender, age, race/ethnicity, education and income). Elevated cotinine was defined as a serum cotinine level of ≥ 0.05 ng/ml. Results: Apartment residents were more likely to have elevated cotinine compared with single-family home residents (58.7% vs. 51.5%, $p = 0.005$). In unadjusted logistic regression, elevated cotinine was positively associated with living in an apartment compared to a single family home (Odds Ratio [OR]=1.54 (95% confidence interval [CI], 1.14, 2.09)). In multivariable regression, adjusting for socio-demographics, elevated cotinine was marginally associated with living in an apartment compared to a single family home (OR=1.33 (0.96, 1.86)), and positively associated with younger ages (20-24 versus age 65

Poster Session 4 • Saturday, February 8, 2014 • 11:00 a.m. – 12:30 p.m.

and older), being male, having Asian ethnicity (compared with white), having a lower income and fewer years of education. Conclusions: Living in NYC MUH may increase the risk of ETS exposure. Housing policies and programmatic interventions may play a critical role in reducing ETS exposure in urban settings.

FUNDING: NO FUNDING

JUSTIFICATION: This study will add information on adult exposure to environmental tobacco smoke in multiunit housing to the evidence base supporting smoke-free housing.

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POS4-20 EVALUATING CHANGES IN FLAVORED AND MENTHOL TOBACCO PRODUCT SALES BEFORE AND AFTER FDA AND NEW YORK CITY BANS

Shannon M Farley*, MPH; Michael Johns, PhD

Background: The U.S. Food and Drug Administration (FDA) prohibited flavored cigarettes, such as fruit, candy, chocolate, cinnamon, or alcohol-flavored (e.g., piña colada), in September 2009. Menthol cigarette were not banned. The New York City (NYC) Council subsequently prohibited all flavored tobacco product sales, including cigars, smokeless, and other tobacco products, but excluding menthol products in October 2009. NYC voluntarily stayed enforcement until January 2011. Except in legally permitted tobacco bars, only menthol flavored tobacco products are allowed to be sold in NYC. The impact of these laws has not been evaluated in NYC. Methods: The NYC Health Department acquired five years of retail tobacco sales data (2008-2012) from stores with annual sales over \$2 million in NYC. Monthly flavored and menthol unit sales were compared using an interrupted time series design, overall and by tobacco product category. Negative binomial regression was used to estimate the percent change in the monthly number of products sold per store immediately after the FDA and NYC bans. Results: The FDA flavored cigarette ban was associated with a 46% decrease in product sales. NYC flavored ban enforcement was associated with sales declines among flavored cigars (91%), smokeless products (100%), and other tobacco products (89%). Unexpectedly, menthol cigarette sales (12%) and menthol cigar sales (85%) declined after NYC enforcement began, despite menthol not being included in the ban. Smokeless menthol product sales significantly increased after announcement of the 2009 FDA (24%) and NYC (25%) flavored bans, while smokeless menthol sales declined 22% once the NYC flavored ban was enforced. Additionally, in this data set, new menthol products (e.g., pipe tobacco) appeared for sale after the FDA ban was implemented and the NYC ban announced. Conclusions: Prohibiting flavored cigarettes nationally, and prohibiting flavored tobacco product sales in NYC significantly reduced flavored tobacco product sales. Other jurisdictions should consider flavored tobacco product restrictions to reduce tobacco consumption.

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JUSTIFICATION: PRODUCT BANS ARE AN EFFECTIVE METHOD OF REDUCING SALES OF FLAVORED TOBACCO.

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POS4-21 EFFECT OF WARNING STATEMENTS IN E-CIGARETTE ADVERTISEMENTS: AN EXPERIMENT WITH YOUNG ADULTS

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Abstract Background and Aims: The marketing and use of electronic cigarettes have increased exponentially in the US since 2008. This experiment examines whether warning statements in television advertisements for e-cigarettes would affect young adults' craving, risk perceptions, and intent to purchase. Design: Advertisements for two e-cigarette brands were edited to contain a warning statement about product ingredients or about the tobacco industry. Participants were randomly assigned to one of 8 treatments or to a brand-specific control condition without any warning statement. Participants: Young adults (n=900, ages 18-34) from a US web panel were recruited from three groups: e-cigarette users (e-cigarette users) who used e-cigarettes in the past 6 months, current smokers who used combustible cigarettes exclusively, and non-users who had not smoked 100 cigarettes in their lifetime and tried e-cigarettes more than 6 months ago. Measurements: Craving and risk perceptions (addictiveness, harmful to health in general, harmful to others) were measured separately for e-cigarettes and combustible cigarettes. Intention to purchase an e-cigarette was measured using the Juster scale. Findings: Both types of warnings reduced craving for e-cigarettes among those e-cigarette users and smokers who experienced any craving ($p < .01$) and reduced intention to purchase among all participants ($p < .001$). Risk perceptions of e-cigarettes did not differ between those exposed to ingredient-themed warnings and the controls. Participants who saw industry-themed warnings reported greater perceptions of general harm ($p < .001$), but also rated e-cigarettes as less addictive than the control conditions ($p < .05$). Conclusion: If banning e-cigarette advertisements on television is a regulatory impossibility, requiring strong warning statements may mitigate the impact of advertising on young adults.

FUNDING: This research was partially supported by the National Cancer Institute (grant number RO1-CA067805) and the National Heart, Lung and Blood Institute (grant number T32-CA 8481567)

JUSTIFICATION: If banning e-cigarette advertisements on television is a regulatory impossibility, requiring the advertisements to convey effective warnings may mitigate their impact on young adults.

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POS4-22 SMOKING CESSATION PREFERENCES AMONG AFRICAN AMERICAN MENTHOL SMOKERS

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Background: African Americans suffer higher rates of smoking-related disease and are less likely to quit smoking than the general population despite making more frequent quit attempts. High rates of menthol cigarette use among African Americans may contribute to this disparity, as there is increasing evidence that menthol smokers have more difficulty quitting. Despite this no study to date has evaluated effective smoking aids specifically in menthol smokers. Methods: 60 African Americans menthol smokers aged 18-75 who smoked at least 5 cigarettes per day sampled one nicotine replacement product per day on six days over a two-week period. The products were blu 24mg nicotine e-cigarettes and 2mg and 4mg nicotine gum, each in menthol and regular flavors. At the end of the sampling period, participants ranked products from 1 (best) to 6 (worst) and selected a product to use for two weeks as they attempted to quit smoking. Smoking was assessed at each visit and verified with exhaled CO. Participants also kept a record of daily cigarette and product use. Results: Of the 53 participants who completed the product sampling phase, 39 (74%) of participants chose the menthol e-cigarette, 10 (19%) chose the regular e-cigarette, and 4 (8%) chose the 2mg mint-flavored nicotine gum. Participants ranked the menthol cigarette highest (average rank 1.8). The regular e-cigarette and 2mg mint gum were similar (average rank 3.0 and 3.1, respectively), followed by 4mg mint gum (4.0), then 2mg and 4mg regular gum (both 4.7). Conclusions: This study demonstrated that menthol smokers strongly prefer menthol-flavored nicotine replacement products.

E-cigarettes were rated most favorably and merit evaluation as a cessation aid, as they can deliver menthol flavoring, the hand-to-mouth routine of smoking, and nicotine replacement. Providing a choice of nicotine replacement products may improve adherence to pharmacotherapy and result in better outcomes among smokers attempting to quit.

FUNDING: ClearWay MN grant RC 2013-0003

JUSTIFICATION: The FDA is considering banning menthol flavoring in cigarettes, which may induce many menthol smokers to quit; therefore research on what cessation aids are effective for menthol smokers is needed.

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POS4-23 PREVALENCE AND CORRELATES OF SMOKING AND CESSATION-RELATED BEHAVIOR AMONG SURVIVORS OF TEN CANCERS: FINDINGS FROM A NATION-WIDE SURVEY NINE YEARS AFTER DIAGNOSIS

J. Lee Westmaas, Ph.D.*, Kassandra I. Alcaraz, Ph.D., American Cancer Society; Carla J. Berg, Ph.D., Emory University Rollins School of Public Health; & Kevin Stein, Ph.D., American Cancer Society.

Introduction: Smoking is detrimental to recovery and survival from cancer, but many cancer survivors continue to smoke. Information is lacking on smoking patterns of survivors many years after diagnosis, correlates of smoking status, likelihood of quitting after diagnosis, and intentions to quit. Methods: Cross-sectional analyses were conducted among survivors of 10 cancers recruited by stratified random sampling in a nationwide, longitudinal, quality-of-life study using registry-verified cancer diagnosis. Standard smoking status questions were added to the most recent survey and completed by 2938 survivors. Results: Approximately 9 years after diagnosis, 9.3% of all survivors were current (past 30 day) smokers. Smoking prevalence was highest among survivors of bladder (17.2%), lung (14.9%), and ovarian (11.6%) cancers. Most current smokers (83%) smoked daily, averaging 14.7 cigarettes per day (cpd). Forty percent of daily smokers smoked more than 15 cpd. Nondaily smokers smoked a mean of 10.9 days in the last 30 days and averaged 5.7 cpd on smoking days. Current smoking was associated with younger age and lower education and income. Quitting after diagnosis was associated with having a smoking-related cancer. Roughly a third of current smokers intended to quit, the majority within the next 3 months. The odds of intending to quit were lower if survivors were married, older, or smoked more. Conclusions: This population-based study indicated that smoking can persist long after initial diagnosis and identified characteristics associated with quitting and intentions to quit. Findings can be used to help develop targeted cessation interventions for cancer survivors.

FUNDING: All funding provided by the American Cancer Society.

JUSTIFICATION: Health care providers still need to continually follow up cancer survivors many years after diagnosis to determine their smoking status and provide resources for helping them to quit; the sum of findings also suggest that survivors of lung and bladder cancers (which are smoking-related cancers) believe that at this length of time after diagnosis (9 years) they believe they are not suffering adverse health consequences of smoking that would justify quitting. This would be an important topic to address in interventions for survivors.

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POS4-24 INTERNATIONAL INCONSISTANCIES OF PREDICTED EXPIRED CARBON MONOXIDE IN NON-SMOKERS: THE AUSTRALIAN EXPERIENCE

Renee Bittoun*, Kentaro Sato, Emma L. Elcombe, Aki Takata. Smoking Research Unit, Brain Mind Research Institute, University of Sydney, Sydney, Australia.

Background: The measurement of expired Carbon Monoxide (CO) is widely used to biologically validate exposure to CO and hence smoking status. As exposure to CO may come from environmental sources as well as smoking there

is inconsistency in the international literature surrounding the predicted normal expired CO level in healthy non-smokers. Australia has a low prevalence of smoking, low levels of air pollution and tight passive smoking regulations thus Australians may have reduced exposure to CO and hence lower control expired CO levels than other countries. Objectives: To determine the mean expired CO level in healthy non-smoking Australian residents and develop an Australia specific expired CO cut-off level to differentiate smokers from non-smokers. Methods: 134 healthy non-smoking volunteers aged 18 to 73 were recruited during the 2013 Australian Smoking Cessation Conference (ASCC). Their expired CO levels in parts per million (ppm) were determined using a calibrated Bedfont Micro+ Smokerlyzer. All participants lived in Australia, were free of major lung and hematological conditions and were not pregnant, conditions which may produce endogenous CO. Results: The mean expired CO level was 2.74 ppm (SD = 0.79, Range 1 to 5 ppm). There was no significant difference between those living in the inner city, urban or rural locations, between morning or evening readings or between genders. Conclusions: Expired CO levels in Australia are lower than the previously suggested international non-smoking cut off level of less than 10 ppm. This may be a reflection of lower levels of air pollution, national smoking prevalence rates and hence exposure to passive smoking. As the expired CO level in non-smokers varies due to environmental exposure, all countries should regularly determine their own expired CO control readings in order to establish their own cut off points to validate self reported smoking status.

FUNDING: No funding

JUSTIFICATION: As environmental Carbon Monoxide changes, this study shows that all countries doing smoking interventions, both clinical and research studies, should measure their own expired Carbon Monoxide levels in order to ensure valid cut off readings for their populations.

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POS4-25 WORKPLACE BASED INTERVENTION TO PROMOTE SMOKING CESSATION AMONG MEN IN THE REGION OF SOUSSE, TUNISIA

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Workplace settings have the potential to provide opportunities and access for tobacco prevention interventions. Purpose: to explore smoking forms among workers and the effectiveness of workplace intervention in tobacco cessation. Study design: We carried out a pre post quasi experimental study among a group of 100 smoking workers. An assessment of tobacco use and attitudes of smokers and their willingness to quit was made before and after a three-month intervention program. The participants were randomly recruited from a factory which is already involved in the project of community based intervention program to control chronic disease in Sousse, Tunisia. A medical doctor already trained interviewed the smokers using a questionnaire. The Carbone monoxide level was also measured for validation of smoking status. The intervention program consisted of an open day of awareness, a group support meeting for unwilling smokers and smoking cessation consultations with the medical doctor. Results: All participants were male, with a mean age of 36.9±7 years, a mean starting age of tobacco use of 18.71±3years. The mean duration of active tobacco smoking was 18.18±7 years. 93% of the participants were cigarette smokers and the mean number of daily consumed cigarettes was of 17.4±9 cigarettes. The percentage of workers smoking chicha regularly was 17%. One quarter of the smokers reported a moderate dependence of nicotine and 18.3% have high degree of dependence. After the intervention phase, 83 employees participated at the final assessment. The percentages of smokers quitting smoking was 25% among cigarette smokers and 41% among chicha smokers. Five cigarette smokers quitted cigarette smoking and became chicha smokers. There was a significant decrease of the mean

number of cigarettes consumed daily. 21.7% of all smokers have had positive influence on their colleagues so that either they attempt to quit or decrease their tobacco consumption.

FUNDING: This work was supported by an NIH award: the Fogarty International Center of the National Institutes of Health under Award Number R56TW009265.

JUSTIFICATION: The success of cessation programs in workplaces has a major potential for tobacco control in developing countries

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POS4-26

COST-EFFECTIVENESS OF VARENICLINE FOR SMOKING CESSATION: EVIDENCE FROM PRACTICE IN CARDIOVASCULAR HOSPITAL IN BRAZIL.

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Varenicline is a partial agonist of nicotinic acetylcholine receptor for use as an aid to smoking cessation. Given the lack of economic studies evaluating the outcomes of smoking cessation programs, we conducted a study to evaluate the cost-effectiveness of varenicline in smoking cessation scenario. The aim of this work was to compare the cost-effectiveness of varenicline versus bupropion and nicotine replacement therapy in a smoking cessation program of a Cardiovascular Hospital. Material and Methods: This is a retrospective outcome research including data of 504 patients from January through December 2012, from a smoking cessation program from a tertiary cardiovascular hospital in São Paulo, Brazil. The follow-up period was 24 weeks. The therapeutic drugs used were: bupropion, nicotine replacement therapy (NRT- patches or/and gum) and varenicline. Incremental cost-effectiveness ratios (ICERs) were estimated in the perspective of the Brazilian Public Health System (SUS). Chi-square, Student's t test and univariate and multivariate logistic regression analyses were performed. Results: The average of Fagerstrom score was > 6, the mean age was 50.7 years (+/-20), with a prevalence of 57% of male. The success rate at 6 months was evaluated and confirmed through exhaled carbon monoxide concentration. The rate of success in the varenicline monotherapy group was 54.9%; varenicline plus bupropion was 60.6%, bupropion plus gum was 36.7%, bupropion plus gum and patches was 34.3% and NRT gum plus patches was 44.8%. The best cost-effectiveness for one subject to be well succeeded was US\$ 505.59 with varenicline monotherapy; US\$ 514.76 with varenicline plus bupropion; US\$ 713.19 with bupropion plus gum; US\$ 1,167.24 with bupropion plus NRT; and US\$ 747.12 with NRT alone. The ICERs for one subject to quit smoking was US\$ - 633.756 and US\$ - 629.83 compared to treatment with bupropion associated with NRT and treatment with NRT alone, respectively. Conclusion: In this study, treatment with varenicline showed to be dominant and cost saving compared to NRT and/or bupropion

FUNDING: no funding

JUSTIFICATION: Treatment with varenicline is cost saving compared to NRT or bupropion.

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POS4-27

COPING WITH STRESS BY SMOKING? A RE-EVALUATION OF THE ROLE OF UNHEALTHY BEHAVIORS AMONG RACIAL/ETHNIC OLDER ADULTS

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Background. The use of unhealthy behaviors, such as cigarette smoking, as coping mechanisms of stress is an ongoing debate. The present study assesses the role of unhealthy behaviors, such as cigarette smoking, in the relationship between stressful environment and depression among African American (AA),

Latino/Hispanic (L/H), and White older adults. Methods. Adults born between 1931 and 1941 who participated in the 2006 and 2008 Health and Retirement Survey (HRS) were analyzed. Unhealthy behaviors in 2006 included current smoking, alcohol drinking, and being obese. Stressful environment in 2006 was assessed by 21 self-reported stress-related events. Using the 8-item Center for Epidemiologic Studies Depression Scale, 4 or more depressive symptoms established depression in 2008. Logistic regression assessed the effects of stressful environment and unhealthy behaviors on depression. Results. For AA, L/H, and Whites, mean number of chronic stress events (1.44, 1.42, and 1.40) and unhealthy behaviors (1.5, 1.4, and 1.4) were comparable, respectively. The prevalence of depression was higher among AA and L/H than Whites: 21.0%, 30.7%, and 16.8%, respectively. Greater stressful environment consistently predicted depression among L/H and Whites (OR=1.58, 95% CI: 1.04-2.41 and OR=1.40, 95% CI: 1.16-1.67), although unhealthy behaviors did not moderate the relationship. However, L/H and White current smokers were more likely to be depressed at follow-up (OR=7.90, 95% CI: 2.02-30.9 and OR=1.72, 95% CI: 1.03-2.88). Conclusions. Unlike findings from previous research, unhealthy behaviors do not play a role in the relationship between stressful environment and depression. Yet, both stressful environment and current smoking are predictive of future depression among L/H and Whites. Findings from this study can be used to promote smoking cessation among older adults and those with high levels of perceived stress, support new and improve existing tobacco control policies to limit tobacco marketing of smoking to relieve stress, and strengthen socioeconomic policies that reduce environmental stressors.

FUNDING: National Cancer Institute (R25 CA113710)

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POS4-28

AWARENESS AND EVER-TRIAL OF ELECTRONIC CIGARETTES AMONG 10 COUNTRIES: FINDINGS FROM THE ITC PROJECT

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Background: Recently, e-cigarettes have generated considerable interest and debate on the implications for tobacco control and public health. Although the rapid growth of e-cigarettes is global, little is known about e-cigarettes around the world. This paper presents awareness and ever-trying of e-cigarettes in 10 countries. Methods: Adult (≥ 18 years) current and former smokers in the International Tobacco Control (ITC) cohort responded to questions on e-cigarettes—"Have you ever heard of electronic cigarettes or e-cigarettes?" and "Have you ever tried an electronic cigarette?"—in 10 countries: Canada (n=1569; Wave 8: 2010-11); United States (n=1515; Wave 8: 2010-11); United Kingdom (n=1321; Wave 8: 2010-11); Australia (n=1509; Wave 8: 2010-11); Malaysia (n=1978; Wave 5: 2011-12); Republic of Korea (n=1739; Wave 3: 2010); China (n=5550; Wave 3: 2009-10); Netherlands (n=1812; Wave 7: 2013); Mexico (n=2125; Wave 6: 2012); and Brazil (n=1059; Wave 2: 2012). Results: There was considerable cross-country variation in both awareness of e-cigarettes [Netherlands (88%), Republic of Korea (79%), United States (73%), Malaysia (62%), United Kingdom (54%), Canada (40%), Brazil (35%), Mexico (34%), China (31%) and Australia (20%)] and in self-reports of ever having tried e-cigarettes [Malaysia (21%), Netherlands (19%), United States (15%), Republic of Korea (11%), United Kingdom (10%), Mexico (4%), Canada (4%), Brazil (3%), China (2%), and Australia (2%)]. Conclusions: The cross-country variability in awareness and ever-trial of e-cigarettes is likely due to a confluence of country-specific market factors, tobacco control policies and regulations (e.g., the legal status of e-cigarettes and nicotine), and the survey timing along the trajectory of e-cigarette awareness and trial/use in each country. These ITC results constitute an important snapshot of the initial stage of what will likely be a rapid progression of e-cigarettes throughout the world. More research

is needed to understand the patterns of global e-cigarette use, particularly on the impact of e-cigarettes on dual use, quitting, and relapse among smokers and initiation among youth.

FUNDING: The ITC Project Surveys from which the data for this study were analyzed are supported by grants from the US National Cancer Institute (R01 CA100362 and P01 CA138389), Canadian Institutes of Health Research (115016), National Health and Medical Research Council of Australia (265903), Cancer Research UK (C312/A6465), Mexican Consejo Nacional de Ciencia y Tecnología (Salud-2007-C01-70032), National Cancer Institute of Brazil, the National Anti-Drug Secretariat of Brazil (SENAD), the Chinese Center for Disease Control and Prevention, The Netherlands Organisation for Health Research and Development (ZonMw), the Korean Ministry of Health and Welfare, and the Malaysian Ministry of Health. Additional support was provided by a Senior Investigator Award from the Ontario Institute for Cancer Research and a Prevention Scientist Award from the Canadian Cancer Society Research Institute to Geoffrey T. Fong, and from the Dutch SILNE Project, funded by the European Commission through FP7 HEALTH-F3-2011-278273.

JUSTIFICATION: The rapid emergence of electronic cigarettes constitutes one of the most important developments in tobacco use and tobacco control because of its potential impact on tobacco use, cessation, and policies designed to reduce tobacco use; this is the first study to present basic awareness and usage data across different countries and thus represents unique data for policymakers and researchers in their responses to the rapid progression of these new products.

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POS4-29 **THE IMPACT OF A NOVEL NICOTINE INHALER DEVICE ON CIGARETTE USE AND NICOTINE CONSUMPTION**

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A 12-week, open-label, extended product usage test (EPUT) was conducted to validate results of an earlier simulated test market (STM) study and, primarily, to assess the impact of a novel nicotine inhaler device on the attitudes and behavior of dissonant cigarette smokers (18-64 years; 5 or more factory-manufactured cigarettes [FMCs] a day). A total of 460 participants were randomized to use the novel inhaler (0.45 mg nicotine; n=158), Nicorette Inhalator (10 mg nicotine; n=149) or Vype, an e-cigarette (12.5 mg nicotine; n=153) and record their daily usage of the product in an on-line diary. Results (post hoc analysis) for the novel inhaler and Nicorette Inhalator are reported. Pre-trial, 71 and 30% of participants allocated the novel inhaler and Nicorette Inhalator, respectively, said they would consider buying their product. At Week 12, 135/160 (84%) and 131/151 (87%) participants were still using their allocated product. Quit rates were 6.7 and 9.9% in the respective groups. Use of both products declined by 25% over Weeks 5-12, with mean reductions in FMCs of 16 and 23%, respectively. Over the study period, 50% or more of the average total daily FMC use was substituted with the novel inhaler versus only 10% with Nicorette Inhalator. After 12 weeks, the novel inhaler was used both at home and in public and approximately 40% of users derived 50% or more of their nicotine from the device. More users of the novel inhaler than Nicorette Inhalator believed their test device would make it easier to quit smoking (93.7 vs. 78.4%). Motivation to use the novel inhaler included: to reduce smoking (66%), to aid quitting (61%), for FMC replacement (30%), and to abstain (18%). The higher rate of FMC substitution with the novel nicotine inhaler device versus Nicorette Inhalator and the large fall in total nicotine consumption over 12 weeks validate results from the earlier STM study and confirm that the novel inhaler could be an appealing alternative to cigarettes for many smokers. It has the potential to enable smokers to reduce or replace their cigarette consumption, making it easier to quit, and to have an impact on public health by reducing the harm from smoking.

FUNDING: The study was funded by Nicoventures Limited, London, UK

JUSTIFICATION: The novel nicotine inhaler device has the potential to enable smokers to reduce or replace their cigarette consumption, making it easier to quit, and to have an impact on public health by reducing the harm from smoking.

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POS4-30 **NICOTINE DEPENDENCE, NICOTINE METABOLISM AND THE EXTENT OF COMPENSATION IN RESPONSE TO REDUCED NICOTINE CONTENT CIGARETTES**

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Background: The United States Food and Drug Administration (FDA) has the authority to regulate tobacco product constituents to promote public health. A reduction in nicotine content in cigarettes may lead to lower levels of addiction. However, persons may compensate for reduced nicotine availability by smoking more cigarettes and/or smoking more intensely. **Objective:** The objective of this study was to test whether individual differences in the level of nicotine dependence and/or the rate of metabolism influence the extent of compensation, smoking behavior, and exposure to tobacco toxicants when smokers are switched to reduced nicotine content cigarettes. **Methods:** Data from this study come from a previously published randomized clinical trial of nicotine reduction cigarettes. Nicotine content of cigarettes was progressively reduced for 6 months and measures of compensation, smoking behavior, and tobacco toxicants were measured. **Results:** There were no individual subgroup differences by level of nicotine dependence or rate of nicotine metabolism in compensation, smoking behavior, and tobacco toxicant exposure. **Conclusions:** The level of nicotine dependence or rate of nicotine metabolism does not appear to influence the extent of compensation when switching to reduced nicotine content cigarettes, an observation that may help inform regulatory planning.

FUNDING: Dr. Frank C. Bandiera is currently a postdoctoral scholar in Tobacco Control in the Center for Tobacco Control Research and Education at the University of California, San Francisco. Dr. Bandiera's fellowship is covered by a postdoctoral training grant from the National Cancer Institute (5R25CA113710-08). Dr. Neal Benowitz is funded by the National Cancer Institute (R01CA078603).

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POS4-31 **TOBACCO-RELATED MORTALITY AMONG PERSONS WITH MENTAL HEALTH AND SUBSTANCE ABUSE PROBLEMS**

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Objective: The rate of cigarette smoking is greater among persons with mental health and/or substance abuse problems. There is some evidence that persons with mental health and/or substance abuse problems are more likely to die from tobacco-related deaths than from other causes. However, there are few population-based datasets with which to study this relationship. **Methods:** The Oregon Health Authority identified persons who received publicly-funded mental health or substance abuse services from January 1996 through December 2005. These cases were identified as having received mental health services, substance abuse services, or both types of services. These cases were then matched to Oregon Vital Statistics records for all deaths (N= 148,761) in the period 1999-2005. **Results:** The rate of tobacco-related death rates was higher among persons with substance abuse problems only (53.6%) and those with both substance abuse and mental health problems (46.8%), in comparison to the general population. The rate of tobacco-related deaths among persons with mental health problems only (29.9%) was similar to that in the general population (30.6%). Persons with substance abuse problems only, and substance abuse and mental problems, also died prematurely from tobacco-related deaths; while there were no differences in tobacco-related premature deaths between persons with mental health problems

only and the general population. Conclusion: Persons receiving substance abuse treatment in Oregon were more likely to die, and more likely to die prematurely, of tobacco-related causes as compared to the general population.

FUNDING: Frank C. Bandiera is currently a postdoctoral fellow in Tobacco Control at the University of California, San Francisco (5R25CA113710-08).

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POS4-32 THE RELATIONSHIP BETWEEN SOCIAL SUPPORT AND TIME TO RELAPSE IS MEDIATED BY REDUCED WITHDRAWAL SYMPTOMS

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Social support has been linked to quitting smoking, but the mechanisms by which social support affects cessation are not well understood. Identifying pathways linking social support to likelihood of cessation can improve social support interventions (Westmaas, Bontemps-Jones, & Bauer, 2010). The current study tested a stress buffering model of social support, which posits that social support protects or "buffers" individuals from the harmful effects of stressors, like quitting smoking. We hypothesized that social support would be negatively associated with time to relapse, and that this effect would be mediated by reduced withdrawal and depression symptoms over time. Participants were weight-concerned women (n = 349; 86% white) ages 18-65 enrolled in a randomized, double-blind, placebo-controlled smoking cessation program. At baseline, participants completed the Interpersonal Support Evaluation List (ISEL). Changes in 12 symptoms of DSM-IV defined tobacco withdrawal, depressive symptoms as assessed by the Beck Depression Inventory (BDI), and biochemically-verified prolonged abstinence were assessed at 1-, 3-, 6-, and 12-months follow-up. As predicted, social support was negatively related to time to relapse in survival models and negatively related to withdrawal symptoms and BDI in time-lagged mixed effects models. These relationships held after controlling for the effects of pre-quit day withdrawal symptoms and BDI, random assignment to bupropion vs. placebo and enhanced counseling vs. standard treatment conditions, FTND level, SES, and CO entered as a time-varying covariate. A temporal mediation model showed that the effect of social support on time to relapse was partially mediated by reductions in withdrawal symptoms over time but not by BDI. Thus, increased social support may buffer women from the harmful effects of cessation-related withdrawal symptoms, which in turn may relate to cessation success. Results are discussed with respect to designing more effective support interventions for the treatment of tobacco addiction.

FUNDING: This research was supported by a grant from the NihR01 DA04174.

JUSTIFICATION: Results will be discussed with respect to designing more effective support interventions for the treatment of tobacco addiction.

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POS4-33 EFFECTS OF THE USE OF ELECTRONIC CIGARETTES WITH AND WITHOUT CONCURRENT SMOKING ON ACROLEIN DELIVERY

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Background: Electronic cigarettes (EC) may have a potential for public health benefit as a safer alternative to smoking, but questions were raised about a toxicant acrolein that can be produced by heating glycerol used in some EC brands. We investigated exposure to acrolein, cotinine and carbon monoxide (CO) before and after 4 weeks of EC use, both in exclusive EC users and in users of both EC and conventional cigarettes. Methods: 40 smokers intending to quit attended a baseline session one week prior to their target quit date (TQD). On the TQD they received their EC (GreenSmoke, 2.4% nicotine) and were then

seen weekly over four weeks. CO and urine samples were collected at TQD and at 4-weeks post-TQD to assay for cotinine and S-(3-hydroxypropyl)mercapturic acid (3-HPMA), a metabolite of acrolein. Results: 33 participants were using EC at the end of treatment and were included in the biomarker analyses. 16 were abstinent from smoking during the previous week (validated with CO < 10 ppm) and 17 smoked. Urinary HPMA levels (ng/mg creatinine) at 4 weeks showed a significant decrease from baseline in the overall sample (1,380 ng/mg creatinine, 95%CI: 1,018-1,742), in abstainers (1,280 ng/mg creatinine, 95%CI: 861-1,699) and in smokers (1,474 ng/mg creatinine, 95%CI: 847-2,101). All groups (the total sample, abstainers and smokers) experienced a significant reduction in CO intake (12, 95%CI: 8-16; 12, 95%CI: 7-16; and 12, 95%CI: 6-19, respectively). Cotinine levels declined significantly in the overall sample and in non-abstainers (592, 95%CI: 143-1,041 and 976, 95%CI: 270-1,682, respectively) but not in abstainers (184, 95%CI: -365 to 733) for whom EC provided practically full nicotine replacement. Conclusions: In smokers who continue to smoke while using EC, EC use significantly reduces rather than increases acrolein exposure. It also significantly reduces overall smoke intake. EC may have a potential to generate useful smoking cessation and harm reduction outcomes, but long-term follow-up studies are needed to confirm this.

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POS4-34 RELATIONSHIPS BETWEEN SMOKING, OBESITY, AND C-REACTIVE PROTEIN: THOUGHT-PROVOKING FINDINGS FROM A CLINICAL STUDY IN HEAVY SMOKERS FROM WEST VIRGINIA

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Background: C-reactive protein (CRP) is a systemic inflammatory biomarker that is used to predict cardiovascular disease (CVD) risk, and is also associated with increased risk of other chronic inflammatory illnesses such as type 2 diabetes. Cigarette smoking and obesity are each associated with elevated CRP levels and increased risk of CVD and diabetes, although the exact nature of these relationships is unknown. We analyzed results from a clinical trial involving heavy smokers from West Virginia to evaluate the relationships between smoking, demographic variables including body mass index (BMI), and CRP levels to gain insight into inflammatory disease risk factors in this population. Methods: Adult smokers (≥ 1 pack per day for ≥ 5 years; n=106) were enrolled in a multi-phase study to evaluate whether an investigational oral product would reduce cigarette craving and/or elevated CRP. As part of this study, multiple smoking, demographic, and biochemical variables were assessed and explored for potential relationships using correlation and regression analyses, including: Fagerström scores; pack-years of smoking; number of cigarettes smoked per day; BMI; age; gender; exhaled carbon monoxide (CO); and serum cotinine and high-sensitivity CRP. Results: Subjects reported using tobacco products for an average of 28.2 ± 10.9 years, and smoking an average of 32.1 ± 7.6 cigarettes per day. Only 21% of study subjects had a normal BMI (< 25 kg/m²), and the remaining 79% were overweight, obese, or morbidly obese. Regression of CRP levels against demographic and tobacco consumption data revealed the strongest covariate was BMI ($r=0.31$, $p=0.001$), not the extent of smoking. Only 14% of subjects with a normal BMI had elevated CRP values compared to 79% of subjects who were classified as morbidly obese (BMI ≥ 40 kg/m²). Conclusions: These findings suggest that the population still smoking in rural areas of the United States (e.g., WV) is subject to multiple interacting risk factors that pose significant health threats by substantially increasing the risk for chronic inflammatory illnesses such as CVD and diabetes.

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POS4-35 VARIATIONS IN SMOKE EXPOSURE MEASURES AMONG CIGARETTE AND CIGARILLO DUAL USERS

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Tobacco product smoking is a complex process where many variables play a role in the users' exposure to toxicants (i.e. tobacco type or oxygen-temperature conditions during combustion). In the current study, we examined plasma nicotine (PN) and carbon monoxide (CO) boost and amount of tobacco smoked in dual users of cigarettes and cigarillos. Seventeen (16 men) self-identified dual users (≥ 10 cigarettes/day; ≥ 1 cigar/week) participated in two experimental sessions (separated by at least 24 hours). Participants were mostly African American ($n=13$) with an average age of 36 ± 11 years. They smoked 17 ± 4 cigarettes/day and were moderately dependent on nicotine (FTND: 6 ± 2). Participants smoked, ad lib, their usual brand of cigarette at one experimental session and a Black & Mild cigarillo at the other. PN and exhaled CO were measured before and after smoking. Cigarettes and cigarillos were weighed before and after smoking to determine the amount of tobacco smoked. The amount of tobacco smoked during the cigarette smoking condition was significantly less than that smoked during cigarillo conditions [0.7 (range 0.5-0.8g) and 1.4g (range 0.8-2.4g), respectively; $p < .01$]. Nicotine boosts for cigarette and cigarillo smoking were similar (22 and 24 ng/mL, respectively). However, after accounting for the differences in the amount of tobacco smoked, there was a significantly greater nicotine boost per gram of tobacco after cigarette smoking compared to cigarillo smoking (32 and 17 ng/mL/g, respectively; $p < .001$). CO boost was significantly greater after cigarillos than cigarettes smoking both before and after controlling for differences in the amount of tobacco smoked (27 vs 9 ppm and 19 vs 12 ppm/g, respectively; $p < .001$) which may convey increased exposure compared to cigarettes. This finding suggests that commonly used measures of smoke exposure (i.e. PN boost and exhaled CO) may differ among combustible tobacco products. The difference in exposure may be due to variations in the products or how they are consumed. Further investigation is needed to establish if smoking cigarillo products contributes to higher exposure not only in CO but also to other toxicants.

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POS4-36 NATIONAL AND STATE PREVALENCE OF SMOKE-FREE HOME RULES IN THE UNITED STATES: TWO DECADES OF PROGRESS

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Secondhand smoke (SHS) exposure causes disease and premature death among nonsmokers. Although many jurisdictions have implemented laws prohibiting smoking in public places, the home remains a prominent source of SHS exposure, particularly for children. This study used data from the 1992-1993, 1998-1999, 2003, 2006-2007, and 2010-2011 Tobacco Use Supplements to the Current Population Survey - a household survey of the civilian, non-institutionalized population - to assess prevalence and trends in smoke-free home rules in all 50 States and the District of Columbia (D.C.). Households were considered to have a smoke-free rule if all adult respondents aged ≥ 18 in the household reported that no one was allowed to smoke anywhere inside the home at any time. The prevalence of smoke-free home rules was calculated overall and by state for each survey year. Trends from 1992-1993 to 2010-2011 were also assessed using logistic regression ($p < 0.05$). The findings indicate that the prevalence of smoke-free home rules increased from 43.0% in 1992-1993 to 83.0% in 2010-2011 ($p < 0.05$). Among households with at least one adult cigarette smoker, prevalence increased nearly four-fold, from 9.6% in 1992-1993 to 46.1% in 2010-2011. Among households with no smokers, prevalence increased from 56.7% to 91.4%. In 1992-1993, the overall prevalence of smoke-free home rules ranged from 25.6% in Kentucky to 69.4% in Utah, while in 2010-2011, prevalence ranged from 69.0% in West Virginia to 93.6% in Utah. From 1992-1993 to 2010-2011, an increase was observed in the prevalence of smoke-free home rules in every state and D.C. ($p < 0.05$), irrespective of whether a smoker lived in the home. These findings suggest that considerable progress has been made adopting smoke-free home rules in the past two decades, particularly in homes with smokers. However, millions of Americans

remain at risk for SHS exposure because their homes are not smoke-free. Efforts to educate the public about the adverse health effects of SHS exposure and to promote smoke-free multiunit housing policies and voluntary smoke-free home rules are crucial to protect nonsmokers from this preventable health hazard.

FUNDING: No funding

JUSTIFICATION: The findings from this study could be used to inform the implementation of voluntary smoke-free home rules across the United States.

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POS4-37 THREADING THE NEEDLE: MONITORING AND TARGETING POLICY IMPROVEMENTS UTILIZING A NOVEL SUB-COUNTY TOBACCO POLICY SURVEILLANCE SYSTEM

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Many states are successful in curbing indoor smoking via state law, yet opportunities exist to further limit exposure via local policy. Public Health - Seattle & King County partnered with University of Washington to design/ pilot a policy surveillance system (LawAtlasSM) focused on 2 policy areas: Local parks and post-secondary institutions. We collected policies from all 39 local cities, through online municipal codes or from city officials. Public college policies were available online or from private institutions' websites/staff. 31 of 40 institutions were included; smaller institutions excluded with over-sampled in areas of tobacco disparities. Policy variables were identified w/model policies and tobacco policy experts. Codebooks were developed & each policy coded with inter-rater reliability analysis. Codes were entered into LawAtlasSM - & subsets then selected for visual display & mapping. Through utilization of this system, we found variation among local policies in both datasets. While most post-secondary students are covered by some policy, a wide range of prohibitions exist. Few are 100% smoking free and significant exceptions exist. Nearly half of institutions have no policies. For parks, 12 of 39 cities had policies in 2013 (up from 5 in 2010). Five in South King County (highest disparities area) had no policies for parks or no policies for some. Four cities prohibited all smoking in 100% of parks ("100% smoking-free") in 2013 (up from 0 in 2010). Although time- / labor-intensive, rigorous policy surveillance methods are needed locally so that public health laws are written optimally and to discover/eliminate disparities. Significant room for improvement exists in tobacco policy across King County parks and post-secondary institutions; findings can shape / direct health department activities. Use of open source systems like LawAtlasSM creates efficiencies for regular benchmarking of policy environments over time.

FUNDING: No funding

JUSTIFICATION: This project demonstrates benefits of developing an ongoing and systematic policy surveillance system that allows public health practitioners and policy makers to monitor effects of particular policy components and target future policy interventions to reduce youth and young adult exposure to tobacco.

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POS4-38

TOBACCO RETAIL OUTLETS: RISKS FOR LOW-INCOME ASIAN AMERICAN AND OTHER VULNERABLE YOUTHS IN RICHMOND, CA

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Background: Tobacco outlets represent risks for access to tobacco products and exposure to tobacco marketing for youth. Tobacco uptake is particularly problematic among low-income youths, as low-income smokers are less likely to quit. Low-income Southeast Asian American youths may additionally be at risk due to high rates of tobacco use among Southeast Asian adults. In an on-going youth-participatory research project in Richmond CA, participants in SEAYL, a Southeast Asian American youth development program, have been conducting research on the tobacco environment in their community, including assessing tobacco retail outlets and impacts near schools. Federal policies prohibit sales of single cigarettes, but not other tobacco products sold singly (cigars, cigarillos). State policies prohibit sales of all tobacco products to youth, and Richmond city policies intending to protect youth from tobacco marketing limit the amount of signage on store windows to 1/3 or less, but do not currently regulate types of products sold, nor restrict tobacco sales within proximity of schools. **Methods:** Youth participants conducted unobtrusive observations in all licensed tobacco outlets in Richmond (N=59) by entering outlets in pairs, accompanied by an adult staff member, and recording the results of each observation on a brief digital checklist form immediately upon exiting the outlet. All outlet addresses were geocoded. **Results:** Within the city, tobacco outlets are concentrated in low-income areas which also have the highest concentration of schools. 48% of outlets sold single cigarettes; 52% sold blunt wrappers (tobacco/cellulose leaves for rolling marijuana cigars); 21% sold small cigars or cigarillos in packs and 25% sold these as singles; and 22% sold e-cigarettes. Nearly one-third of outlets had more than 1/3 of windows covered with advertising. Nearly two-thirds of tobacco outlets were found to be within 2000 feet of schools. **Conclusions:** Richmond city policies may not protect vulnerable youths from tobacco marketing and access.

FUNDING: This study was supported by California Tobacco-Related Disease Research Program grant 21AT-0012.

JUSTIFICATION: This research may support community efforts to enhance and expand tobacco control policies, including enforcement of existing policies, to protect vulnerable youth from exposure and access to tobacco products.

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POS4-39

RECRUITMENT OF UNDERSERVED WOMEN INTO A SOCIAL NETWORK SMOKING CESSATION STUDY

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Purpose: We describe recruitment of a subpopulation of women who participated in a social network study that used an established address-based sampling (ABS) approach. **Objectives:** 1) to apply Brick et. al's (2011) method of ABS to recruit Ohio Appalachian women for a health-related survey 2) to compare response rates between the current study and Brick's published results and 3) to describe sample and social network characteristics of study participants. **Methods:** We replicated Brick et. al's method of using a two-phase ABS approach. Our first phase included a screening questionnaire mailed to all randomly selected households (n=1950) in 3 Ohio Appalachian counties to identify members of the eligible subgroup (i.e. age 18+ and county resident). Three and 6-week follow up letters were sent to households not returning a questionnaire. Phase two of recruitment involved contacting one randomly selected eligible woman enumerated by each household, based on return of the screening questionnaire. These women (n=598) were invited by field interviewers to participate in a one-time in-person health survey. As part of the survey, each woman was asked to name up to 9 social ties, or 'alters', for

each of two questions: 1) who they spend the most time with in daily activity and 2) who they look to for advice or feedback. Smoking status of women and alters was recorded. **Results:** Based on AAPOR RR 1 calculations, the response rates were 40% and 68% for phases one and two, respectively. Mean age of enrolled women (N=408) was 52, with 20% current and 23% former smokers. Mean number of alters listed for social network questions 1 and 2 were 6.6 and 4.7, respectively. Mean number of alters was significantly different between ever and never smokers for social network question 2. **Conclusions:** Study response rates mimic those of Brick et. al. Phase I had a slightly lower response rate than Brick et. al, possibly because our Phase II protocol required a commitment to a one hour, in-person survey. In general, these results are encouraging. We recommend the two-phase ABS approach for reaching subpopulations. Network size will be considered when designing a network-based intervention.

FUNDING: This analysis is an extension of a Center for Population Health & Health Disparities NIH P50 Grant # 5P50CA105632-06 to conduct research on cervical cancer disparity in Appalachia.

JUSTIFICATION: This study will help to inform the design and implementation of a network-based smoking cessation intervention for an underserved population of women.

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POS4-40

DEVELOPING A CRITICAL AWARENESS OF THE TOBACCO ENVIRONMENT FOR YOUTH: RESULTS OF A PHOTOVOICE PROJECT IN RICHMOND, CA

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Background: Tobacco use and availability in the social environment represent risks for youth smoking uptake and exposure to secondhand smoke. Low-income people, including U.S. Southeast Asians, are disproportionately at risk for tobacco use. Participatory research approaches may develop among participants a critical awareness of social-structural conditions which underlie such disparities. In a youth-participatory research project in Richmond CA, participants in SEAYL, a Southeast Asian American youth development program, have been conducting research on the tobacco environment in their community. To develop critical awareness, the program utilizes PhotoVoice, in which participants record and analyze their environment through photography. **Methods:** Youth participants conducted a series of photo-expeditions in their low-income community and in nearby communities with higher SES. Youth took photographs to qualitatively capture elements of the environment which they felt impact tobacco use. They discussed their photographs using a critical assessment technique (SHOWeD); selected photographs to highlight; wrote brief narratives describing these selections; and displayed the results to adult allies and community stakeholders. **Results:** The PhotoVoice display focused on tobacco impacts on the neighborhood surrounding their high school (Richmond High School) compared to neighborhoods surrounding El Cerrito and Albany High School and Berkeley High School. Themes which emerged were: Positive environment (e.g. clean spaces, no trash on ground, and alternative activities for youth); Negative environment (e.g. trash, tobacco product litter on the ground); Lack of enforcement (e.g. school officials not enforcing tobacco-free rules); Lack of signage supporting a tobacco-free environment; Negative perception of Richmond. Overarching issues were lack of care about their community and about youth. The team is discussing actions to address these issues. **Conclusions:** PhotoVoice can support development of a critical awareness of tobacco as a social justice as well as health issue, which may in turn support advocacy to reduce the impacts of tobacco on vulnerable youth.

FUNDING: This study was supported by California Tobacco-Related Disease Research Program grant 21AT-0012.

JUSTIFICATION: Participatory research on environmental aspects of tobacco within a social justice framework may enhance youth's abilities to critically assess and resist tobacco influences.

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POS4-41

DIFFERENTIAL PREDICTORS OF RELAPSE IS A FUNCTION OF TIME QUIT: FINDINGS FROM THE ITC 4-COUNTRY SURVEY

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We (Yong et al, 2013, NTR) recently reported that the heaviness of smoking index (HSI) was most predictive of relapse in the first week of a quit attempt, but was not predictive beyond around one month. In this paper we look at determinants of relapse is a function of time quit for a range of other variables of interest. Methods. Data from the ITC four country survey on cases reporting quit attempts both attempts that spanned survey waves and attempts that occurred within one survey wave. Depending on the question asked, the number of waves it was asked, and the period of time quit studied, the sample size ranged from 9017 through to 808. All analyses controlled for sociodemographics, wave of survey, and time in sample. We consider the following intervals: less than 1 week, 1- 2 weeks, 2-4 weeks, 30- 90 days, 90- 180 days, and 180- 365 days. Results. Other indices of dependence and valuing smoking showed a similar pattern to HSI, losing predictive value beyond around 1 month. Similarly, reported financial stress is only predictive in the first month. Use of medications for the quit attempt was protective in the first 2 week, but not thereafter, and may be associated with higher relapse after around 3 months. Having more friends who smoke was a weak risk factor at all times. Reporting prematurely stubbing out cigarettes was not predictive early, but becomes so after 2 weeks. Having previous quit attempts in the past year is protective in the first week (for 1 other only), but becomes predictive of increased relapse from 2 weeks. Motivational variables were not clearly related to relapse in the first week, but become predictive particularly between 1 week and 3 months. Older smokers are less likely to relapse only after around 3 months. There were no clear gender effects. Conclusions. These findings provide more evidence that the factors influencing relapse change as the duration of a quit attempt increases. Understanding this may help to develop more effective relapse prevention interventions.

FUNDING: The ITC Four-Country Survey is supported by multiple grants including R01 CA 100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center) and also in part from grant P01 CA138389 (Roswell Park Cancer Institute, Buffalo, New York), all funded by the National Cancer Institute of the United States, Robert Wood Johnson Foundation (045734), Canadian Institutes of Health Research (57897, 79551), National Health and Medical Research Council of Australia (265903, 450110, APP1005922), Cancer Research UK (C312/A3726), Canadian Tobacco Control Research Initiative (014578); Centre for Behavioural Research and Program Evaluation, National Cancer Institute of Canada/Canadian Cancer Society.

JUSTIFICATION: This paper presents evidence that we need to rethink relapse prevention, and consider different determinants for early versus later relapse.

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POS4-43

ROLE FOR DYNORPHIN/KAPPA OPIOID RECEPTOR SYSTEM IN THE ESCALATION OF NICOTINE INTAKE

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Background: The neurobiological mechanisms that underlie escalation of tobacco smoking has not been investigated to date as no animal model exhibited stable escalation of nicotine intake. We have recently demonstrated that rats given extended access (21h/day) to nicotine self-administration on an intermittent

schedule (48h between sessions) showed a robust escalation of nicotine intake. Using this novel model, we examined whether the dynorphin/kappa opioid receptor (KOR) system plays a role in the escalation of nicotine intake. Methods and results: In experiment 1, Rats received injection of either vehicle or the long-lasting KOR antagonist NorBNI (30 mg/kg, s.c) prior to the initiation of the intermittent schedule, or after escalation has been established. NorBNI attenuated the escalation of nicotine self-administration but had no effect on nicotine intake after escalation has been already established. Following the escalation of nicotine intake, rats were perfused and immunohistochemical essays demonstrated a significant increase in prodynorphin in the central amygdala (CeA) of vehicle-treated rats compared to drug-naïve rats. To examine whether increased expression of dynorphin in the CeA mediates the escalation of nicotine self-administration, rats were injected intra-CeA, prior to the nicotine self-administration procedure, with recombinant adeno-associated viral (AAV) vectors encoding either Pdyn-specific shRNA (shPdyn; prodynorphin knockdown) or a scramble shRNA (shScr; control). Escalation of nicotine self-administration was significantly attenuated in the shPdyn rats. Conclusions: These findings confirm that the dynorphin/KOR system is involved in the escalation of nicotine intake, particularly within the CeA, and may have important clinical implications. As the dynorphin/KOR system has been implicated in emotional control and stress responses in general, these results support the postulation that escalation of nicotine intake may be heavily dependent on its ability to alleviate the aversive symptoms of withdrawal.

FUNDING: This research was supported by the Tobacco-Related Disease Research Program (TRDRP) from the State of California (grant 17RT-0095), the Pearson Center for Alcoholism and Addiction Research, and the National Institute on Drug Abuse (DA023597).

JUSTIFICATION: The findings of this study confirm suggest that targeting the dynorphin/KOR system could be useful for the treatment of nicotine addiction and further suggest that escalation of tobacco abuse may be heavily dependent on the ability of nicotine to alleviate the aversive symptoms of withdrawal.

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POS4-44

FEASIBILITY AND PRELIMINARY EFFICACY OF A WEB-BASED TOBACCO TREATMENT PROGRAM FOR SMOKERS LIVING WITH HIV

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Background: Although over 50% of persons living with HIV (PLWH) in the US smoke cigarettes, effective cessation strategies for this population have yet to be reported. Recent surveys document that most US PLWH have home internet access. Although web-based tobacco treatment is effective in other populations, its feasibility and efficacy in PLWH is unknown. Methods: Positively Smoke Free (PSF) is an 8-session, 7-week, cessation intervention for PLWH guided by Social Cognitive Theory that was adapted for web-delivery (PSFW). In 2012-2013, we enrolled PLWH smokers referred from an urban HIV-care center into a randomized (1:1) controlled trial comparing PSFW to standard care/brief advice to quit. Both groups were offered nicotine replacement therapy. Incentives were not linked to PSFW usage. Feasibility and efficacy endpoints included program usage, engagement, and CO biochemically-verified 7-day point prevalence abstinence (3 months post-intervention). Results: 178 subjects were referred for screening. 15 were excluded because of low literacy, 6 because of limitations in computer access, and 19 for other reasons. 138 subjects enrolled and 69 were randomized into each condition. Baseline cohort characteristics: Age 45.6±9.9; 55% M, 44% F, 1% TG; 76% Black, 20% White, 47% Latino. In the PSFW condition, 28 (41%) completed all 8 web sessions and 67% completed ≥6. Mean total time logged into the site was 60 minutes (0-511 min.), and mean # of clicks on interactive features was 10 (0-40). Age was positively correlated with time spent on the site (P=0.03). There were no other significant demographic associations with site usage. At 3-month follow-up, 10% of the PSFW group and 4% of controls were abstinent. Among those who completed all 8 sessions, 18% were abstinent, and among women completers 31% were abstinent. Conclusions: Delivery of web-based tobacco treatment to urban, minority HIV-infected populations is a feasible goal.

Rates of website usage and engagement were encouraging. Trends toward higher quit rates in those receiving web-based treatment, especially women who completed the program, suggest potential for therapeutic efficacy.

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JUSTIFICATION: This trial demonstrates that smokers living with HIV can be reached by web-based tobacco treatment strategies and suggests that such strategies may be effective in promoting cessation.

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POS4-45 **EFFECTS OF VARENICLINE AND NEGATIVE AFFECT ON SMOKING CESSATION IN DEPRESSED SMOKERS**

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Tobacco use remains the largest contributor to preventable morbidity and mortality in the world and most quit attempts are unsuccessful. One of the strongest predictors of relapse is negative affect. Recent studies suggest that medications such as varenicline reduce withdrawal-related negative affect, presumably boosting the odds of quitting. The purpose of this study was to explore the relationship between negative affect and varenicline treatment by examining whether varenicline moderated the effect of pre-quit negative affect on smoking in the context of a randomized, double-blind cessation trial of varenicline vs. placebo. The sample consisted of 525 adult smokers (63% female) with major depression recruited from sites in the US (n = 255), and Europe (n = 270), randomly assigned to 12 weeks of varenicline or placebo treatment, and subsequently followed for 40 weeks. We used logistic regression to test predictor effects on 1) smoking status over time during post-treatment follow-up, and 2) the probability of achieving 4 weeks sustained abstinence by end of treatment. Findings indicated that higher baseline negative affect was associated with lower odds of abstinence (ps < .05). However, when the sample was stratified by treatment, baseline negative affect was associated with cessation failure for placebo (p = .002), but not varenicline (p = .575). Additionally, we found that European participants were more likely to be abstinent compared with US participants for both outcomes (ps < .01). While those randomized to varenicline were more likely to be abstinent regardless of region, analyses of abstinence by end of treatment indicated that baseline negative affect was associated with cessation failure for European (p = .019) but not US (p = .411) participants. These results extend previous findings that varenicline is associated with less withdrawal-related negative affect during cessation, and suggest that it aids cessation even in smokers with elevated depression. Findings also point to potential regional differences in the relationship between negative affect and cessation that may be related to differences in smoking prevalence.

FUNDING: This study was funded by Pfizer.

JUSTIFICATION: Findings suggest that varenicline aids cessation regardless of baseline depressive symptoms.

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POS4-46 **CHANGES IN E-CIGARETTE AWARENESS, TRIAL, USE AND RELATIVE HARM BELIEFS AMONG CURRENT AND FORMER SMOKERS IN FOUR HIGH-INCOME COUNTRIES**

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Background: E-cigarettes (ECs) have become widely available globally in recent years and responses from governments have been varied. ECs that contain nicotine are banned in Australia and Canada whilst these products are legal in the US and the UK. Recent research indicates that as expected, awareness and

use of these products are much higher in the US and the UK than in Australia and Canada. This study aimed to examine how EC awareness, use and harm perceptions of current and former smokers changed over time and whether they showed differential trends across these four countries with different regulatory environments. **Methods:** Data (about 1500 per wave per country) from the ITC 4-country project (i.e., Waves 8 and 9 data from Australia, Canada, the UK and the US with an additional interim wave, Wave 8.5, in Australia) were analysed. The Australian data were complete but the data from the other three countries were only partial as data collection was still ongoing at the time of this abstract. **Results:** In Australia where complete data are available, EC awareness, trial and use had all increased over time (from 2010 to 2013), while belief about EC being less harmful than ordinary cigarettes appears to have declined due to a greater tendency to report "Don't Know" in later surveys, among both current and former smokers. About 40% reported that their current brands contained nicotine even though these are illegal in Australia. Smokers aged 55+ and those who had quit smoking were less likely, while those with higher income and education were more likely, to become aware of ECs over time. Current smokers and those of younger age were more likely to have tried ECs in subsequent waves. Preliminary results from the other 3 countries also indicate a marked increase in awareness, trial and use of ECs over the study period. **Conclusions:** EC awareness and use are rapidly rising in the last 3 years among both current and former smokers, even in countries where these products are banned. Misunderstanding about EC relative harmfulness appears to be rising in Australia and public education is needed to correct it.

FUNDING: Supported by multiple grants including R01 CA 100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center) and also in part from grant P01 CA138389 and an ITC pilot study grant (Medical University of South Carolina, Charleston, South Carolina), all funded by the National Cancer Institute of the United States, Robert Wood Johnson Foundation (045734), Canadian Institutes of Health Research (57897, 79551), National Health and Medical Research Council of Australia (265903, 450110, APP1005922), Cancer Research UK (C312/A3726), Canadian Tobacco Control Research Initiative (014578); Centre for Behavioural Research and Program Evaluation, National Cancer Institute of Canada/Canadian Cancer Society.

JUSTIFICATION: The findings from this study will inform policy-makers on appropriate actions to take to ensure that the benefits of e-cigarette use can be maximised and any undesirable effects will be minimised.

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POS4-47 **SMOKING IN THE HOMELESS VETERAN POPULATION AND ASSOCIATIONS WITH PHYSICAL HEALTH, MENTAL HEALTH AND ECONOMIC MEASURES**

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Background The past several decades have witnessed a sharp decline in smoking prevalence in the US, with current adult smoking rates close to 20%. Unfortunately, the prevalence of cigarette use among homeless individuals is as high as 70%. Veterans are over-represented within the homeless population and little is known about their patterns of tobacco use and the physical, psychological, and economic burdens associated with this tobacco use. **Methods** A cross-sectional survey was administered to 6069 homeless individuals living in transitional housing, emergency shelters, and open encampments in 80 cities across Minnesota. Descriptive analyses were conducted to compare the economic and health profiles of homeless Veteran smokers to smokers within the larger homeless population. **Results** Homeless Veterans (n=489) and non-Veterans (n=3705) who self-identified as current smokers were compared across physical, mental, and economic status variables using chi-square and t-test analyses. With respect to smoking behaviors, a larger percentage of Veterans (74%) self-identified as current smokers compared to non-Veterans (69%), and Veterans reported smoking a greater number of cigarettes per day than non-Veterans (12.6 vs. 10.8, respectively). A higher percentage of Veteran vs. non-Veteran smokers reported needing medical care for a physical ailment (46% vs. 36%). The prevalence of multiple health issues, including respiratory problems, frostbite and high blood pressure were significantly higher among Veteran vs. non-Veteran smokers. While Veterans and non-Veterans did not differ in their need for medical attention for a mental health issue, the prevalence of alcohol abuse disorder and PTSD were higher among Veteran vs. non-Veteran smokers. Veteran and non-Veteran smokers did not differ significantly across measures of economic

status. Conclusions Homeless Veteran smokers are a demographic with a unique physical and mental health profile. The disparity across homeless Veteran and non-Veteran smokers with respect to the prevalence of acute and chronic physical and mental health problems highlights the need for more research examining how best to serve this population.

FUNDING: Primary funding for this project was provided by a grant from the NIH - R01HL081522-S1?. This work is also supported by resources and the use of facilities at the Center for Chronic Disease Outcomes Research at the VA Minneapolis.

JUSTIFICATION: Provides an overview of the unique physical and mental health needs of homeless Veteran smokers, an under-researched demographic.

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POS4-48 SMOKERS' QUIT PLANS DURING HOSPITALIZATION AND 3-MONTH FOLLOW-UP SMOKING STATUS AND USE OF QUIT AIDS, INCLUDING ELECTRONIC CIGARETTES

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Hospitalization is often a "golden opportunity" for smokers to make a quit attempt, either because they have required abstinence or because they are focused on their health. The 2008 Tobacco Guidelines suggest several strategies to increase quitting success; as well, there is an emerging product, electronic cigarettes, that has been touted as a "quit aid" by some. We recruited cigarette smokers admitted to an urban tertiary care academic hospital to a smoking cessation RCT; 740 were assigned to "usual care." During hospitalization, patients were asked about their plans regarding quitting after discharge. Three months post-hospitalization, participants were called to complete a short survey over the phone regarding their smoking status during the previous 30 days and use of specific products that are recommended or have been reported to aid in quitting. Chi square and Fisher's exact tests tested the relationships between usual care participants' quit plans at hospitalization and smoking status and use of quit-aid products post-hospitalization. In hospital, 27% of participants reported they planned to stay quit, 57% to try to quit, 13% didn't know and 3% did not plan to quit. Eighty-seven percent (n=645) of participants provided 3-month follow-up data. Of these, 29.8% reported no smoking in the previous 30 days representing 51% of those planning to stay quit, 26% planning to try to quit, and 8% of those unsure of quit plans (p<.0001). There was no significant difference among quitters and non-quitters use of quit aids; only 6 reported using Nicotine Replacement Therapy, 2 Bupropion, 2 Varenicline, 3 Counseling, 17 Health Care Provider advice and 59 electronic cigarettes. As expected, quit plans predicted smoking status 3-months later. There was minimal use of quit aids, with advice from health care providers being the one most used second to use of electronic cigarettes, which are not a proven efficacious quit aid.

FUNDING: National Institute of Drug Abuse U01DA031515

JUSTIFICATION: Among smokers who wish to quit after a hospitalization, there is a greater use of electronic cigarettes than proven quit aids.

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POS4-49 SNUS AND HOOKAH USE AMONG NON-SMOKING ADOLESCENTS AND YOUNG ADULTS INCREASES RISK FOR SUBSEQUENT CIGARETTE SMOKING

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Objective: To assess whether first use of snus or hookah among non-cigarette smoking adolescents and young adults increases their risk of subsequent cigarette smoking. Methods: We conducted a two-wave longitudinal study of 2,541 adolescents and young adults from all 50 US states. At baseline, we ascertained whether respondents had ever smoked cigarettes, used snus, or used hookah.

At follow-up 2 years later (N=1,596), we then ascertained whether baseline non-cigarette smokers had subsequently tried smoking or were current (past 30 day) smokers. We fit a multiple logistic regression models among baseline non-cigarette smokers to assess whether first use of snus or hookah increases the risk of cigarette smoking initiation and current smoking, accounting for socio-demographic and behavioral characteristics, and smoking by friends and parents. Results: 1,048 of the 1,596 respondents had never smoked cigarettes at baseline: 15 had used snus (1%), 66 had used hookah (6%), 5 had used both snus and hookah (0.5%), and 962 had used neither (91.8%). Among baseline non-cigarette smokers, snus users had higher rates of trying smoking 55% vs. 21% (p<0.01) and higher rates of current smoking 25% vs. 5% (p<0.01) at follow up compared to non-users. Baseline hookah users also had higher rates of trying smoking 39% vs. 20% (p<0.01) and higher rates of current smoking 11% vs. 5% (p=0.04), compared to those who had not used hookah. In multivariate analyses, baseline use of snus and hookah were both significant predictors of subsequently trying smoking (adjusted odds ratio [AOR]=2.9, 95% CI 1.1-7.8 and AOR=2.2, 95% CI 1.3-3.8 respectively). Baseline use of snus (but not hookah) was a significant predictor of current smoking (AOR=4.2, 95% CI 1.3-13.6 and AOR=1.7, 95% CI 0.7-4.1 respectively). Conclusions: Snus and hookah use among non-smoking adolescents and young adults both significantly increased the risk of subsequent cigarette use in the following 2 years. Although the numbers of users were small, prior snus use increased subsequent potential harm in this population. The results support the regulation of hookah under the Tobacco Control Act to limit youth access.

FUNDING: This project has been funded in part by the National Cancer Institute (CA077026; PI Sargent) and National Center For Advancing Translational Sciences of the National Institutes of Health under Award Number KL2TR001088.

JUSTIFICATION: We add to body of regulatory evidence available to the FDA by demonstrate snus and hookah use among adolescents and young adult non-smokers increases the likelihood of subsequent cigarette smoking.

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POS4-50 HISPANIC DISPARITIES IN DENTAL CARE PROVIDERS' DELIVERY OF TOBACCO CESSATION INTERVENTIONS

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The United States Public Health Service recommends that health care providers screen patients for tobacco use and offer tobacco use treatment (TUT) to all patients who are tobacco users. Nonadherence to TUT clinical practice guidelines is considered to be a modifiable, root cause of tobacco-related disparities. As part of a large cluster, randomized control trial examining the effectiveness of several TUT implementation strategies, baseline patient exit interviews (PEI) were conducted with 292 adult patients seeking routine dental care in New York City. Consistent with the 5A's model of brief TUT, 8 provider behaviours were assessed and included in the PEI summary score (ask, advise, assess, assist, provide written information, discuss the use of medication, give a prescription and refer). Participants were of middle socioeconomic status and ranged in age from 18 to 80 (M =45 years). In terms of self-identified race and ethnicity, 38% were Hispanic or Latino; 33% White, 23% Black, 11% Asian and 32 % Other/Mixed. Overall, we observed low adherence to brief TUT. Median PEI scores were 1 (min=0, max=8). In addition, Hispanic patients were less likely than non-Hispanics to report receiving TUT from their dental care providers (p= .004). More specifically, Hispanics were less likely to be "Asked" about their smoking status (41%) than non-Hispanics (58%) (p = .007). Hispanics were also less likely to be "Advised" of their smoking status (42%) than Non-Hispanics (57%), (p =.006). Dental care providers do not consistently deliver TUT to their patients. Our results show a disparity across Hispanic ethnicity in the implementation of TUT. There are several possible explanations for this apparent disparity in quality of care including, language barriers, and misperceptions about the low prevalence of smoking among Hispanic patients. In order to reduce observed disparities in the delivery of TUT to Hispanic dental patients, future research should identify and address multi-level barriers to the consistent delivery of TUT.

FUNDING: This work is supported by R01CA162035 and T32CA009461.

JUSTIFICATION: Our data illustrate that dental providers' adherence to the PHS guidelines must be improved and that there may be a significant disparity in delivery of tobacco treatment.

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POS4-51 SIMULATION MODELING IN TOBACCO CONTROL RESEARCH: A SYSTEMATIC REVIEW

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Background: The purpose of this systematic review was to provide a comprehensive overview of how modeling techniques have been used in research to predict tobacco-related outcomes. Methods: Electronic searches were conducted in five databases. Eligible studies used a mathematical model to project a tobacco-related outcome. Mathematical models with differing structures, purposes, and outcomes were eligible for this review, including dynamic simulations, state-transition models and discrete event simulations. Included studies estimated the prevalence of tobacco use, tobacco-related health outcomes, and/or tobacco-related costs. During data extraction, studies were categorized by their modeling objective: 1) to evaluate the effects of a population-level policy, legislation, or regulation ("policy"); 2) to assess the economic impact of a policy or program ("economic"); and 3) to estimate the effect that tobacco use changes or trends in tobacco-related disease would have on future disease outcomes ("disease"). Results: Two hundred and seventy four studies were included in the review. This poster serves as an overview of our findings. Of the included studies, 227 were coded as having only one of the three model objectives—policy (n=45), economic (n=130) and disease (n=52)—and 47 were coded as having more than one objective. The policies most frequently examined were price interventions (n=38) and media campaigns (n=28). Many of the economic studies evaluated smoking cessation strategies, including cessation counseling by a healthcare provider (n=104), quit lines (n=12) and community-based cessation interventions (n=7). Most of the disease studies projected a tobacco-related health outcome (n=59), with the rest projecting patterns of tobacco use (n=15). The most common outcomes modeled among the disease studies were tobacco-attributable morbidity and mortality (n=21) and lung cancer (n=13). Conclusions: This review offers a first step in describing the breadth of the literature on models used to project tobacco-related outcomes. It is a foundation for future in-depth analyses of our data, and a framework for others interested in these methods.

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POS4-52 AMERICAN INDIAN TRIBAL COLLEGE STUDENTS' EXPOSURE TO ENVIRONMENTAL TOBACCO SMOKE AND ATTITUDES TOWARD REGULATION OF TOBACCO ON CAMPUS

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Introduction: Rates of smoking among tribal college students (TCS) are more than double the rates of non-minority US college students, making environmental tobacco smoke (ETS) exposure in this population an important issue. While

efforts to encourage smoke-free campuses have resulted in more than 1,180 US colleges instituting smoke-free campus policies, only 3 tribal colleges have been successful at becoming smoke-free. Objectives: We established a cohort of TCS to determine factors associated with ETS exposure and their views on campus smoke-free policies. Methods: In this ongoing observational prospective cohort study, we are recruiting four consecutive freshman cohorts (2011–14). Using a web survey, students at 2 tribal colleges are surveyed biannually. The survey examines smoking behavior, peer tobacco use, smoking norms, and attitudes toward regulation of tobacco, as well as other health behaviors. We present the first 3 years of baseline data. Results: Of 792 participants, 53% were female, the mean age was 27 (SD = 7.8), and 44% self-identified as smokers. When asked how many of your 5 closest friends smoke, 31% had 3–5 friends who smoke. While 30% of students said that they spend some of the time with people who smoke cigarettes, 22% stated that they spend almost all or all of the time with people who smoke. When asked about with whom they live, 34% of students stated that someone in their home currently smokes cigarettes but almost 80% of students said that smoking is not allowed inside where they live. Slightly more than half (53%) of students knew their campus smoking policy and most (44%) learned about it from the student handbook. When asked if they would like their campus to be smoke-free, 27% disagreed, 20% were neutral and 53% agreed. Conclusions: While the current smoking prevalence of non-minority college students has decreased dramatically over the past decade, TCS continue to smoke at a much higher rate. Furthermore, TCS have high exposure to ETS due to limited smoking policies on campus and exposure to other indoor areas. Suggestions for complete smoking bans on campus would reduce smoking prevalence and exposure to ETS among TCS.

FUNDING: This work was funded by the National Institute on Minority Health and Health Disparities (P20 MD004805: PI Daley). CMP was supported in part by the National Cancer Institute and the Center to Reduce Cancer Health Disparities (U54 CA154253: PI Greiner).

JUSTIFICATION: This study can lead to recommendations for smoke-free policies on tribal college campuses thereby reducing smoking prevalence and exposure to ETS among tribal college students.

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POS4-53 ADHERENCE TO NICOTINE REPLACEMENT THERAPY AMONG HAZARDOUS DRINKING SMOKERS CALLING A TOBACCO QUITLINE

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We examined adherence to NRT as a smoking cessation outcome and predictor of smoking quit rates in a randomized trial of hazardous drinkers who contacted the NY State Smokers' Quitline for smoking cessation assistance (N=1,948). Participants received either Tobacco Only Counseling (standard quitline treatment) or Alcohol + Tobacco Counseling, both in addition to nicotine replacement if eligible. Adherence was assessed by self-report at the 7-month follow-up. Of those smokers who successfully completed the 7-month follow up assessment (N = 861), 93.8% reported using their medication (87.3% received patches, 12.6% received gum, and 0.1% received lozenges). Participants were then asked to select which category best described their level of medication use: (1) all of it, (2) about half of it, or (3) less than half of it. For this investigation, NRT adherence was dichotomized as follows: (1) used all medication (56.5%) and (2) all others (43.4%). We tested demographic, smoking, and alcohol variables that might affect adherence (e.g., age, quitting confidence, % heavy drinking days at baseline, etc.). Gender and confidence in ability to quit were associated with higher NRT adherence (p's < .05). Specifically, men and smokers with greater quitting confidence were more likely to adhere. We then tested NRT adherence as a predictor of smoking quit rates at the 7-month follow-up, controlling for condition, gender, and confidence. Higher NRT adherence ($\beta = -0.63$, SE = 0.18; OR = 0.53 [95%CI: 0.38 – 0.76]; p < 0.001) and confidence ($\beta = -0.46$, SE = 0.19;

OR = 0.63 [95%CI: 0.44 – 0.91]; $p = 0.014$) were associated with decreased odds of smoking. The results suggest that NRT adherence rates among heavy drinking smokers calling a Quitline could be improved. Further, heavy drinking smokers' confidence in their ability to quit may be an important factor to target to improve adherence and smoking cessation quit rates.

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POS4-54 NICOTINE INTAKE FROM ELECTRONIC CIGARETTES AND EFFECT OF PRACTICE

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Background: Electronic cigarettes (EC) have the potential to generate a substantial public health benefit if there is a switch from smoking to EC use on a population scale. The nicotine delivery profile of the device is likely to play a major role in their attractiveness to smokers. The present study aimed to assess the effect of experience with EC use on pharmacokinetic (PK) parameters of nicotine intake, and to examine the speed of nicotine delivery from EC with a view to establishing optimal parameters for the testing of the device. Methods: Six smokers provided PK data after their first use of EC (GreenSmoke, 2.4% nicotine) and again following four weeks of use. On both occasions they attended after overnight abstinence from both smoking and EC use, and used EC ad-lib for 5 minutes. Blood samples were taken before and 5, 10, 15, 20, 30 and 60 minutes after the start of EC use. Results: Compared to the PK profile when using EC for the first time, four weeks of practice generated a small mean increase in the peak plasma concentrations (from 4.6 to 5.7 ng/ml, NS) and a significant increase in overall nicotine intake (from $AUC_0 \rightarrow \infty$ 115 to $AUC_0 \rightarrow \infty$ 206 ng*min/ml, $p < 0.05$). Peak nicotine levels were achieved within 5 minutes of starting EC use, which is much faster than with oral NRTs and suggests that, in some users at least, EC may provide nicotine via pulmonary absorption. Conclusions: Smokers trying EC for the first time should be informed that, with practice, they may find EC more rewarding. The first-generation EC model used in this study delivered only low levels of nicotine, but did so quickly. This may explain some of the EC appeal to smokers.

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POS4-55 THE IMPACT OF WEIGHT CONTROL BELIEF ON CIGARETTE CONSUMPTION AMONG ADULTS: FINDINGS FROM THE ITC PROJECT

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Background: Previous studies have documented the association between weight concerns and smoking behaviors among teenagers and young adults. Yet, few studies investigate these associations by gender, age and country, or among adults. Objective: This paper aims to present the prevalence of weight control belief among adult smokers and examine its association with cigarette consumption by gender, age, and country stratifications. Methods: The International Tobacco Control Policy Evaluation Project (ITC Project) surveys whether smokers agree that smoking helps control weight in the US, the UK, Canada, Australia, Mexico, Uruguay, Malaysia and China. Using data taken from these countries, we plot the adjusted probability of having weight control belief and examine the stability

of having the belief in two consecutive waves by the stratifications. We further analyze the association between weight control belief and cigarette consumption. Finally, we estimate whether the weight control belief has an impact on cigarette consumption through price responsiveness as well. Findings: This study leads to comprehensive findings: First, gender difference in the weight control belief does not exist in some low and middle income countries (LMICs). Unlike high income countries (HICs), younger female smokers in LMICs are more likely to have the belief than older ones. While female smokers are more persistent in holding the weight control belief than male, smokers in LMICs are more likely to change their belief over years than those in HICs. The examination of the association between the belief and cigarette consumption indicates that, although subject to the studied country and gender, weight control belief is associated with more cigarette consumption with a more acute impact on younger female smokers than older ones. Moreover, weight control belief has an interaction impact on cigarette consumption by decreasing price responsiveness among younger US female smokers and older Mexican male smokers. Our findings suggest that weight control belief should be an important policy concern in both HICs and LMICs.

FUNDING: The data collection for the ITC Project is supported by grants R01 CA 100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center, and P01 CA138389, R01 CA090955) from the National Cancer Institute of the United States, Robert Wood Johnson Foundation (045734), Canadian Institutes of Health Research (57897, 79551, and 115216), Commonwealth Department of Health and Aging, Canadian Tobacco Control Research Initiative 14 (014578), National Health and Medical Research Council of Australia (265903), the International Development Research Centre (104831-002), the International Development Research Centre (African Tobacco Situational Analysis), New Zealand Health Research Council (06/453), New Zealand Ministry of Health, Mexican Consejo Nacional de Ciencia y Tecnologia (Salud-2007-C01-70032), Bloomberg Global Initiative—International Union Against Tuberculosis and Lung Disease, the Chinese Center for Disease Control and Prevention, the French Institute for Health Promotion and Health Education (INPES), the French National Cancer Institute (INCa), Observatoire français des drogues et toxicomanies (OFDT), the Netherlands Organisation for Health Research and Development (ZonMw) (the Netherlands), German Federal Ministry of Health, Dieter Mennekes-Umweltstiftung and German Cancer Research Center (DKFZ), Cancer Research UK (C312/A6465), NHS Health Scotland (RE065), Flight Attendants—Æ Medical Research Institute (FAMRI), Glaxo-Smith Kline (3516601), Pfizer (Ireland), the Korean Ministry of Health and Welfare, the Malaysian Ministry of Health, and ThaiHealth Promotion Foundation. A Senior Investigator Award from the Ontario Institute for Cancer Research and a Prevention Scientist Award from the Canadian Cancer Society Research Institute for the third author and the SILNE Project is funded by the European Commission through FP7 HEALTH-F3-2011-278273.

JUSTIFICATION: Believing that smoking helps control weight decreases price responsiveness among younger US female smokers and in Low- and middle-countries, younger female smokers are more likely to believe that smoking helps control weight. Effective policies that inform smokers, in particular female and young smokers, that smoking does not necessarily help control weight is highly needed and surveillance on weight concern-related smoking in LMICs is warranted.

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POS4-56 SMOKING INITIATION AND CESSATION IN INDIA – A DURATION ANALYSIS

Ce Shang*, Frank J. Chaloupka, G. Emmanuel Guindon, Pavel Dramski, Prabhat Jha, CORRESPONDING AUTHOR: Institute for Health Research and Policy University of Illinois at Chicago

A handful of studies have shown that rising bidi and cigarette prices reduce smoking in India, however existing literature does not estimate the price effect on smoking initiation and cessation. This study provides the first assessment of the impact of tobacco prices on smoking initiation and cessation in India. By utilizing retrospective information on the timing of smoking initiation and cessation from the 2009 Global Adult Tobacco Survey of India and historical tobacco prices from 1998-2009, we estimate the price elasticities of smoking initiation and cessation for bidis and cigarettes. For bidis, we find a 10% increase in price would increase the hazard of cessation by 3-6% and reduce the hazard of initiation by 2-3%; for cigarettes, a 10% increase in price would increase the hazard of cessation by 2% and reduce the hazard of initiation by 3%. The estimates are consistent

with the price elasticities of smoking participation estimated for India in previous studies and suggest a larger impact of bidi prices than cigarette prices on smoking outcomes as well. Interestingly the estimates by rural-urban strata indicate that the price impact on smoking cessation is significant for rural residents but not for urban residents. In addition, increasing bidi prices are only associated with a lower initiation rate among rural residents while increasing cigarette prices are only associated with a lower initiation rate among urban residents.

FUNDING: Funding for the Global Adult Tobacco Survey (GATS) is provided by the Bloomberg Initiative to Reduce Tobacco Use. Government of India contributed to GATS implementation in the country. Bill and Melinda Gates Foundation provided additional funding for GATS. Additional support for the authors is provided by a grant from the Bill and Melinda Gates Foundation to the University of Toronto.

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POS4-57 EFFECTS OF USER PUFF TOPOGRAPHY AND DEVICE CHARACTERISTICS ON ELECTRONIC CIGARETTE NICOTINE YIELD

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Background: Some electronic cigarette (ECIG) users attain tobacco cigarette-like plasma nicotine concentrations, while others do not. Understanding the factors that influence ECIG user plasma nicotine concentration is relevant to regulation, including product labeling and abuse liability. These factors may include user puff topography, ECIG liquid content, and ECIG design features. This study addresses how these factors can influence ECIG vapor nicotine yield. **Methods:** A smoking machine generated vapor from one type of ECIG cartridge (V4L CoolCart) while puff duration (1.8, 3.6, 8 sec), puff velocity (1.1 vs 2.1 l/min), voltage (2.2 vs 3.6 V), and liquid nicotine concentration (18 mg vs 36 mg/ml) were varied. Nicotine content of the particulate phase was determined by GC/MS for 15 puffs, with 3 determinations per condition. A mathematical model was developed from first principles to simulate the ECIG vapor production process: we simulated the time-resolved temperatures in the vicinity of the ECIG heater, the vaporization rate, and nicotine concentration in the vapors produced during each puff, accounting for inter-puff cooling. **Results:** Nicotine yields from 15 puffs ranged from less than 0.1 to more than 3 mg. Greater puff duration resulted in disproportionately greater nicotine yield, both per puff and per liter drawn. For example, doubling the duration from 1.8 to 3.6 s at a constant puff velocity resulted in double the puff volume but 4 times the nicotine yield. Conversely, puff velocity had no effect on nicotine yield per puff or per second. Higher nicotine concentration and higher voltages resulted in higher nicotine yields, both per volume and per second. These results were predicted by the theoretical model ($R^2 > 0.9$ predicted vs. measured). **Conclusions:** Depending on puff conditions and product features, ECIGs can provide far less or far more nicotine than a single cigarette in 15 puffs. ECIG users can attain higher nicotine doses by drawing relatively low velocity, long duration puffs in comparison to conventional tobacco cigarettes. ECIG emissions can be predicted from knowledge of puff topography and ECIG device characteristics.

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JUSTIFICATION: This work illustrates how analytical laboratory methods and engineering analysis can be used to inform regulation of novel tobacco products.

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POS4-58 USING COTININE TO ADJUST FOR MISCLASSIFICATION IN SELF REPORT OF SMOKING

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Background: People may not accurately report their smoking status leading to misclassification. Levels of cotinine, a major metabolite of nicotine, can be used to validate self reported smoking status. Assuming that cotinine based smoking status is a gold standard we can adjust regression analyses of smoking based on self report for misclassification. Misclassification in the outcome variable in regression analyses can lead to bias and a reduction in statistical power. If the relationship between the true value and the misclassified measure does not vary by the exposure misclassification can result in an attenuation of the observed association. If misclassification does vary depending on the exposure then the estimate of association may be biased in either direction. **Methods:** We used multiple imputation methods for missing data and latent class analysis to adjust regression analyses of smoking and parental monitoring for possible misclassification in self report. Cotinine measures were available for 3206 individuals of 5107 with self reported smoking status. We generated multiple datasets with cotinine validated smoking status missing completely at random from a subset with complete case data to examine the performance of the methods where the relationship between cotinine validated smoking status and parental monitoring was known. We then applied these methods to the full sample of all individuals with self report smoking available. **Results:** Misclassification adjusted analyses show that low parental monitoring is associated with higher likelihood of being a smoker (OR: 3.01, 95% CI: [2.19, 4.12]), but that the magnitude of the association is lower than that based on self report of smoking alone (OR: 4.07, 95% CI: [3.24, 5.10]). **Conclusion:** The methods presented allow us to adjust for possible misclassification of smoking status in to reduce potential bias. Results based on self report alone may over estimate the magnitude of association between parental monitoring and smoking. Where internal validation data is not available it is still possible to use external validation data to adjust for misclassification.

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POS4-59 KNOWLEDGE, ATTITUDES AND BELIEFS ABOUT WATERPIPE (HOOKAH) SMOKING AMONG EAST AFRICAN YOUNG ADULTS: QUALITATIVE AND QUANTITATIVE FINDINGS

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Background: Waterpipe smoking (WPS, hookah) contains many of the same toxic chemicals and health risks as cigarettes. Although it is estimated that 10-20% of US college students smoke waterpipe, use is ubiquitous among young adults of East African descent residing in the Twin Cities. We conducted the first qualitative and quantitative investigation to increase our understanding of WPS among Somali and Oromo youth in this new immigrant community. **Methods:** In Phase 1, focus groups were conducted among East African young adult college students (N=48). Themes were identified across topics. In Phase 2, respondent-driven sampling was used to recruit hookah smokers to complete a 20-minute survey (N=50). Both qualitative and quantitative interviews took place in community locations and were administered by ethnic and gender-matched staff. Participants included those who self-identified as Somali or Oromo, endorsed ever using hookah and were 18-29 years. **Results:** Phase 1: Participants were stratified by 2 and 4-year College. Findings indicate that WPS is a social norm, prevalent among youth and elders at most social gatherings, in homes and other meeting places. Females are more likely to use in their home and children are exposed to WPS secondhand smoke. Limited information exists about the negative health risks of WPS. Phase 2: Participants (N=50) were 50% female, 94% never-married and 54% lived with their parents. 72% were confident that most people their age smoke hookah and 4.2 (SD=4.4) of their five closest friends smoke waterpipe. 48% smoked hookah >100 times in their life; 96% endorsed past 30-day use and 26% used daily. Mean days smoked hookah/past 30 was 11.5 (SD=9.8). 40% reported WPS use when alone and 22% reported symptoms of dependence. Over half (53.3%) consider

the dangers of hookah smoking to be exaggerated. Conclusion: WPS is a cultural norm among young adults of East African descent in the Twin Cities. This at-risk community does not associate WPS with long term health consequences. Results carry implications for public health campaigns to challenge dangerous health assumptions and health education interventions to decrease prevalence

FUNDING: The study was conducted while first author (Jibril, A.) was an undergraduate student at the University of Minnesota and supported through the Masonic Cancer Center and Program in Health Disparities Research, University of Minnesota Medical School. Funding was also received from the Center for Urban and Regional Affairs, University of Minnesota and the North Star Stem Alliance.

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POS4-60 DOES MOUTHPIECE-BASED MEASUREMENT OF ELECTRONIC CIGARETTE TOPOGRAPHY INFLUENCE PLASMA NICOTINE AND SUBJECTIVE EFFECTS?

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Background: Electronic cigarettes (ECIGs) heat a nicotine-containing solution; the resulting vapor is inhaled by the user. ECIG use behavior (puff topography) can be recorded using mouthpiece-based computerized systems; however, the extent to which these systems influence nicotine delivery and subjective effects in ECIG users is unknown. Methods: Plasma nicotine, subjective effects (withdrawal symptoms, direct effects of ECIG use, and topography equipment interference), and puff topography were measured in seven experienced ECIG users using their preferred ECIG and e-liquid (≥ 18 mg/ml) in two sessions (with and without CReSS, a mouthpiece-based device used to measure puff topography in cigarette smokers). In both conditions, participants underwent a directed bout (i.e. 10 puffs at 30 second intervals). Results: Two factor repeated-measures ANOVAs (session; time) were performed for plasma nicotine and subjective measures. Main effects of time were observed for plasma nicotine ($F(1,4) = 13.48$; $p < .05$); nicotine levels increased significantly in both sessions. A main effect of time was observed for "Urge to use an e-cigarette" ($F(1,6) = 7.26$; $p < .05$), which was reduced in both sessions. Main effects for time were also observed for: "Pleasant", "Satisfying", "Taste good" and "Awake"; these ratings increased over both sessions ($F_s(1,6) > 7.12$, $ps < .05$). No significant main effects or interactions were observed across session (with or without CReSS) on any measure. During ECIG use with CReSS, mean peak flow rate was 22.51 ml/s (SD = 9.40). Conclusions: In these experienced users, ECIGs increased plasma nicotine concentration and reduced withdrawal symptoms, and these effects did not differ when the CReSS topography device was used. Mean peak flow was approximately half that observed for cigarette smokers in previous studies using the same equipment (e.g., 55.1 ml/s [SD = 1.6]; Kleykamp et al., 2008). CReSS equipment was developed for and validated with the higher peak flow rates associated with cigarette smoking. The lower peak flow rates observed here may indicate the need to validate CReSS with ECIGs before it is used to measure ECIG user topography.

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JUSTIFICATION: Electronic cigarettes can deliver nicotine and reduce withdrawal symptoms in experienced users, however; mouthpiece-based computerized systems to measure puff topography may need to be validated before being used to measure electronic cigarette topography.

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POS4-61 SMOKING CESSATION AND POST-CESSATION WEIGHT GAIN AMONG PATIENTS WITH MENTAL DISORDERS: CLINICIAN PERSPECTIVES

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Background: Most people who stop smoking gain weight and despite the high prevalence of tobacco use among people with mental disorders this population has received limited access to effective tobacco use treatments and interventions that manage post-cessation weight gain. US Department of Health guidelines for treating tobacco use recommend that clinicians assess patients' smoking status at every appointment and that brief interventions, at least, be offered to every patient who smokes. They also provide recommendations for addressing post-cessation weight gain and highlight the need for patients with mental disorders to be provided with treatment. This study investigated current practices and opinions of clinicians at a community mental health center regarding smoking cessation, and weight management, among people with mental disorders. Methods: Participants were clinicians employed at a community mental health center in Chicago. Participants were recruited at a staff meeting and completed a short anonymous survey regarding their current practices and opinions. Results: 22 clinicians with an average of 23 years experience completed the survey. 32% of clinicians reported assessing patients' smoking status annually or less frequently. Only one participant reported assessing patients' smoking status at every appointment. 32% of clinicians provided smoking cessation advice or treatment to patients annually or less frequently. On average, clinicians rated the importance of addressing smoking, and smoking and weight, with patients as 8.7 and 8.6 out of ten respectively. Clinicians' confidence in addressing these issues averaged 6.5 and 6.8 out of ten, respectively. 73% of clinicians reported weighing their participants annually or less frequently. Conclusions: This study highlights that there may still be a way to go before guidelines for treating tobacco use are consistently being met within community mental health centers. Clinicians within these types of services should be provided with further training in evidence based smoking cessation treatments. Research regarding specific barriers to meeting recommended guidelines within these types of services is needed.

FUNDING: The work described in this abstract was funded by the National Health and Medical Research Council of Australia/Æs Centre for Research Excellence in Mental Health and Substance Use.

JUSTIFICATION: The gaps between current practices within community mental health centers and recommended tobacco use treatment guidelines highlighted in this study could be used to inform improvements in clinical practice.

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POS4-62 TRENDS IN SMOKING AMONG NEW YORK CITY ADULTS WITH SERIOUS PSYCHOLOGICAL DISTRESS, 2002-2012

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BACKGROUND: Numerous studies have documented that individuals with poor mental health, including serious psychological distress (SPD), are more likely to smoke and less likely to successfully quit than psychologically healthy individuals. Smoking prevalence among New York City (NYC) adults decreased 28% between 2002 and 2012, following the implementation of comprehensive tobacco control. Given the heavy burden smoking presents to those with poor mental health, it is important to examine if smoking has declined among those with SPD at a rate comparable to the rest of the population during this period. METHODS: Data are from the annual NYC Community Health Survey, a stratified random digit dial survey of approximately 10,000 adults, weighted to represent the adult NYC population. SPD in the past 30 days was based on Kessler 6 scores: SPD (≥ 13),

at risk for SPD (7-12), or no SPD (0-6). Current smoking was defined as smoking 100 cigarettes lifetime and on at least some days now. Quit attempts were defined as intentional cessation for one or more days in the past 12 months. Prevalence and trend analyses were conducted using SUDAAN. RESULTS: SPD prevalence was unchanged between 2002 (6.4%) and 2012 (5.5%) (p=0.08). Current smoking showed a negative linear trend among adults with no SPD (17.9% to 12.9%, p<.001) and at risk for SPD (26.3% to 22.2%, p=0.034); however, smoking among adults with SPD showed no change (30.6% to 35.9%, p=0.306). Among adults with SPD, the smoking prevalence increased for men and white non-Hispanic adults. Quit attempts did not vary by SPD over time; the prevalence of quit attempts each year was as high or higher among smokers with SPD compared to those at risk or with no SPD. CONCLUSIONS: This is one of the only studies to look at population-level trends in smoking among adults with SPD following comprehensive tobacco control. Smoking among adults with SPD did not decline at rates comparable to the rest of the population despite comparable quit attempt rates. Additional efforts are needed by providers and the broader public health community to assess and treat these co-occurring conditions.

FUNDING: No Funding

JUSTIFICATION: Our study suggests the need for routine screening of SPD and smoking by medical providers and increased promotion of mental health and smoking cessation services by the public health community.

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POS4-63 WORKING WITH CALIFORNIA TRIBES TO MEASURE PARTICULATES IN CASINOS

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Background: Through lowered exposure to secondhand smoke, research-backed smoke-free indoor space policies aim to reduce worker health risks. However, secondhand smoke protection is still limited in California's gaming industry, because the sovereignty of Indian tribes means that they are not subject to state tobacco control policy. Methods: After gaining permission of tribal council members and casino management, we performed air quality monitoring at two California casinos on two consecutive days (Friday and Saturday) per location. We used Sidepak AM510 Personal Aerosol Monitors (TSI, Inc.) to record realtime fine particle concentrations (PM2.5) every 10 seconds. Investigators carried monitors to different sections in and around the casinos using a predetermined schedule. Monitors were also placed at fixed locations in the pit for both nights of monitoring. Along with PM2.5 measurement, we counted active smokers and total patrons in the casino. Results: Patrons' PM2.5 exposures, reflecting levels occurring at single locations in different casino rooms, had medians of up to 55 micrograms per meter cubed in the main slot areas of each casino. Patron exposure levels in the nonsmoking poker and player's club areas of one casino were generally much lower with medians of 2 to 5 micrograms per meter cubed, and closer to typical outdoor (clean) levels, which had a median of 2.9 micrograms per meter cubed, but the median level of one part of a nonsmoking area at the other casino was higher than on the main smoking floor at 65 micrograms per meter cubed. Conclusions: High PM2.5 levels with median levels up to ~20 times above outdoor levels in the smoking areas of the casinos represent substantial exposures for both casino staff and patrons. In one casino, levels in labeled nonsmoking gaming and lower level recreation areas were also high, apparently due to the free flow of air from the main smoking areas, although we found <10% of casino patrons in smoking areas to be actively smoking.

FUNDING: This study was supported by California Tobacco-Related Disease Research Program grant 20CA-0103.

JUSTIFICATION: These results were shared with tribal casino management, in the hopes of stimulating the expansion of smoke-free policies to reduce PM2.5 exposure.

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POS4-64 PATTERNS OF USE AND PERCEPTIONS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS: A SYSTEMATIC REVIEW

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Background: Electronic cigarettes or electronic nicotine delivery systems (ENDS) have recently attracted attention for several reasons. Compared to regular, combustible cigarettes they deliver nicotine without combustion, contain fewer toxicants, and may be less expensive. ENDS can also be used in some places with indoor cigarette smoking restrictions and may help people quit cigarette smoking. The objective of this study was to conduct a systematic review of studies on consumer awareness, attitudes, and perceptions of ENDS and patterns of ENDS use, including the impact of ENDS use on cigarette cessation. Methods: Electronic searches conducted in Medline, Embase, and PsycINFO were searched for publications through November 14, 2013. Two independent coders performed all screening and data extraction. There was no exclusion based on location. Results: 230 articles were identified for screening and 51 articles met the inclusion criteria for this review (31 addressed consumer awareness, attitudes, and perceptions of ENDS and 45 addressed patterns of ENDS use; not exclusive categories). Preliminary results show that overall awareness of ENDS is growing among US adults, doubling from 16.4% in 2009 to 32.2% in 2010, and increasing again to 75.4% in 2012. ENDS awareness is highest among current smokers and young adults. ENDS are generally perceived to be less harmful than regular cigarettes by ENDS users, current smokers, and recent quitters. Ever use of ENDS is also increasing among youth, young adults, and adults. Available studies on use of ENDS for cessation of conventional cigarette smoking are few and provide mixed results. Conclusions: Evidence from this systematic review suggests that awareness and use of ENDS is growing. There is currently limited data on the potential of ENDS use for conventional cigarette smoking cessation. To determine the potential impact of ENDS on overall tobacco use and population health, continued surveillance and additional randomized trials are needed to estimate the impact of ENDS use on smoking initiation, maintenance, and cessation.

FUNDING: No funding.

JUSTIFICATION: The results of this systematic review show that overall awareness of ENDS and ever use is increasing rapidly, which will inform public health.

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POS4-65 SOCIETAL AND HUMAN AND ECONOMIC DEVELOPMENTAL CORRELATES OF SMOKING PREVALENCE IN NATIONS

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Background: We propose a model for smoking prevalence in nations. Demand for tobacco is related to societal, and human and economic development characteristics, which influence manufacturers' decisions to increase supply (and demand) through trade and marketing. Methods: A database was constructed from global sources including United Nations Human Development Programme, World Health Organization, The Economist, and KOF Index of Globalization. Seventy-five nations and 53 independent variables were selected based on relevance, data quality, and annual coverage from 1998 - 2012. We modeled nations' overall and gender-specific prevalence with multi-level mixed effects linear regression. Since the independent measures are based on inherently different scales, they were each standardized ($\mu=1$, $\sigma=1$) to enable comparison of the relative strengths of association with prevalence. β coefficient units represent change in prevalence per standard deviation of respective predictor variables. Results: Smoking prevalence for both genders was associated with household disposable income; ratio of consumer expenditures to disposable income; and price of the most sold cigarette brand (e.g. Marlboro) relative to gross domestic product per capita. Specific correlates of female smoking prevalence were in order of strength of association (β , 95% confidence interval) human development index (8.3, 4.6-12.0), median population age (4.9, 2.0-7.7), gender inequality index (4.5, 0.9-8.1), tobacco advertising allowed at point-of-sale (2.1, 0.7-3.5), and government voice and accountability (-0.8, -0.4 - -1.6). Specific correlates of male smoking prevalence were satisfaction with life (-4.2, -2.7--5.7), dependency ratio (-0.9, -0.4, -1.3), and political stability (0.8, 0.3, 1.3). Conclusions: Male and female smoking prevalence

are related to cigarette affordability. Stressors such as gender inequality may increase female smoking prevalence. Nations could respond to decrease prevalence through governance and the social emergence of policies. Further research examines nation characteristics that are predictive of impending change in smoking prevalence in emerging economies (e.g. Brazil, Mexico).

FUNDING: The authors acknowledge the Swiss Re Foundation for financial support of the SEARCH research collaboration between the Harvard School of Public Health and Swiss Re.

JUSTIFICATION: This study helps to advanced the understanding of societal and economic effects on smoking prevalence, with public health policy relevance.

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POS4-66 EFFECTS OF SOCIAL AND ECONOMIC GLOBALIZATION AND GOVERNANCE ON SMOKING PREVALENCE IN NATIONS

Hillel R. Alpert, ScD*, Gregory N. Connolly, DMD, MPH

Background: Smoking prevalence is related to nations' societal, and human and economic development characteristics. Manufacturers' trade and marketing decisions may react to these to influence prevalence, and nations may respond through the social emergence of policies. We examined nations' characteristics that may be predictive of forthcoming change in smoking prevalence. **Methods:** We analyzed data of 75 nations and 53 independent variables culled from several global sources as described in the accompanying report. We modeled change in nations' smoking prevalence as predicted by societal and human and economic development characteristics using multi-level mixed effects linear regression with a three-year time lag. Independent measures were standardized so that β coefficient units represent change in prevalence per standard deviation of respective predictor variables. **Results:** Predictors of change differed for male versus female smoking prevalence. For male smoking prevalence, they were in order of strength of association (β , 95% confidence interval) gross national income per capita (1.0, 0.4-1.7), control of corruption index (-1.0, -0.5- -1.6), economic globalization (EG) (-0.5, -0.1- -0.8), mean years of schooling (-0.5, - -0.1.9), and trade balance (0.3, 0.1-0.6). In contrast, social globalization (SG), as measured by personal contacts (-0.5, -0.3, - -0.8) or percent internet users, (-0.6, -0.4, - -0.8), was the only independent predictor of female smoking prevalence. For example, Mexico's relatively high SG (50.4) and EG (57.7) indices in 2006 anteceded the largest (1.2%) 3-year declines in male in female smoking prevalence, compared to Brazil's SG (37.7) and EG (56.7) indices anteceding smaller (1.0% and 0.2%) declines in male and female smoking and India's SG (31.8) and EG (41.6) indices anteceding the smallest (0% and 0.5%) declines. **Conclusions:** Change in nations' smoking prevalence may be predicted by factors other than correlates of current prevalence. For male, these include domestic (e.g. wealth, governance, education) as well as economic globalization characteristics. For females, social globalization characteristics are the most predictive.

FUNDING: The authors acknowledge the Swiss Re Foundation for financial support of the SEARCH research collaboration between the Harvard School of Public Health and Swiss Re.

JUSTIFICATION: This study informs national and global tobacco control policy by identifying predictors of future smoking prevalence in nations.

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POS4-67 IMPACT OF AUTOMATED TOBACCO ASSESSMENT AND CESSATION SUPPORT ON SURVIVAL FOR LUNG CANCER PATIENTS

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Background: Tobacco cessation studies in cancer patients often rely on self-selection to participate in cessation services and retrospective reviews for tobacco use. The purpose of this study is to describe tobacco use and cessation patterns and the impact of cessation on survival, for all lung cancer patients at an NCI Designated Comprehensive Cancer Center that uses a mandatory tobacco assessment and automatic referral program. **Methods:** Lung cancer patients presenting at Roswell Park Cancer Institute (RPCI) were screened with a standardized tobacco assessment and all patients who used tobacco within the past 30 days were automatically referred to a telephone based tobacco cessation program. Demographic, health information and self-reported tobacco use at last contact were obtained from the electronic medical record and the RPCI tumor registry, for all lung cancer patients referred to the cessation program between October 2010 and October 2012. Descriptive statistics and cox proportional hazards regression were used to determine potentially important predictors of survival as of August 2013. **Results:** 314 out of 972 thoracic clinic referrals to the cessation service between October 2010 and October 2012 had confirmed lung cancer (32.3%). 71.0% (223/314) of lung cancer referrals were successfully contacted and participated in one telephone based cessation call and 123/223 (55.2%) provided self-reported tobacco use in a follow-up call through August 2013. A significantly greater proportion of quitters at the last contact were alive (n=77/120; 64.2%) compared to current users (n=84/181; 46.4%; p=0.002). After controlling for age, pack year history, sex, ECOG performance status, time between diagnosis and last contact, and clinical stage, current tobacco use compared to quit at last contact is approaching a statistically significant association with mortality (HR=1.49; 95%CI: 0.98-2.27). **Conclusions:** Evidence suggests that tobacco cessation among lung cancer patients after diagnosis may be associated with reduced mortality.

FUNDING: Roswell Park Alliance Foundation, NCI R25CA113951

JUSTIFICATION: Evidence suggests that automated tobacco assessment can effectively refer patients to a dedicated cessation service, which may be associated with reduced mortality among lung cancer patients who quit using tobacco after diagnosis.

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POS4-68 AVAILABILITY OF REDUCED HARM TOBACCO PRODUCTS RELATIVE TO E-CIGARETTES IN RETAIL STORES IN THE UNITED STATES 2010-2012

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Background: Electronic cigarette (e-cig) availability in retail stores has increased dramatically since 2007, when they were first introduced in the U.S. While their safety and effectiveness as a smoking cessation device has yet to be determined, initial studies of smokers indicate that e-cigs are perceived as a reduced harm product. Point of sale availability of e-cigs relative to other reduced harm tobacco products (moist snuff, snus and dissolvable products) may be one factor affecting the demand for these products. **Methods:** Field staff collected cross-sectional tobacco-related data in a national sample of retail stores selling food located in school enrollment zones for 8th, 10th and 12th grade students in the U.S. in 2010 (n=2,296 stores), 2011 (n=2,414) and 2012 (n=2,288) as part of the Bridging the Gap Community Obesity Measures Project. **Results:** E-cig availability in the stores selling tobacco products more than doubled from 3 to 7% of stores between

Poster Session 4 • Saturday, February 8, 2014 • 11:00 a.m. – 12:30 p.m.

2010 and 2011, and then quadrupled to 31% in 2012. Comparatively, slightly less than three-quarters of stores sold moist snuff in each of the three years while snus and dissolvable product availability remained constant between 2010 and 2011 and then declined in 2012 from 60% to 47% (snus) and 5% to less than 2% (dissolvables) of stores. Availability differed by store type; in 2012, e-cigs and dissolvables were most prominent in drug stores (49%, 6%, respectively) followed by convenience stores (31%, less than 1%) and supermarkets (23%, 3%) compared to moist snuff and snus, which had greater availability in convenience stores (81%, 53%, respectively) than supermarkets (67%, 43%), and drug stores (39%, 43%). Neighborhoods where the majority of residents were white were more likely to sell reduced harm products than neighborhoods of color, after controlling for income, urbanicity and store type. Conclusions: E-cigs, moist snuff, and snus are generally available in retail food stores for smokers seeking these products, although racial/ethnic inequities in access exist. Retail store marketing policies to increase access to these reduced risk alternatives for smokers should be considered.

FUNDING: Support for this project was provided by the Robert Wood Johnson Foundation as part of the Bridging the Gap: Research Informing Practice and Policy for Healthy Youth program (grants #64702 and 70157); and by a National Cancer Institute-funded grant (Grant#1U01CA154248), titled "Monitoring and Assessing the Impact of Tax and Price Policies on U.S. Tobacco Use." The Monitoring the Future study is funded by the National Institute on Drug Abuse.

JUSTIFICATION: Policies to regulate the marketing of reduced harm products should be inclusive of all products, and should encourage access to all smokers, regardless of racial/ethnic backgrounds.

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POS4-70

ACCEPTABILITY OF FEMALE SMOKING AND SMOKELESS TOBACCO USE IN BANGLADESH AND INDIA: FINDINGS FROM THE ITC PROJECT

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BACKGROUND: Unlike most high-income countries, there is still a gender gap in many LMICs whereby female smoking rates are much lower than males. A unique situation exists in parts of South East Asia, where female smoking rates are low but smokeless tobacco use is high. This study aims to examine acceptability of female smoking and smokeless tobacco use in Bangladesh and India, and to distinguish factors that might explain female tobacco use in comparison to males, such as social norms and beliefs about tobacco. **METHODS:** Data are from Wave 1 of the TCP India (IN) Project (2010-2011) and Wave 2 of the ITC Bangladesh (BD) Project (2010). **RESULTS:** Smokeless tobacco-only use was the most common form of tobacco use among females in both countries. The use of smokeless tobacco among females was perceived as more acceptable than both female cigarette and bidi smoking, with similar patterns observed in both countries. For example, in India female smokers were more likely than male smokers to say female cigarette and bidi smoking is acceptable (14 vs 2%, $X^2=23.473$, $p=.001$; and 16 vs 2%, $X^2=27.796$, $p<.01$ respectively). Female smokeless tobacco users were significantly more than males likely to say that female smokeless tobacco use is acceptable (22 vs 6%; $X^2=119.345$, $p<.001$). The majority of tobacco users said society disapproves of tobacco use, with more agreement that society disapproves of smoking than smokeless tobacco use (IN: 63.6 vs 57.7% overall; BD: 59.9 vs 28.7%). Female smokers and mixed users were the least likely to say that society disapproves of smoking. The belief that it is acceptable for females to use tobacco, and the belief that society approves of smoking/smokeless tobacco were associated with lower likelihood of intending to quit tobacco. **CONCLUSIONS:** Smokeless tobacco was more acceptable than smoking in both countries, particularly for females. Female tobacco users tended to view their own tobacco use behavior as more acceptable than other types of tobacco use and than their male counterparts perceived it to be. Beliefs about social acceptability of female tobacco use may be an important predictor of intentions to quit.

FUNDING: The ITC Bangladesh Survey was supported by the International Development Research Centre (IDRC Grant 104831-002), U.S. National Cancer Institute (P50 CA111236; P01 CA138389); Canadian Institutes of Health Research (Operating Grants 57897, 79551 and 115016); and the Robert Wood Johnson

Foundation (045734). The TCP India Survey was also supported by the US NCI and CIHR grants. The first author is supported by a doctoral award from the Canadian Institutes of Health Research (CIHR) and Geoffrey T. Fong is supported by a Senior Investigator Award from Ontario Institute for Cancer Research.

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POS4-71

ACHIEVING RAPID SMOKING URGE RELIEF AND NICOTINE PHARMACOKINETICS THROUGH THE MANIPULATION OF THE PARTICLE SIZE OF A CONDENSATION AEROSOL OF NICOTINE AND PROPYLENE GLYCOL

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BACKGROUND. Existing electronic nicotine delivery devices tend to produce sub-micron particles, which have insufficient mass to settle in the deep lung, resulting in buccal delivery and slow pharmacokinetics (PK) and pharmacodynamics (PD). In contrast, 1-3 micron particles can reach the deep lung and have enough gravitational mass to settle on the alveoli, leading to rapid PK and PD effects. This ascending, placebo- and vehicle-controlled, dose ranging Phase 1 study explored the tolerability, PK and PD of a novel 1-3 micron condensation aerosol of nicotine and propylene glycol (PG). **METHODS.** We recruited 77 smokers (averaging 21.2 cigarettes per day) and randomly assigned them to 7 cohorts (N=9-12) involving dosing with 10 inhalations in the following conditions: placebo (air only), vehicle (PG only), 25, 50 (both 2.5% and 5% solutions), 75 or 100 mcg of nicotine per inhalation. Outcome measures included smoking urge (baseline, 1-, 15- and 30-minutes post-dosing), nicotine PK (baseline, 30-seconds, 5-minutes post-dosing), the modified Cigarette Evaluation Scale, and a product debriefing assessment. **RESULTS.** The placebo, vehicle, 25 and 50 mcg (5.0%) dose groups reported modest median percent smoking urge reductions (13%, 17%, 38%, and 39%, respectively) at 1-minute post-dosing. In contrast, the 50 (2.5%), 75, and 100 mcg dose groups all reported significant ($p<.01$) reductions in their median percent smoking urge (75%, 70%, and 83%, respectively) at 1-minute post-dosing, which were sustained over time. The nicotine dosing groups produced median nicotine PK changes between .68 and 2.0 ng/mL within 30 seconds after dosing. Multivariate analyses revealed that more dependent smokers reported greater smoking urge reductions than less dependent smokers, irrespective of their baseline smoking urge. 75% of subjects reported that they would use the 50 mcg (2.5%) aerosol as a substitute for their smoking. **DISCUSSION.** The implications of this research, including the integration of the aerosol with real-time eHealth tools, as well as preliminary data from a within-subject follow-on trial involving an e-cig and combustible cigarette comparator, will be discussed.

FUNDING: e-Nicotine Technology, Inc. funded this research.

JUSTIFICATION: Leveraging the scientific body of data from respiratory drug delivery, this study examined the subjective and pharmacokinetic characteristics of a novel condensation aerosol of nicotine, which has important clinical, public health, and regulatory implications.

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POS4-72

DIFFERENCES IN PERCEIVED RISK OF TOBACCO PRODUCTS AMONG ADULT TOBACCO USERS IN BANGLADESH AND INDIA: FINDINGS FROM ITC SURVEYS

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Background: Research has shown that smokers underestimate their risk of harm from smoking, but less is known about risk perceptions of tobacco products and how they affect behavior, including product switching. This is particularly important in countries like India and Bangladesh, where there are high rates of tobacco use

of multiple products. Methods: Data was from the International Tobacco Control (ITC) Bangladesh and India Surveys, prospective cohort face-to-face surveys of adults. The Bangladesh Wave 1 (W1; 2009) Survey was conducted among a nationally representative sample of 3109 tobacco users and 2658 non-users; Wave 2 (W2; 2010) included 3108 users and 2554 non-users. The India W1 Survey (2010-11) included 8051 tobacco users and 2534 non-users in four states. Results: In both countries, tobacco users perceive their own product to be less harmful than other products. Smoked tobacco (ST) users (cigarettes and bidis) in India were more likely to say that smokeless tobacco (SL) is more harmful than cigarettes (42%) and bidis (42.1%) compared to mixed users (25.4%; 25%) and SL users (13%; 12.3%). In Bangladesh, the majority (65.2%) of cigarette smokers at W2 said that bidis are more harmful than cigarettes, compared to 27.5% of bidi smokers, the majority (63.3%) of whom said there is no difference in harm. Among cigarette-only users at W1 in Bangladesh, their perception of harm of bidis at W1 did not predict whether they switched to bidis-only at W2 (Wald $F=0.057$, $p=.945$) but their perception of bidis at W2 was significantly related to whether or not they had switched ($\chi^2(2, N=1625) = 26.85$, $p<.01$); among those who switched from cigarettes to bidis ($n=55$), the majority (60.8%) said that bidis are more harmful at W1, but after switching at W2, the majority (57%) of those same individuals said there is no difference in harm. Conclusions: Similar to how smokers perceive their risk of harm to be lower than other smokers, these findings suggest that tobacco users in India and Bangladesh perceive their product to be less harmful than other products. Data from those who switch products suggest they also switch their perceptions, perhaps as a way to justify their behavior.

FUNDING: The TCP India Project has received funding support from the U.S. National Cancer Institute (P01 CA138389), the Canadian Institutes of Health Research (79551 and 115016), and an Ontario Institute for Cancer Research Senior Investigator Award for Geoffrey T. Fong. The ITC Bangladesh Survey has received funding support from the International Development Research Centre (IDRC Grant 104831-002), Canadian Institutes of Health Research (Operating Grants 57897, 79551 and 11501), the US National Cancer Institute (R01 CA100362, the Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC; P50 CA111236) and P01 CA138389), Robert Wood Johnson Foundation (045734) and Ontario Institute for Cancer Research (Senior Investigator Award to Geoffrey T. Fong). The first author has received funding support from the Canadian Institutes of Health Research (Doctoral Research Award).

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POS4-73 CUE REACTIVITY IN TOBACCO SMOKERS WITH SCHIZOPHRENIA AND NON-PSYCHIATRIC CONTROLS: A PRELIMINARY STUDY

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Background: The prevalence of cigarette smoking in patients with schizophrenia (SZ) is ~80%, compared to less than 20% in the general population; furthermore, SZ patients have more difficulty quitting smoking. Understanding smoking cue reactivity in SZ may help understand mechanisms for the higher rates of smoking and lower quitting success, and guide the development of future treatment interventions for this common co-morbidity. This preliminary study examines the effect of in vivo smoking cues on craving in tobacco-dependent patients with schizophrenia and non-psychiatric control smokers. Methods: Our sample was comprised of 10/12 (83%) cue-reactive patients and 13/15 (87%) controls; cue reactivity was defined as a positive inflection of subjective craving of at least 1mm on a visual analog scale (VAS; 100 mm). Participants were exposed to both a neutral (pencil and eraser) and smoking cue (cigarette and lighter) in 90 second epochs, separated by a 5 minute washout period. Results: A main effect of smoking cues was found ($F(3, 63) = 31.795$; $p<.001$), reflecting a significant difference in subjective craving in response to smoking versus neutral cues in SZ ($t(9) = -3.521$, $p=0.007$) and ($t(12) = -3.584$; $p=0.004$) smokers. No differences were found between groups in response to smoking cue exposure ($t(21) = 0.60$; $p=0.95$). Conclusions: Our preliminary data suggests that this in vivo smoking cue reactivity paradigm was effective in eliciting a craving response in smokers with and without schizophrenia, but that the magnitude of cue-elicited craving was similar between SZ and CON groups, consistent with previous research (Fonder

et al., 2005; Tidey et al., 2008). While we found no differences in cue reactivity in SZ and CON smokers, these findings may have implications for the development of tobacco treatments for smokers with schizophrenia.

FUNDING: Supported in part by CIHR Operating Grant #115145 (to Dr. George) and the Institute for Medical Sciences, University of Toronto (to Ms. Bridgman).

JUSTIFICATION: Elucidating the mechanisms underlying craving and tobacco comorbidity in schizophrenia may help researchers understand low cessation rates in this population, and may guide novel treatments for smoking cessation.

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POS4-74 SMOKING PATTERNS AND SMOKING CRAVINGS AMONG SOMALI MALE SMOKERS BEFORE, DURING AND AFTER RAMADAN

Kolawole S. Okuyemi, Barrett Sewali*, Scott Lunos, Diana DuBois, Abdillahi Kahin, Abdillahi Ganey, Saul Shiffman,

Smoking prevalence in Muslim communities in different parts of the world remains relatively high ranging between 20 % and 45%. The aims of the current study were to determine the smoking patterns and smoking cravings and urges surrounding the holy month of Ramadan in a male smokers whole planned to fast. Somali adult smokers ($N=46$, mean age= 34 years) completed a baseline survey 2 weeks before Ramadan, carried smart phones for data collection during Ramadan, and completed a survey 1 week after Ramadan. The current analyses used data collected at 3 time points (pre-Ramadan=T1, Ramadan= T2 and 1 week post- Ramadan= T3). The mean (SD) age of initiation = 17.0 (3.3) years, mean quit attempts in the past year = 1.0 (1.3), average cigarettes per day (CPD) pre-Ramadan = 13.4 (5.2), during Ramadan = 3.5 (5.4), and post-Ramadan = 8.1 (6.2). Further analysis of the self reported CPD during Ramadan revealed that 30/37 (81.1%) had a decrease in CPD during Ramadan of at least 50%; 26/37 (70.3%) had a decrease in CPD during Ramadan of at least 75%; 7/37 (18.9%) had a decrease in CPD during Ramadan of at least 100%. The smoking urges and cravings were assessed using the validated ten-item Questionnaire on Smoking Urges (QSU-brief). Factor 1 mean scores (S.D) representing the strong desire and intention to smoke; baseline = 10.0 (4.1), Ramadan= 11.2 (2.9), post Ramadan = 10.6 (4.7); Factor 2 mean scores representing an anticipation of relief from negative affect; baseline 9.2 (3.7), Ramadan=10.4 (2.8) and post Ramadan= 9.8 (4.5). Differences were found between time points for average CPD ($p<0.05$) but not for QSU measures; T1 vs T2 = <0.0001 ; T1 vs T3 = 0.0003; T2 vs T3 = 0.0005. Findings indicate that Somali male smokers reduce smoking during and after the holy month of Ramadan despite increased smoking craving. Thus if smokers do reduce their CPD smoked during and after Ramadan, developing interventions that target smokers leading to the month of Ramadan might effectively address smoking cessation programs for Muslims communities across the globe.

FUNDING: 2013 Pilot Grant in Health Disparities Research University of Minnesota (Internal Grant)

JUSTIFICATION: Smoking cessation interventions may need to integrate faith beliefs of smokers to help increase the chances of quitting smoking for certain populations.

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POS4-75 ALTERNATIVE TOBACCO PRODUCT USE AND PROFILES OF HEALTH BEHAVIOR IN YOUNG ADULTS

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INTRODUCTION: Use of alternative tobacco products is becoming increasingly prevalent among young adult college students, a population at high risk of initiating patterns of tobacco use and health damaging behaviors that may extend throughout adulthood. Little is known about the prevalence of co-use of multiple tobacco products and health behaviors associated with alternative tobacco use products among college students. METHOD: In this cross-sectional study of a

convenience sample, 539 college students (Mean age = 20.1 years, 75% female, 38% Asian, 33% White, 18% Multiracial) completed a survey assessing lifetime use of six tobacco products and various health behaviors and characteristics in 2010 to 2012. RESULTS: Prevalence of lifetime use was: tobacco cigarettes 39%, cigars 23%, pipe 13%, chewing tobacco 7%, snus 4%, electronic (e) cigarettes 8%. Prevalence of poly-use (>2 products) was 24%. Risky behaviors (i.e., alcohol problems, drug abuse, gambling, and sexual risk behavior) were generally associated with higher use prevalence for each of the six tobacco products and higher poly-use, over and above demographic covariates. Physical activity, consumption of healthy food, and body mass index largely were not associated with tobacco products. Consumption of unhealthy food and food craving were inversely associated with tobacco cigarette use. After statistically adjusting for co-use across the six products to identify unique associations with individual use of a particular tobacco product, use of different products had somewhat unique profiles of health behavior correlates (e.g., cigars-gambling), although sexual risk taking and alcohol problems were uniquely associated with multiple types of tobacco product use. CONCLUSIONS: Use of different tobacco products appear to be associated with health behavior profiles in a non-monotonic fashion in college students. In conjunction with other similar work, the current findings may inform health promotion programming targeting use of various tobacco products and other health behaviors in young adults.

FUNDING: This study was conducted at the University of Southern California. Supported by National Institute on Drug Abuse Grants R01-DA026831 and K08-DA025041.

JUSTIFICATION: These findings may inform health promotion programs of the prevalence and habits of alternative tobacco product use among college students and contribute to the development of comprehensive prevention programs that incorporate associations with risky health decisions and behaviors.

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POS4-76 SUSCEPTIBILITY TO CIGARETTE USE AMONG MIDDLE AND HIGH SCHOOL ELECTRONIC CIGARETTE USERS, NATIONAL YOUTH TOBACCO SURVEY, 2011-2012

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Electronic cigarettes (e-cigarettes) are novel products that may be associated with susceptibility to and initiation of cigarette use. We analyzed data from the 2011 and 2012 National Youth Tobacco Surveys of U.S. middle and high school students (n=43,524) to assess susceptibility to cigarette use, a known predictor of cigarette smoking initiation among youth. Susceptibility was defined among youth never cigarette smokers by a composite measure that combined responses to two questions: "Do you think you will smoke a cigarette in the next year?" and "If one of your best friends were to offer you a cigarette, would you smoke it?" We assessed cigarette smoking susceptibility among three mutually exclusive groups of youth never cigarette smokers: never used any tobacco product (cigarettes, cigars, chewing tobacco, snuff, dip, bidis, kreteks, pipe, hookah, snus, dissolveables, or e-cigarettes), current use of only a smokeless tobacco product (SLT) (chewing tobacco, snuff, dip, snus, or dissolveables), and current use of e-cigarettes alone or in combination with SLT. We report prevalence of susceptibility and results from a multivariate model that adjusted for gender, race/ethnicity, school (middle or high), and presence of a smoker in the household. Susceptibility was 22.9% (95% confidence interval [CI]: 22.1-23.7) among never tobacco users, 39.6% (CI:32.3-46.9) among current SLT only users, and 70.4% (CI:56.5-84.3) among current users of e-cigarettes alone or in combination with SLT. Compared with youth who never used tobacco, youth who reported current use of e-cigarettes alone or in combination with SLT had seven-fold higher susceptibility to cigarette use (adjusted odds ratio [AOR]=7.01, p<0.001, CI:3.60-14.36) and SLT only users had two-fold higher susceptibility (AOR=1.94, p<0.01, CI:1.41-2.65). Our findings indicate that youth who are current e-cigarette users but have never smoked a cigarette are more likely than either SLT only users or youth who have never used tobacco to demonstrate susceptibility to cigarette use. Further assessment with longitudinal data could confirm if e-cigarettes are a gateway to cigarette use among youth.

FUNDING: No Funding.

JUSTIFICATION: If electronic cigarettes serve as a gateway for youth initiation of combustible cigarettes, aggressive public health prevention action may be necessary.

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POS4-77 IF AT FIRST YOU DON'T SUCCEED: CHARACTERIZATION OF SMOKERS WITH LATE SMOKING ABSTINENCE ONSET

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Smoking cessation research has aimed to clarify characteristics that predict initial and sustained abstinence. Less attention has been paid to predictors of gaining abstinence, following an initial failure. The current investigation aimed to explore a range of pre-treatment smoking, demographic, and psychosocial characteristics related to gaining abstinence following an initial failure. Participants included 328 individuals enrolled in an extended 52-week smoking cessation intervention who failed their initial quit attempt. Gaining abstinence was defined as achieving seven-day point prevalent abstinence at any post quit date assessment point. Having a partner ($\chi^2(1, 322)=4.1, p=.04$), identifying as Hispanic ($\chi^2(1, N=320)=4.3, p=.04$), higher level of attendance (Welch's $F(1, 97.5)=3.9, p=.04$) biochemically-verified ($F(1, 327)=5.5, p=.02$) nicotine dependence ($F(1, 319)=5.2, p=.02$), and cannabis use ($\chi^2(1, N=)=6.4, p=.01$) were related to gaining abstinence. A comprehensive logistic regression model suggested partner status (OR = 2.60, 95% CI = 1.13-6.00) and attending more sessions (OR = 0.71, 95% CI = 1.02-1.26) as the best predictors of gaining abstinence. The current study aimed to characterize smokers that are more likely to gain abstinence following an initial failed attempt. Our findings indicated having a partner and attending more treatment sessions are the best predictors of gaining abstinence. In addition, we found preliminary support suggesting using cannabis, less nicotine dependence, and identifying as Hispanic are related to gaining abstinence. Together, our findings provide novel insight into this understudied area and provide an initial framework toward understanding gaining abstinence following failure.

FUNDING: This research was supported by grants P50 DA009253, R01 DA002538, and T32 DA007250-19.

JUSTIFICATION: Our findings highlight the need for improved strategies to help smokers re-engage in a cessation attempt following an initial failure.

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POS4-78 IMPROVING CESSATION PHARMACOTHERAPY VIA VIDEOCONFERENCE EDUCATIONAL OUTREACH TO PRESCRIBERS

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Smoking cessation pharmacotherapy is underutilized. Educational outreach can improve prescribing, but distances separating educators and physicians impede widespread use of this practice. Videoconference has been shown to be feasible for clinical education, but no research has assessed whether it is effective. This study evaluated the efficacy of videoconference delivery of an educational intervention for prescribers across a state mental health system. Methods: We randomly assigned prescribers within community mental health centers (CMHCs) to receive in-person or videoconference educational outreach with audit and feedback for smoking cessation pharmacotherapy. We evaluated prescribing trends in Medicaid pharmacy claims for nicotine replacement therapy (NRT) and varenicline in the 12 months before and 9 months after the intervention among 13,569 adult Medicaid recipients in the CMHCs. (We did not evaluate claims for bupropion because of our inability to determine whether it was used for depression or smoking cessation.) To evaluate the longitudinal effect of the intervention, we applied segmented regression analysis of interrupted time series, comparing prescribing trends before and after the intervention. We also

evaluated the effect of intervention type (in person vs. videoconference) on trend change by including type by trend interaction terms in the model. Results: The time trend for NRT prescribing changed after the intervention compared to before ($p < .01$), indicating that the proportion of people who filled prescriptions for NRT increased in the period after the intervention, relative to before. NRT prescribing at centers receiving in-person educational outreach initially increased more than at videoconference centers, but this difference reversed over time. Trends did not change significantly for varenicline ($p = .07$), and type of intervention delivery did not influence prescribing of varenicline. Conclusion: This research suggests that even a single session of educational outreach with audit and feedback can increase cessation pharmacotherapy in large treatment systems, and that delivery of education via videoconference is effective.

FUNDING: No funding

JUSTIFICATION: Videoconference can be used to expand the reach of clinician training for cessation pharmacotherapy

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POS4-79 GENDER AND ETHNIC/RACIAL DIFFERENCES IN SOURCES OF CIGARETTES AMONG ADOLESCENT SMOKERS

Nichea S. Spillane, Ph.D., Megan E. Roberts, Ph.D., Suzanne M. Colby, Ph.D., Nancy Barnett, Ph.D., and Kristina M. Jackson. Center for Alcohol and Addiction Studies, Brown University

Cigarette smoking is the most preventable cause of death in the United States. The majority of smokers initiate prior to age 18. Those that initiate prior to age 16 are more likely to have higher rates of nicotine dependence. Early smoking is more prevalent among certain subgroups, such as Native Americans, Whites, and Hispanic/Latinos. One key strategy to prevent or reduce youthful smoking is limiting access to cigarettes. It is thus critical to understand how adolescents obtain cigarettes. In the present study, we sought to describe cigarette sources and to examine differences in access by race/ethnicity and gender. Data were taken from a three-year longitudinal study examining substance use milestones in adolescents age 11 – 14 at Time 1 (average age 12.2 (SD = .98)). The sample was composed of 1,023 students (48% male) in six Rhode Island middle schools, and included roughly equal numbers of 6th, 7th, and 8th graders. The ethnic/racial composition was primarily non-Hispanic White (72%), Black (4%), Hispanic (13%), Native American (2%), Hawaiian/Pacific Island (<1%), Multi-ethnic (7%). Analyses included only adolescents who had smoked a full cigarette and who indicated a source of obtaining cigarettes at least once across five time points ($n = 64$). The median number of sources endorsed by participants was 2.0 across all 5 waves. The most commonly endorsed source across all youth was close friend (73.4%), someone at school (46.9%), boy/girlfriend (20.3%), and another type of relative (20.3%). Access from parents was reported by 15.6% of the individuals. There were no significant differences among the ethnic/racial groups for accessing cigarettes from parents, or from friends, but there was a significant difference for accessing cigarettes from other family members ($\chi = 10.63, p < .05$). We also examined potential gender differences for accessing cigarettes and the only significant difference was that females were more likely than males to report access from a significant other. Understanding how adolescents obtain cigarettes will have important implications for policies on access and for prevention/intervention programs.

FUNDING: Supported by NIDA grant K08 DA029094 to Dr. Spillane and NIAAA R01 AA016838 to Dr. Jackson.

JUSTIFICATION: This study has the potential to inform both prevention programs and policy to prevent or reduce access to cigarettes by elucidating the sources of access to cigarettes in young adolescents.

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POS4-80 THE RELATIONSHIP BETWEEN NICOTINE METABOLISM, CARCINOGEN AND PAH EXPOSURE AND SMOKING BEHAVIORS AND ENVIRONMENTAL TOBACCO EXPOSURE AMONG BLACK AND WHITE SMOKERS

Jesse L. Mason, Ph.D. Clark Atlanta University

Tobacco use and its consequences vary among ethnic and racial groups. There are complex interactions, including race/ethnicity, gender, socioeconomic status (ses), and etc, between various factors that influence smoking behaviors. The purpose of this study was to explore the possible relationships between biomarkers of nicotine, tobacco exposure, polycyclic aromatic hydrocarbons, corresponding smoking behaviors and self-reported behaviors that may increase environmental tobacco exposure (ETS). Using archival data from a quit-smoking study we explored whether there was a relationship between biomarkers for nicotine metabolism, carcinogenic exposure, PAH exposure and smoking behaviors ($N = 82$). Nicotine metabolism was investigated using levels of metabolites of nicotine such as total cotinine, cotinine-glucuronide, and nicotine glucuronide as a percentage of nicotine and its metabolites using 24-hour urine samples. In addition, carcinogenic exposure and detoxification among smokers were examined using biomarkers of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) such as NNAL and NNAL-Gluc:NNAL. Metabolic activation of polycyclic aromatic hydrocarbons (PAH) between Black and White smokers were also investigated using phenanthrene (Phe) and its metabolites as bio-markers. Using Pearson Product Moment correlation coefficients and chi square analyses, race was strongly related to bio-markers of nicotine metabolism, menthol smokers, number of attempts to quit, reason for relapse, indicators of ETS, and PAH metabolism. Baseline carbon monoxide levels showed a stronger relationship to certain smoking behaviors than any of the bio-markers, such as cigarettes per day, method used to quit smoking, larger percentage of friends who smoked, and carcinogenic exposure. Finally, gender was strongly correlated to symptoms of withdrawal, PAH exposure, and levels of motivation to quit. Supplemental analysis will be available. The interactions between gender, race, and socioeconomic levels need to be further investigated as it relates to smoking behaviors, smoking related health outcomes, and tailored intervention and prevention programs.

FUNDING: T-50DAO13333

JUSTIFICATION: This potential applicability of this research towards informing public health and clinical research is the necessity for both individualized treatment and the need for a interactive models for decreasing health disparities.

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POS4-81 CIGARETTE BRAND MARKET SHARE AND TRENDS AMONG PREMIUM AND DISCOUNT CIGARETTE BRANDS: FINDINGS FROM NSDUH 2002 - 2011

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The National Survey on Drug Use and Health (NSDUH) is a nationally representative survey of the US population with regards to alcohol, tobacco, and illicit drug use. We analyzed NSDUH data from 2002-2011 to assess the market brand share of the top 10 cigarette brands in America. Since the NSDUH data was weighted and used a complex sampling frame we analyzed the data using SUDAAN 11 running within SAS 9.3. To provide an estimate of market share, the survey weights were adjusted to account for individuals' reported number of days smoked and number of cigarette smoked per day. We restricted our analysis to the top 20 cigarette brands because they comprised over 92% of the market during all 10 years. We assessed market brand share for the top 10 cigarette brands, and then we looked to determine if there were any changes in market brand share over the 10 year period. Our results indicate that Marlboro had the largest overall brand share in the period between 2002 and 2011, averaging 39.4%, and consistently holding more than 38% of the market in any given year. Marlboro market share was relatively constant till 2007 at 39%, but then it was observed to fluctuate

till 2011 between 39% and 41%. Newport had the second highest total market share (8.4%), followed by Camel at 7.4%. The test for trend for the increase in market share for Newport and Camel were both significant when compared to all other cigarette brands on the market (p 's $<.001$). American Spirit also gained in its overall market share increasing from 0.26% in 2002 to 1.04% in 2011 ($p <.001$). With regards to discount cigarette brands, Pall Mall showed significant growth from 1.7% of the market in 2002 to 8.1% by 2011. The test for trend for Pall Mall was significant for its growth when compared to all other brands on the market ($p <.001$). Using the consumption adjusted weight avoids confounding brand preference with consumption, as discount brand smokers tend to smoke more cigarettes while youth smokers tend to smoke fewer cigarettes, and these tend to be premium brands. Future research will focus on assessing demographic characteristics of Premium cigarette users and Discount cigarette users.

FUNDING: No funding

JUSTIFICATION: Understanding trends in brand share is important to contextualizing the impact of regulatory policies on the relative attractiveness of products.

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POS4-82

DEVELOPMENT AND TESTING OF A CLASSIFICATION ALGORITHM FOR IDENTIFYING FILTER VENT BLOCKING

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There is significant inter-individual variability in exposure to nicotine and toxicants that can be attributed to differences in smoking behaviors, including puff volume and filter vent blocking. One can take larger puffs and/or physically block the air vents with lips or fingers to increase intake. These are traditionally measured using in-line devices or visual inspection, which may be error prone or affect behavior. We propose a new method for classifying vent blocking behavior of smokers using ventilated cigarettes. Our method, developed with Java and JavaFX Technology, extracts a feature set of rotationally invariant mean statistics from the image of a smoked filter. These features are used with a support vector machine and a hidden Markov model, which naturally capture the filter-staining process, to train the classifier. Experimentation on images of 212 machine-smoked Kentucky Reference 1R5F and 3R4F cigarettes, generated using total puff volumes ranging from 70 to 700 mL, at 0%, 50%, or 100% blocking of the filter, demonstrates significant improvement in classifying vent blocking behavior against current approaches. Our standards model yielded a validation accuracy of 92%. Data applying the training set to 'unknowns' across a variety of brands obtained from human smokers are presented. These results further pave the way for low-cost, non-invasive digital images of smoked cigarette filters to help us better infer smoker topography and hence yield a better understanding of a smoker's behavior and, eventually, exposure.

FUNDING: Supported by a grant from the National Cancer Institute (R21 CA160825)

JUSTIFICATION: Improved measurement of smoking behaviors and exposures may have utility in better assessing disease risks.

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POS4-83

NICOTINE PHARMACOKINETICS IN THE BRAIN AND BLOOD AFTER MECHANISM-BASED INHIBITION OF BRAIN CYP2B6 USING IN VIVO MICRODIALYSIS IN RATS

Kristine Garcia*, Anh Dzung Lê and Rachel F. Tyndale. Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health, and Departments of Pharmacology and Toxicology and Psychiatry, University of Toronto, Toronto, Ontario, Canada.

Genetic variation in the nicotine metabolizing enzyme CYP2B6 can influence the acquisition of smoking in adolescents and craving and relapse during cessation. This variation does not affect hepatic nicotine metabolism, therefore the impact on smoking behavior may be due to its effect on nicotine metabolism in the brain where CYP2B6 is expressed. Previous experiments in rats to model CYP2B6 slow metabolism in the brain demonstrated that C8-xanthate (C8X), a mechanism-based (suicide) inhibitor of CYP2B6, given via intracerebroventricular (ICV) injections facilitated acquisition and increased motivation for nicotine self-administration (NSA). The goal was to investigate if C8X ICV injections specifically altered nicotine brain but not plasma levels. In vivo microdialysis was conducted to measure nicotine after a single intravenous (IV) nicotine injection in rats treated ICV with C8X or its vehicle. Microdialysis probes were implanted into the right lateral ventricle and rats were given C8X (20 micrograms) or vehicle (artificial cerebrospinal fluid) 24 hours prior to test day. On test day, baseline dialysate was collected prior to the nicotine IV injection at a flow rate of 2 microliter/minute for 15 minutes and after the nicotine injection (0.15 mg/kg) dialysate was collected every 15 minutes for 135 minutes. Blood was sampled from the saphenous vein at 15 and 75 minutes post-nicotine injection. Preliminary data in 9 rats showed higher mean nicotine dialysate levels 15-30 minutes post-nicotine injection in C8X-treated rats ($N = 5$) compared to vehicle-treated rats ($N = 4$). Mean AUC from 0-30 and 0-60 minutes post-nicotine injection were also greater in C8X-treated rats compared to vehicle-treated rats. Plasma nicotine and cotinine levels were not different between C8X and vehicle-treated rats, indicating that the ICV injection of C8X did not alter peripheral nicotine metabolism. These results suggest that inhibition of CYP2B6 using C8X influences nicotine brain levels within the first 30 minutes after a single nicotine injection and this increase in nicotine could explain the NSA behaviors observed after ICV C8X treatment.

FUNDING: CIHR grant MOP97751, Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health

JUSTIFICATION: Understanding the role of CYP2B6 influencing nicotine in the brain can provide new directions for treating addiction

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POS4-84

USING VIRTUAL REALITY TO EXPLORE ENVIRONMENTAL CUES IN BLACK AND WHITE ALCOHOL-DEPENDENT SMOKERS

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Background: Nicotine and alcohol dependence among Black smokers and drinkers results in more severe consequences than for their White counterparts. A key contributor to dependence is cue reactivity. Differences between these groups have been examined; few comparisons focus on the impact of cross-cue reactivity. We explored cross-cue reactivity, specifically smoking cues' effect on alcohol craving, in Black and White alcohol-dependent smokers using virtual reality (VR) cue exposure methods. VR environments expose individuals to social, physical, and affective interactions using contextually appropriate visual, auditory, and olfactory stimuli, which may provide a more ecologically valid cross-cue reactivity picture. Methods: Alcohol-dependent smokers (14 Black, 6 White) were immersed in four VR cue environments: the first and last were identical, devoid of smoking or alcohol cues. The two cue environments were an office courtyard and a party, each with smoking-related cues. The environments presented no overt alcohol cues. On leaving each environment, participants gave visual analog scale ratings of current alcohol craving, attention paid to alcohol cues, and thoughts about drinking at that moment. Results: Results indicate Black participants had significant alcohol thought increases compared to White participants after the party environment, $p < .05$, and the second neutral environment, $p < .05$. Conclusions: That Black participants reported more thoughts of drinking than White participants after being

shown smoking-related cues in the party and second neutral environment may be related to genetic differences that could hinder ability to dismiss thoughts of drinking as quickly as White participants. Also, the VR party was designed to consider diversity; however, virtual party-goers were primarily White. This may have been uncomfortable and stressful, triggering a race-based reactivity pattern, where Black participants thought about drinking more than Whites. Future research should explore cultural differences related to cue reactivity between Black and White polysubstance users and create culturally grounded VR environments for Black polysubstance users.

FUNDING: Research supported by the National Institute on Alcohol Abuse and Alcoholism Grant#1R41AA014312-01

JUSTIFICATION: A better understanding of the cultural experiences of Black polysubstance users could lead to culturally grounded VR environments that could improve research and service delivery to this population.

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POS4-85

THE EFFECTIVENESS OF ASSISTED VERSUS UNASSISTED SMOKING CESSATION IN THE GENERAL POPULATION: RESULTS FROM THE 2010-2011 TOBACCO USE SUPPLEMENT OF THE CURRENT POPULATION SURVEY

Mohammad Siahpush*, University of Nebraska Medical Center, Raees A Shaikh, University of Nebraska Medical Center, Molly A McCarthy, University of Nebraska Medical Center, Melissa Tibbits, University of Nebraska Medical Center, Asia Sikora, University of Nebraska Medical Center, Gopal K Singh, U.S. Department of Health & Human Services

Background: The effectiveness of assisted versus unassisted methods of smoking cessation using population-based data is not adequately studied. Existing research on this topic does not examine duration of pharmacotherapy use. Our objective was to investigate the association between assisted versus unassisted methods of quitting, with a particular focus on duration of pharmacotherapy use among assisted quitters, and the probability of successful cessation using recent national data in the US. **Methods:** We used the 2010-2011 Tobacco Use Supplement to the Current Population Survey. We limited the analysis to current daily smokers who made a quit attempt in the past year and former smokers who were a daily smoker one year prior to the survey (n = 9080). Data were available on use and duration of use of nicotine replacement therapy, Varenicline, Bupropion, telephone quitlines, one-on-one counseling, stop smoking clinics, and web-based programs. **Results:** There was no difference in cessation rates between the groups who used pharmacotherapy alone, behavioral aids alone, both pharmacotherapy and behavioral aids, or neither form of assistance (p = 0.149). However, when we compared those who did not use pharmacotherapy with those who used pharmacotherapy (with or without behavioral aids) for different durations, we found overwhelming evidence for a nonlinear relationship (p < 0.001). Compared to those who did not use pharmacotherapy, those who did so for one or two weeks were less likely to succeed in quitting, while those who used pharmacotherapy longer than 2 weeks were more likely to successfully quit smoking, after controlling for relevant variables such as nicotine dependence. **Conclusions:** We found evidence, in the general population of smokers, of effectiveness of pharmacotherapy for smoking cessation if it is used for longer than two weeks. A reason many previous population-based studies have found no effect of cessation aids in quit success may be that these studies did not examine duration of pharmacotherapy use. Smokers who intend to quit smoking should be strongly encouraged to comply with the recommended duration of use of these aids.

FUNDING: "No Funding"

JUSTIFICATION: This research contributes to the knowledge of successful quitting interventions.

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POS4-86

DEVELOPMENT AND EFFECTIVENESS OF A MULTI-LAYERED TOBACCO CESSATION PROGRAM FOR CANCER PATIENTS

Vance Rabiuss, Jason D. Robinson, Janice A. Blalock, Maher Karam-Hage, Paul M. Cinciripini. Department of Behavioral Science, The University of Texas MD Anderson Cancer Center, Houston, Texas

Tobacco plays a causal role in at least 15 types of cancer, accounts for almost one-third of all cancers, and has deleterious consequences on cancer treatment outcomes. Since 2006 the Tobacco Treatment Program (TTP) has provided smoking cessation treatment to patients and employees at MD Anderson Cancer Center (MDACC). The TTP provides a program of behavioral counseling and pharmacotherapy for smoking cessation, in combination with psychotherapy and/or psychiatric treatment for conditions directly affecting a cessation attempt. We report the impact of enhancing provider-driven referrals with automatic electronic referrals (AERs) based on self-reported tobacco use in a patient's electronic health record (EHR) with the goal of expanding our service offerings to reach all patients who smoke. In early 2012, an electronic screening was put in place for all MDACC patients to conform to meaningful use of EHR standards. This resulted in the AER to TTP of all patients who self-identified as tobacco users or recent quitters. From Sep 1, 2012 to Aug 31, 2013, the TTP received 5102 eligible, unique patient referrals. We also developed a multi-layered series of options to serve all patients. In Sep 2012, we added two educational/motivational services (EMS): (1) the minimum provision of educational materials and a follow-up phone call, (N=1072) and (2) a motivational call, educational materials and follow-up call, (N=3184). In May 2013 we began offering a phone counseling only option (PO; N=86). Our original comprehensive multi-session tobacco cessation counseling and pharmacotherapy service (TTP1) served 760 patients. We attempted to contact all patients at 3 months following their referral. Response rates (RR) and 7-day point prevalence abstinence (PP7), assuming non-responders are still smoking, are as follows: EMS 1, RR=16%, PP7= 9% (94/1072; EMS 2, RR=17%, PP7 = 7% (227/3184); PO RR=50%, PP7=17% (15/86); TTP1 RR=73%, PP7=34% (259/760). A multi-layered service offering extended TTP's reach. Higher abstinence rates were associated with counseling services and the highest rate was associated with counseling plus pharmacotherapy.

FUNDING: The authors are supported in part by the NCI, P30 CA16672 Cancer Center Support Grant to MD Anderson. The Tobacco Treatment Program is supported by State of Texas Tobacco Settlement Funds.

JUSTIFICATION: This program can serve as a model for providing tobacco cessation assistance for cancer patients.

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POS4-87

SELF-DEFINITION AS A SMOKER, PEER INFLUENCE, AND CONCORDANCE OF SELF-DEFINITION AS A SMOKER WITH ACTUAL BEHAVIOR

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Background. Youth self-definition, interpersonal relatedness, & peer influences are related to smoking. We examined the relationships among individual tobacco use characteristics, key components of peer networks, and congruence between self-definition as a smoker versus actual smoking behavior. **Method.** Data from over 1400 youth in a youth tobacco awareness intervention in Texas were used. A variety of self-reported measures were examined. These included tobacco use, perceptions of peer tobacco use & attitudes, congruence of actual behaviors and self-perceptions, nicotine dependence, and years until intended quit. **Structural Equation Modeling (SEM)** was used to test an a priori model as well as a corrected, best fit model. **Results.** Participants reported almost 4 years of previous smoking history, using around ½ a pack per day, low nicotine dependence, and intent to smoke at least until age 21. Initial analysis demonstrated poor fit for the a priori model that specified significant direct influence of peer smoking on congruence between self-report and actual tobacco use, and congruence of tobacco use versus self-definition as a direct influence of smoking. The best-fit model supported a portion of our hypothesis that individual perception of peer

attitudes & behaviors affect the individual's current smoking behavior, but peer influence on the congruence variable was indirect only. Congruence was negatively related to smoking behavior, suggesting that the less congruent the individual is, the more they are likely to smoke. Discussion. Results indicate that a key part of helping youth who use tobacco to quit will be to have them realistically assess their support and peer systems. Additionally, the data support earlier work that has demonstrated that self-perceptions of tobacco use – and self-definition as a “smoker” – are not necessarily accurate. A more accurate self-assessment of this congruence with actual level of smoking will be necessary to more effectively address adolescent use.

FUNDING: This project was funded by the Texas Department of State Health Services.

JUSTIFICATION: This work supports the need to help adolescent smokers accurately self-identify themselves as tobacco users, as well as analyze their peer networks, in order to be most successful at quitting.

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POS4-88 **ELECTRONIC CIGARETTE USE OUTCOME EXPECTANCIES AMONG YOUNG ADULTS**

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Background: E-cigarette use outcome expectancies and their relationships with demographic and e-cigarette use variables are not well understood. Based on past cigarette as well as e-cigarette use research, we generated self-report items to assess e-cigarette outcome expectancies among college students. The objective was to determine different dimensions of e-cigarette use expectancies and their associations with e-cigarette use and use susceptibility. **Methods:** Self-report data were collected from 307 multiethnic 4- and 2-year college students [M age = 23.5 (SD = 5.5); 65% Female; 35% current cigarette smokers] in Hawaii. Data analyses were conducted using factor and regression analyses. **Results:** Exploratory factor analysis among e-cigarette ever-users indicated 7 factors: 3 positive expectancy factors (social enhancement, affect regulation, positive sensory experience) and 4 negative expectancy factors (negative health consequences, addiction concern, negative appearance, negative sensory experience). Confirmatory factor analysis among e-cigarette never-users indicated that the 7-factor model fit reasonably well to the data. Being a current cigarette smoker was positively associated with positive expectancies and inversely with negative expectancies. Higher positive expectancies were significantly associated with greater likelihood of past-30-day e-cigarette use. Except addiction concern, higher negative expectancies were significantly associated with lower likelihood of past-30-day e-cigarette use. Among e-cigarette never-users, positive expectancy variables were significantly associated with higher intentions to use e-cigarettes in the future, adjusting for current smoker status and demographic variables. **Conclusions:** E-cigarette use expectancies determined in this study appear to predict e-cigarette use and use susceptibility among young adults and thus have important implications for future research.

FUNDING: No Funding

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POS4-89 **ELECTRONIC CIGARETTES THAT PRODUCE NICOTINE AEROSOLS SUBSTANTIALLY DEVOID OF KNOWN TOXIC IMPURITIES**

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BACKGROUND: Electronic cigarettes are an increasingly popular alternative to traditional cigarette smoking. An appeal of electronic cigarettes is their presumptive superior safety to tobacco-burning cigarettes. Additional data, however, is needed on the aerosol particle size and purity produced by electronic cigarettes, and the safety of any potential impurities. NJOY King is a widely available brand of electronic cigarette that vaporizes a liquid consisting of glycerol, propylene glycol, nicotine, and flavor components. **METHODS:** Four varieties of NJOY King electronic cigarettes were obtained for analysis: traditional and menthol flavors, each in nominal nicotine strengths of 3% and 4.5%. The liquid for vaporization was analyzed for potential contamination with tobacco-specific nitrosamines (TSNAs), diethylene glycol, pesticides, and microbes. The cigarettes were smoked by machine and the emitted aerosol collected and analyzed for nicotine content, particle size, and known harmful and potentially harmful constituents (HPHC) of tobacco smoke as defined in Section 904(a)(3) of the United States Food, Drug, and Cosmetic Act. The safety of inhaling any potential trace impurities (found here or previously reported in literature) was assessed by comparison of inhaled dose to OSHA permissible exposure limits for airborne compounds. **RESULTS:** The electronic cigarette liquid lacked detectable TSNAs, diethylene glycol, pesticides or microbial contamination. Simulated smoking yielded an aerosol with a mass median aerodynamic diameter of 0.8 micrometers (geometric standard deviation of 1.5). No detectable carbon monoxide, TSNAs, or polyaromatic hydrocarbons above environmental background were detected in the collected aerosol. Trace impurities (metals, carbonyl compounds) were indistinguishable from ambient air contamination and/or at least 10-fold below OSHA limits when calculating daily inhalation exposures. **CONCLUSIONS:** The tested varieties of electronic cigarettes produce a respirable nicotine aerosol without the major harmful and potentially harmful impurities characteristic of traditional cigarette smoke.

FUNDING: The experimental work was funded by NJOY Corporation. S.J.L. did not receive any funding from NJOY.

JUSTIFICATION: The present study shows that NJOY Kings electronic cigarettes deliver nicotine without significant toxic byproducts.

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POS4-90 **IMPACT OF THE SINGLE TEXT-ONLY HEALTH WARNING ON SMOKERS' PERCEPTIONS AND BEHAVIOR IN ZAMBIA: FINDINGS FROM THE ITC ZAMBIA SURVEY**

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Background: There are few studies on the impact of health warnings in Africa. Zambia ratified the WHO Framework Convention on Tobacco Control (FCTC) in 2008 and introduced a single text-only health warning that is less than 30% on the bottom front and back of cigarette packs in 2010. This study evaluates the impact of this text-only warning on Zambian smokers' perceptions and behaviour. **Methods:** Wave 1 of the International Tobacco Control (ITC) Zambia Survey (2012) included validated indicators of health warning impact used in ITC Surveys in 21 other countries: noticing warnings, reading warnings closely, thinking about health risks, motivation to quit, avoiding warnings, and reports of forgoing a cigarette. The ITC Zambia Survey was conducted by face-to-face interviews of a representative national sample of 1483 tobacco users (smokers and smokeless users) and 595 non-users aged 15+ years. **Results:** 70% of Zambian smokers reported knowing that cigarette packs have a health warning. 21% of smokers could not read the English health warning on the packs. Among smokers who were aware of the health warning: 44% noticed the warning “often” or “whenever I smoke”; 26% read or looked closely at the warning “often” or “regularly”; 38% stated that the warning

made them "a lot" more likely to think about the health risks of smoking; 38% reported that the warning made them "a lot" more likely to quit smoking; 33% stated that the warning made them forgo smoking cigarettes at least a couple of times in the last month; and 19% reported making an effort to avoid the warning in the last month. The majority of smokers (62%) and non-users (79%) wanted more health information on cigarette packs. Conclusions: Because there have been no campaigns in Zambia to inform the public about the harms of cigarettes, it is not surprising that the Zambian warning elicited relatively high salience and impact, compared to other ITC countries. However, ITC findings from other countries suggest that introducing pictorial images would increase the current impact of the health warning in Zambia, as well as increasing motivations to quit among smokers and reducing relapse among quitters.

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POS4-91 IMPACT OF ASSESSMENT MODALITY ON RECRUITMENT AND RETENTION IN ONLINE SMOKING CESSATION STUDIES

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Background: Few studies have addressed the optimal approach to recruit and retain smokers in online cessation interventions. Fully automated web-based can yield large numbers of participants quite rapidly, but have suffered from high rates of attrition. In contrast, interviewer-administered assessments have yielded higher follow-up rates but lower overall recruitment volume. This study compared the impact of WEB and phone (PH) assessments on recruitment and retention rates and cost efficiency in the context of a Facebook cessation study. **Methods:** Online ads for a Facebook cessation study were run on Google and Facebook for 27 days and linked to a study invitation page with eligibility screening for two study arms. In the WEB arm, participants completed the baseline survey online; PH participants completed the baseline survey by phone with a research assistant within 24 hours of screening. Participants in both arms were randomized to receive a follow-up survey via e-mail, Facebook message, or phone at 30 days. Participants were paid \$15 for follow-up survey completion. **Results:** A total of \$6,074 was spent on ads, generating 3,834,284 impressions and resulting in 8,683 clicks (avg cost \$0.70 per click). 4,442 people clicked on the WEB ad and 4,001 clicked on the PH ad: 12% (n=535) of WEB participants and 8% (n = 332) of PH participants accepted the online study invitation (p<0.001). Among the 727 participants who completed online eligibility screening, an equal proportion (55%) in each arm (n=293 WEB, n=182 PH) were eligible. 68% of WEB participants completed the baseline survey compared to 33% of PH participants (p <0.001). Enrollment costs were \$27 WEB and \$87 PH. There were no between group differences in the proportion that installed the Facebook app (58% WEB vs. 49% PH) or that completed the 30-day follow-up survey (43% WEB vs. 46% PH). **Conclusions:** A more intensive phone assessment protocol yielded a lower rate of recruitment, equivalent follow-up rates, and higher enrollment costs compared to a web-based assessment protocol. Future research should focus on honing web-based assessment protocols to further optimize recruitment and retention.

FUNDING: This study was funded by Legacy.

JUSTIFICATION: This study will inform future efforts to recruit and retain participants in online smoking cessation intervention studies.

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POS4-92 PUBLIC OPINION ON REGULATION OF ELECTRONIC CIGARETTES IN RESTAURANTS IN THREE MAJOR METROPOLITAN AREAS

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Background. Awareness, sales, and ever-use of electronic cigarettes (e-cigarettes) have exploded since becoming available in U.S. markets in 2007. There have been efforts in some states, and nationally, to regulate smoking of e-cigarettes in public places, including restaurants. However, very little is known about public support for such measures. **Methods.** In 2013 we conducted a mailed survey of 3058 young adults, aged 18-35, in three major metropolitan areas in the South, Midwest and West. A dual-frame sample, consisting of an address-based sample and a list sample, was used. The survey included questions about awareness, attitudes, and use of conventional and new tobacco products, including e-cigarettes. **Results.** Awareness of e-cigarettes was almost universal, with 97% of participants reporting that they had heard of e-cigarettes prior to taking our survey. 43% favored policy banning e-cigarette use throughout a restaurant, 29% thought use should be restricted to smoking areas, and 27% thought there should be no restrictions. This distribution represents a dramatic departure from opinion on smoking in restaurants, with 81% favoring policy banning cigarette smoking throughout a restaurant, 18% favoring restriction to smoking areas, and 0.7% favoring no restrictions. In multivariable models, statistically significant (p<.05) correlates of support for policies banning use of e-cigarettes in any part of a restaurant included age (OR=1.02), being married (OR=1.25), having a college education (1.30), current cigarette smoking (OR=0.33), current e-cigarette use (OR=0.30), lifetime smokeless tobacco use (OR=0.69), and a belief that e-cigarettes are appealing to others your age (OR=0.37). **Conclusions.** Opinion concerning regulation of e-cigarette use in restaurants was divided, especially compared to widespread support for bans on smoking conventional cigarettes in restaurants. Promotion of such regulation presents challenges to tobacco control advocates, since key arguments that have been used to promote cigarette bans, such as the negative health effects of second-hand smoke, are likely to be much less compelling when applied to e-cigarettes.

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JUSTIFICATION: This study has the potential to inform efforts among policymakers and advocates to formulate state and federal public policy.

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POS4-93 THE EFFECTS OF A SMOKING CESSATION EDUCATIONAL PROGRAM ON PERINATAL NURSES' RELAPSE PREVENTION COUNSELING BEHAVIOR WITH POSTPARTUM WOMEN.

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Background: There have been significant gains in smoking cessation among pregnant women, but the rate of postpartum relapse remains high. Smoking is harmful to both the mother and child's health and women need to be educated about the risk of relapse and effective strategies to remain smoke free. The high rate of early postpartum relapse suggests that interventions must take place soon after delivery. Perinatal nurses are in the ideal position to begin the introduction of relapse prevention strategies, but many do not feel confident in providing these interventions. Despite evidence that nurses can be effective in providing tobacco counseling, few nurses actually follow through with recommended guidelines and assist and arrange follow up care. **Methods:** A multi-site, interventional study was conducted using a pre-test/post-test design. A total of 162 perinatal nurses from four hospitals participated in a smoking cessation and relapse prevention

counseling education program. Participants completed pre, post and one month follow up tests assessing perceived knowledge, attitude, self-efficacy, and behavior toward smoking cessation and relapse prevention counseling in the postpartum period. Descriptive statistics were used to characterize respondents; one way repeated ANOVAs were used to evaluate differences in scores on attitude, self-efficacy, knowledge and behavior. Results: There was a significant increase in scores on knowledge, self-efficacy and behavior from pretest to follow up test. Although quitline referral scores increased from pre to follow-up test, the scores were very low. There were no significant differences in scores related to participant age, years of experience or level of education. OB nurses had significantly higher scores than neonatal nurses on all constructs. Conclusions: Results indicate that a brief educational program is effective in increasing perinatal nurses' tobacco counseling knowledge, self-efficacy and behavior. Specific tobacco counseling educational programs for neonatal nurses need to be developed. Interventions are needed to increase nurses' quitline referrals for postpartum women at risk of smoking relapse.

FUNDING: Support for this research was provided by the Nurse Practitioner Healthcare Foundation through the Astellas Promoting Heart Health Across the Age Span Award; and by a faculty research grant from the University of Scranton.

JUSTIFICATION: Providing perinatal nurses with education about effective tobacco counseling interventions has the potential to decrease the rate of postpartum smoking relapse.

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POS4-94

GOOD INTENTIONS GO UP IN SMOKE: INPATIENT NICOTINE REPLACEMENT THERAPY IS RARELY CONTINUED IN OUTPATIENTS

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Introduction: Seventy percent of smokers want to quit smoking, but only 2-3% are successful each year. Counseling and medication(s) can double the likelihood of successful smoking cessation. In November 2012, Olive View-UCLA Medical Center (OVMC) instituted a tobacco-free campus policy, representing an opportunity to assist inpatient smokers in quitting. **Methods:** The study population included all OVMC inpatients from 11/15-1/31/13. We determined the number of inpatients who affirmatively responded to a universal nursing admission questionnaire about tobacco use. A pharmacy database query revealed inpatients on NRT while hospitalized and outpatient prescriptions of NRT filled. We matched outpatient NRT prescriptions to inpatients. House staff completed a survey regarding barriers to prescribing NRT. **Results:** Twenty-two percent (323) of inpatients during 1,485 admissions were current tobacco users. Forty-one percent of smokers (133) were prescribed NRT. In contrast, outpatient NRT was dispensed to only 1 inpatient during the dates of inquiry. There was a highly-statistically significant difference in hospitalized tobacco users receiving inpatient NRT compared with outpatient NRT upon discharge ($p < 0.0001$). House staff surveys revealed 42.1% address smoking cessation "rarely" to "some of the time," 57.9% address it "most of the time" to "always." Most (71%) indicated "do not remember" as the primary reason for not addressing smoking cessation; 47.1% reported they lack time; 14.7% stated they do not know how to effectively have a smoking cessation conversation with patients. **Conclusion:** Our results show a minority of hospitalized smokers are prescribed NRT, and essentially none fill an outpatient NRT prescription at our hospital. Explanations include: 1) patients may not desire to quit smoking but receive NRT as an inpatient because of the tobacco-free policy, and 2) NRT prescriptions were filled at outside pharmacies. However, surveys indicated that insufficient patient education and counseling on smoking cessation, inadequate provider reminders, and low provider self-perceived efficacy in smoking cessation counseling contribute to these low proportions.

FUNDING: No Funding

JUSTIFICATION: The next steps will focus on improving these barriers to NRT prescribing through a comprehensive smoking cessation program to improve NRT prescribing in our patient population.

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POS4-95

A LONGITUDINAL ANALYSIS OF E-CIGARETTE USE AND SMOKING CESSATION

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Background: E-cigarette use has been rapidly increasing in recent years, particularly among cigarette smokers. E-cigarettes are promoted and perceived by many as smoking cessation devices. Studies on convenience samples of e-cigarette users report efficacy for smoking cessation, but large population level studies do not show increased cessation rates. We performed a longitudinal prospective national study of smokers to examine if e-cigarette use predicted smoking cessation or changes in cigarette consumption. **Methods:** Participants were recruited from a national US online panel and were assessed at baseline in 2011 and at one-year follow-up in 2012. Current smokers at baseline ($n=949$) reported past 30-day e-cigarette use at baseline, smoking cessation at one-year follow-up, and cigarette consumption at both baseline and follow-up. **Results:** At baseline, 88 (9.4%) of current smokers reported current (past 30-day) use of e-cigarettes. At one-year follow-up, 10.2% of current e-cigarette users at baseline reported quitting smoking, compared to 13.8% of those who had not used e-cigarettes ($\chi^2 = .88$, $df=1$, $p=0.35$). In a logistic regression including baseline intention to quit, cigarettes per day and time to first cigarette, baseline e-cigarette use did not significantly predict smoking cessation at one-year follow-up ($aOR=0.76$ [$CI=0.36, 1.60$], $p=0.46$). In a linear regression of continuing smokers at follow-up, baseline e-cigarette use did not predict changes in cigarette consumption. **Conclusions:** These findings indicate that e-cigarettes, as used naturally in a general population of smokers, may not have a positive total effect on smoking cessation.

FUNDING: Funding sources: R01-CA141661 and TRDRP 21FT-0040

JUSTIFICATION: These findings may be used to understand the potential impact of electronic cigarette use on smoking cessation among adult smokers in the US.

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POS4-96

SECONDHAND SMOKE EXPOSURE AND SERUM COTININE LEVELS AMONG CURRENT SMOKERS IN THE UNITED STATES

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Background: Secondhand smoke (SHS) exposure among current smokers may be a source of additional exposure to toxins and may encourage continued smoking or impede cessation efforts. Our objective was to determine whether SHS exposure among smokers results in detectable differences in serum cotinine levels. **Methods:** Using the National Health and Nutrition Examination Survey (NHANES) for the years 1999-2012, we compared the serum cotinine levels of 2776 US adult smokers who had smoked in the previous 5 days stratified by self-reported SHS exposure sources (at home and/or work) and accounting for smoking intensity. A weighted multivariate linear regression model was used to determine the association between SHS exposure and cotinine levels among smokers. **Results:** The geometric mean cotinine level for smokers not exposed to SHS at work was 79.4 ng/mL compared to 107.7, 193.3 and 196.8 ng/mL for those exposed to SHS at work only, home only, and both home and work, respectively ($p < 0.05$). For the same respective groups, the geometric mean cotinine levels of those who smoke 1-9 cigarettes per day (light smokers) were 39.3, 56.2, 84.8, 88.4 ng/mL compared to 215.1, 210.9, 247.9, 235.9 ng/mL among those who smoked ≥ 10 cigarettes per day (moderate/heavy smokers). After controlling for the average number of cigarettes smoked per day and days smoked in the previous 5 days, survey year, age, gender, and education, smokers exposed to SHS at work only ($n=434$), home only ($n=694$), and both home and work ($n=363$) all had higher cotinine levels ($\beta=0.10$, $p=0.171$; $\beta=0.22$, $p<0.001$; and $\beta=0.27$, $p<0.001$, respectively) than those not exposed to SHS at home or work ($n=1285$). **Conclusions:** Smokers

living or working in locales where others smoke have measurable and significantly higher cotinine levels than smokers reporting no SHS exposure. The effect of SHS on cotinine levels was especially pronounced where exposure occurred at home and among light smokers. As the home and work environment can be a significant source of SHS exposure, even among smokers, future research is needed on the role SHS may have in nicotine dependence, cessation outcomes and other health impacts among smokers.

FUNDING: supported by grant R25 CA 113710 from the National Cancer Institute, National Institutes of Health.

JUSTIFICATION: In our study secondhand smoke exposure resulted in elevated cotinine levels among smokers which may undermine public health efforts by encouraging continued smoking or impeding cessation efforts and may also impact clinical research utilizing cotinine levels, or dosing consideration for nicotine replacement therapy in clinical practice.

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POS4-97 **QUITTING BEHAVIORS AND SMOKING RELAPSE AMONG AMERICAN INDIAN TRIBAL COLLEGE STUDENTS**

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INTRODUCTION: American Indians (AI) use recreational tobacco more than all other racial/ethnic groups and find it more difficult to quit smoking. Yet they are under-represented in tobacco research. Little is known about the quitting behaviors of AI college students. The aims of this study were to determine factors associated with quitting behaviors among AI Tribal college students. **METHODS:** Using baseline data from a longitudinal study of tobacco use among AI college students, we identified socio-demographic and smoking related factors associated with quit attempts in the past 12 months and intention to quit in the next 6 months using multivariate logistic models and generated relapse curves based on time to first cigarettes after waking using the Kaplan-Meier method. **RESULTS:** Of 792 participants, 44% self-identified as smokers; mean age 27 years (SD=7.8) and 47% males. Majority (>93%) smoked ≤ 10 CPD and 59% started smoking regularly ≤ 18 years old. Over 1 in 5 smoked their first cigarette within 30 minutes of waking. Fifty-four percent (n=136) were interested in quitting in the next 6 months. On a scale of 1-10, 56% ranked >6 on motivation and 75% on confidence to quit and remain quit. Younger students- aged <24 years (AOR 0.53 95% CI 0.29-0.98), those interested in quitting (AOR 0.39 95% CI 0.20-0.75) and those with higher confidence to quit and remain quit (AOR 0.19 95% CI 0.08-0.42) were less likely to have made a quit attempt in the past 12 months, while those with higher motivation score >6 were more likely to do so. While those who were highly motivated to quit were more likely to be interested in quitting in the next 6 months, those who have made a quit attempt in the past 12 months were less likely to be interested. Those who smoked within 30 minutes of waking were more likely to relapse compared to those who did not ($p<0.001$). **CONCLUSION:** smoking is highly prevalent among AI college students. There is an inverse relationship between Interest in quitting within the next 6 months and quit attempts in the past 12 months. Also, the relapse curve suggests smoking within 30 minutes of waking might be a strong marker of nicotine dependence in this population

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POS4-98 **RACE / ETHNICITY AND TIME TO FIRST CIGARETTE OF THE DAY**

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Background: The risks associated with cigarette smoking are not evenly distributed among all racial groups. For example, despite similar smoking prevalence rates and smoking fewer cigarettes per day, black smokers are more likely to have difficulty quitting and to develop lung cancer than white smokers. Time to first cigarette of the day (TTFC) is an important indicator of nicotine uptake and risk exposure independent of the number of cigarettes per day. The present study examines difference in TTFC among a diverse population of young adult smokers. **Method:** Data from the present study come from 1,948 young adult smokers from Wave III of the National Longitudinal Study of Adolescent Health (ADD Health) between the ages of 21 and 28 (M=22) who reported ever having been a regular smoker. Group comparison statistics and logistic regression models examined TTFC and related smoking behaviors between Hispanic, white, black, Native American and Asian smokers. **Results:** More than 30% of black participants smoked within 5 minutes of waking, despite being significantly more likely to be an infrequent smoker (smoking between 1-14 days in the last 30), and being significantly more likely to be a light smoker (smoking between 1 and 10 cigarettes per day). Being below the 50th percentile in personal income was a significant predictor of smoking within 5 minutes of waking for white and black smokers. Traditional indicators of smoking intensity such as number of days smoked or number of cigarettes per day did not predict smoking within 5 minutes of waking among black smokers. **Conclusion:** TTFC may be a strong indicator of increase nicotine and carcinogen exposure in black smokers, and may reflect a potential mechanism for the increased lung cancer rates and failed cessation attempts among black smokers. TTFC may be an important screening item, independent of cigarettes per day, for clinicians and interventions to identify those at highest risk for cessation failure and disease risk.

FUNDING: No Funding

JUSTIFICATION: Understanding differences in the time to first cigarette of the day between races may help guide research in the disparities in lung cancer risk and cessation failure and may help inform future interventions.

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POS4-99 **THE INFLUENCE OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) ON ELECTROPHYSIOLOGICAL CORRELATES OF ATTENTION**

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Background: Despite an increase in the prevalence of electronic nicotine delivery systems (ENDS), or "e-cigarettes", the neurocognitive effects of this product and its potential for abuse remains unclear. The use of traditional cigarettes is associated with an acute increase in attentional processing which can be detected using event-related potentials (ERPs), a sensitive measure of transient brain activity. Further, this attentional "boost" may be linked to abuse liability. However, it remains unclear whether this attentional enhancement stems from nicotine administration alone, or is related to other aspects of cigarette smoking. In the present study, this question was investigated by comparing ERP indices of attentional amplification following exposure to either traditional cigarettes or ENDS, with or without nicotine. **Methods:** During four separate laboratory visits, cigarette smokers used ENDS, ENDS placebo, their own brand cigarette, or "sham" smoked their own brand cigarette in a Latin-square order. During smoking sessions, ERPs elicited by stimuli presented in the context of a two-stimulus oddball task were recorded. ERPs were recorded immediately before and after smoking, as were subjective measures (relief of craving/withdrawal). **Results:** Whereas the P3 component did not differ across the four conditions, another ERP component associated with attentional amplification, the lateral-occipital N2, was shown to vary across the four conditions. Both sessions involving nicotine administration (ENDS and own brand) resulted in a nominal boost to the N2 component. However, only the effect of the own brand session survived the statistical correction for multiple comparisons. **Conclusions:** The present results support the notion that properties of cigarettes, other than their capacity to deliver nicotine, contribute to their observed neurocognitive effects.

Similarly, differences in the experience associated with ENDS use, compared to traditional cigarettes, may limit their ability to alter neurocognitive functioning. These findings have implications for the abuse liability of ENDS products and their predicted utility as a smoking cessation tool.

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POS4-100 SOCIAL ATTITUDES TOWARD SMOKING SCALE

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Younger adults, especially college students tend to be social smokers and social influences have an impact on attitudes towards smoking and willingness to initiate and model smoking behavior. Social attitudes towards smoking are not well understood among college students and are traditionally measured from a policy, marketing, interpersonal and health standpoint. In addition, most research has focused on attitudes of smokers only, which precludes nonsmokers and those at risk for initiating smoking. The purpose of this study was to develop and validate a scale to assess social attitudes toward smoking among college students. Participants (n = 490) were 18-25 years of age, attended a large Southern California University, and 30.2% were White, 27.6% Latino, 28.4% Asian/Pacific Islander. An "Attitudes toward Smoking Scale" was developed based on existing psychosocial measures. The six-point likert-type scale (strongly agree to strongly disagree) included 24-items such as "Smoking goes along with drinking", "Smoking promotes socializing", and "Smoking is a social activity". Using principal component factor analysis, 11 of the 24 items loaded on a social dimension of smoking factor, with a significant correlation from time one to time two ($r = 0.76$, $p < .01$); Therefore, the scale exhibited stability over a two-week time period. In addition, the scale demonstrated good internal consistency (Cronbach's $\alpha = .82$). Almost half of the participants (46.5%) had never tried smoking, 37.1% had tried but were not current smokers, and 16.3% were classified as current smokers. Despite smoking classification, social attitudes were rated favorably ($M = 2.54$, $SD = .84$) among all participants. Current smokers had significantly higher positive attitudes toward smoking, compared to tried non smokers and never smokers, $F(2,483) = 43.08$, $p = < .001$, providing evidence of the scale's construct validity. The present study provides evidence of the reliability and validity of a brief measure of social attitudes toward smoking among college students. Understanding social attitudes toward smoking among young adults may guide interventions to prevent and reduce smoking behavior.

FUNDING: "No Funding"

JUSTIFICATION: This study elucidates the need to examine social attitudes among smoking and non-smoking younger adults in order to inform prevention and cessation efforts.

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POS4-101 RANDOMIZED TRIAL OF TELEPHONE-DELIVERED ACCEPTANCE AND COMMITMENT THERAPY FOR SMOKING CESSATION: TRIAL DESIGN FEASIBILITY, SATISFACTION, AND PRELIMINARY OUTCOMES

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Introduction: Quitlines serve 500,000 US smokers each year. But their low quit rates stifle their impact. A new counseling approach is needed to boost quit rates and, in turn, population-level impact. Accordingly, the current study tested a new counseling approach called Acceptance & Commitment Therapy (ACT) in a study of trial design feasibility, satisfaction, and outcomes. The key innovation is a new conceptual model for smoking cessation counseling, tested in the widely disseminable context of a tobacco quitline. Methods: We recruited 121 uninsured South Carolina State Quitline callers who were adult smokers (at

least 5 cigarettes/day) wanting to quit within the next 30 days. Participants were randomized to five sessions of telephone counseling consisting of either standard cognitive behavioral therapy (CBT) or ACT. All participants were offered two weeks of Nicotine Replacement Therapy (NRT). Results: The follow-up data retention rate at 3 and 6 months was 66% and 67%, respectively (vs. 50% in typical quitline studies). Data retention did not differ by group ($p > .05$). ACT participants accepted more calls than CBT participants (Mean = 3.25 in ACT vs. 2.23 in CBT; $p = .001$). Regarding treatment satisfaction, 100% of ACT participants reported their assigned treatment was useful for quitting smoking (vs. 87% for CBT; $p = .03$) and 97% of ACT participants would recommend their assigned treatment to a friend (vs. 83% for CBT; $p = .06$). The primary outcome was 30-day point prevalence abstinence at 6 months post randomization using the standard missing=smoking imputation. The overall quit rates were 31% in ACT vs. 22% in CBT (OR=1.5, 95% CI=0.7-3.4). Among participants depressed at baseline, the quit rates were 33% in ACT vs. 13% in CBT (OR=1.2, 95% CI=1.0-1.6). Consistent with ACT's theoretical model, among participants scoring low on acceptance of cravings at baseline, the quit rates were 37% in ACT vs. 10% in CBT (OR=5.3, 95% CI=1.3-22.0). Conclusion: ACT is feasible to deliver by phone, acceptable to quitline callers, and shows highly promising quit rates compared to standard CBT quitline counseling. ACT shows exciting potential as a new intervention approach.

FUNDING: This study was funded by a grant from the National Institute on Drug Abuse (#R21DA030646).

JUSTIFICATION: ACT is an innovative behavioral treatment for smoking cessation that, based on the effect size estimate from this study, could help 45,000 more quitline callers stop smoking each year.

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POS4-102 IDENTIFYING THEMES FOR EFFECTIVE SMOKING CESSATION MESSAGING TO VIETNAMESE AND KOREAN IMMIGRANT PATIENTS

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Background: Smoking prevalence among Vietnamese and Korean American males remains disproportionately higher than the U.S. general population. While physician advice can be effective, Asian-American smokers are less likely to receive advice to quit from their providers. This study aimed to develop an understanding of both patient and provider views to enhance the effectiveness of physician advice. Methods: Three focus groups with patients and providers at a community health center serving predominantly Asian immigrants were conducted in language, recorded, transcribed, translated into English, and analyzed using qualitative analysis software. Two patient focus groups (Vietnamese, n=11; and Korean, n=6) included both current and former smokers ranging in age from 30-80. The provider focus group consisted of 8 bilingual health center staff members (3 medical providers and 5 medical assistants). Results: Both patients and providers perceived effectiveness of physician advice was low. Patients stressed the importance of one's willingness and motivation over provider advice. Providers acknowledged that most successful quit attempts were not due to physician advice but were related to patient's own prominent illness. Both patients and providers believed smoking behavior to be influenced by various cultural factors, such as collectivist Asian values that place family above individual interests. As such, patients showed greater willingness to quit for the health of their family rather than their own. Furthermore, providers recognized smoking as a way for patients to cope with acculturative stress and feel a "sense of home" in America. Conclusion: These findings underscore the importance of socio-cultural context in regards to smoking cessation among Asian immigrant patients. Increasing effectiveness of physician advice may require culturally-appropriate messaging that emphasizes both family and personal health, and addresses patients' motivations to smoke, specifically in the context of their immigration experience. These themes informed the development of a clinic-based "Mobile Doctor" interactive video program targeting Vietnamese and Korean immigrant patients.

FUNDING: Tobacco-Related Disease Research Program

JUSTIFICATION: To inform clinical smoking cessation interventions for Asian immigrant populations.

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POS4-103 NICOTINE N-GLUCURONIDATION IN FIVE ETHNIC GROUPS

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Background: UGT2B10 catalyzed glucuronidation may contribute significantly to nicotine metabolism in individuals deficient in C-oxidation. The product of C-oxidation, cotinine is oxidized to trans 3 hydroxycotinine (3HCOT) and N-glucuronidated by UGT2B10. On average, the extent of nicotine and cotinine glucuronidation is lower in African Americans (AA) than European Americans (EA). The UGT2B10 variant (rs61750900, D67Y) contributes to decreased glucuronidation in both AA and EA. This variant does not explain the majority of the lower glucuronidation in AA. Here we compare nicotine and cotinine glucuronidation in smokers from 5 ethnic groups and determined the effect of a UGT2B10 splice variant (rs116294140), which is common in AA. **Methods:** Nicotine and metabolites were quantified in overnight or first morning urine samples from AA (n=356), Native Hawaiians (NH (n=330)), EA (n=444), Latinos (LA) (n=459) and Japanese Americans (JA) (n=711) smokers. Smoking dose was quantified by urinary nicotine equivalents (NE)=total cotinine + total nicotine + total 3HCOT. All individuals were genotyped for the UGT2B10 variants, rs61750900 and rs116294140. Glucuronidation ratios were calculated as the total metabolite minus the free metabolite divided by the free metabolite. To examine differences in glucuronidation across racial/ethnic groups, least-square means were computed and adjusted for age, sex, creatinine, BMI, and NE. **Results:** Nicotine glucuronidation ratio differed by ethnicity (p <0.002), ranging from 0.25 in AA to 0.48 in LA. The ratio in AA homozygous for rs116294140 was 0.05 (n=40), significantly lower (p<0.001) than in heterozygous (0.23, n=156) and homozygous wild type (0.32, n=151) individuals. LA and JA carriers of this variant also had reduced levels of glucuronidation. In HA and EA, nicotine glucuronidation was lower in carriers of rs 61750900. Cotinine-glucuronidation was similarly related to genotype. **Conclusion:** Nicotine glucuronidation varies by ethnicity, much of this variation is explained by the frequency of UGT2B10 genotypes in these groups. To access nicotine metabolism in smokers all nicotine metabolic pathways should be considered.

FUNDING: Funded by NIH grant P01CA138338

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POS4-104 THE IMPORTANCE OF SOCIAL CONTINGENCIES IN SMOKING CESSATION AMONG COLLEGE STUDENTS PARTICIPATING IN A QUIT AND WIN CONTEST: A QUALITATIVE INQUIRY

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Background: Quit and Win Contests are often used as a persuasive public service campaign to promote smoking cessation in a community forum. Little is known about the social contingencies of quitting among college students participating in a Quit and Win contest. We report qualitative findings investigating the social influences, social support and social contingencies of quitting among college students participating in a "Quit and Win" contest. **Methods:** We conducted six focus groups with college students from two Minneapolis Universities who were participants in our 2012 Quit and Win contest. A moderator led the discussion groups, following a semi-structured moderator's guide. Focus groups were audiotaped, transcribed, coded and analyzed for themes across topics. **Results:** Participants included 27 young adult (age 26.3±7.7) college students who were primarily female (63%) and Caucasian (85%). 52% were quit at the time of the focus group. Those who were current smokers smoked 11.7±8.4 CPD on 28.5±3.9 days/month; 19% were nicotine dependent; and 2.9 (1.4) of their five closest friends smoked. Themes emerging from focus group discussions: 1) Most joined

the contest for chance for win financial incentives but others saw it as an important "push to quit"; 2) By and large, participants did not disclose their joining the contest to others; 3) The desire to please family members/partner was an important reason to quit; 4) Non-smoking family/friends were perceived as more supportive than smokers in their quit attempt; smokers in their network were thought to undermine their efforts; 5) Smokers are ambivalent about the type of support they need in a quit attempt and inconsistent in their expectations for others; 6) Intra-treatment counseling was not viewed as a source of support. **Conclusion:** Because of the reluctance of young adult smokers to disclose their desire to quit, contests do not appear to foster a sense of community support on a college campus. Given that social support is important in long-term health behavior change, future studies should address how campus campaigns can be utilized to address the individual and changing support needs of participants.

FUNDING: The funding for this project was supported by a diversity supplement for Winta Ghidei from the parent grant 5R01-HL094183-04S1 by the National Institute of Health/Es National Heart, Lung, and Blood Institute and Boynton Student Health Services, University of Minnesota.

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POS4-105 SMOKING THROUGH A TOPOGRAPHY DEVICE INFLUENCES SOME ASPECTS OF SMOKING BEHAVIOR AND REWARD

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Background: Smoking topography is an important methodological tool for studying smoking behavior. It allows researchers to accurately measure or control how a cigarette is smoked on indices such as the number of puffs, puff duration, and puff volume. Only a few published studies have directly compared reactions to smoking through a topography device to naturalistic smoking (e.g., Lee et al., 2003; Blank, Disharoon, & Eissenberg, 2009). **Methods:** Using a within subjects design, 58 three-hour abstinent smokers (38% female, mean of 12 cigarettes per day) smoked their preferred brand of cigarettes one time through a portable topography device and one time naturalistically in counterbalanced order across two laboratory sessions. Smoking behavior (e.g., number of puffs, smoking duration) and subjective ratings of smoking motivation and reward (urge, mood, withdrawal, smoking satisfaction, etc.) were assessed. **Results:** No differences were found between smoking topography and naturalistic smoking on self-reported changes in smoking urge, positive or negative affect, or nicotine withdrawal symptoms. Participants took more puffs when smoking through the topography device but there were no differences in smoking duration or carbon monoxide boost. Scores on smoking satisfaction, enjoyment of respiratory tract sensations, psychological reward, and craving reduction were all significantly greater during naturalistic smoking compared to topography. **Conclusions:** Smoking through a topography device relative to naturalistic smoking did not significantly influence outcomes on important measures commonly used in smoking research including smoking urge, affect and nicotine withdrawal. However, some of the rewarding characteristics of smoking were diminished when smoking through a topography device. Future research is needed to confirm these findings. Implications are discussed. **Keywords:** topography, smoking reward, craving, methodology

FUNDING: This research was funded by American University.

JUSTIFICATION: Smoking topography has recently been used to predict abstinence in patients using Nicotine Replacement Therapy. A better understand of how smoking through a topography device impacts smoking sanctification may improve the predictive validity of this methodology.

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POS4-106

PLAIN PACKAGING OF CIGARETTES AND SMOKING BEHAVIOUR: A RANDOMISED CONTROLLED TRIAL (ISRCTN 52982308)

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INTRODUCTION: Plain packaging would require all cigarettes to be sold in packs with a standard pack shape, colour and method of opening, leaving only the brand name in a standard font and location. We conducted the first randomised controlled trial of smoking behaviour and attitudes when using plain as compared to branded packs. **METHODS:** Adult regular smokers were randomised to receive their regular brand of cigarette in a plain Australian pack or a branded United Kingdom pack, and used these over a 24-hour period. The primary outcomes were number of cigarettes smoked, and volume of smoke inhaled per cigarette, measured using a portable smoking topography monitor. Secondary outcomes were taken after the 24-hour period and comprised self-reported ratings of motivation to quit smoking, cigarette taste, experience of smoking from the cigarette pack, experience of smoking the cigarette, attributes of the cigarette pack, perceptions of the on-pack health warning, changes in smoking behaviour, and views on plain packs. Analyses were conducted using linear regression, adjusted for age, sex, heaviness of smoking at baseline and, where appropriate, self-reported ratings at baseline. This trial is registered with ISRCTN (52982308). **RESULTS:** 128 smokers were randomised, 64 to plain packs and 64 to branded packs. Smokers randomised to the plain pack condition smoked on average fewer cigarettes than those randomised to the branded pack condition and inhaled more smoke per cigarette, but in both cases the confidence intervals were wide and included the null. Our secondary outcomes indicated that smokers randomised to the plain condition rated the experience of smoking from the cigarette pack more negatively, rated the cigarette pack more negatively and rated the health warning as more impactful. **CONCLUSIONS:** Plain packaging may not directly impact on smoking behaviour among regular smokers, although a larger trial would be required to answer this question with certainty. However, using a plain pack for a 24-hour period appears to have clear effects on ratings of the experience of smoking from the pack, the pack itself, and the impact of the health warning.

FUNDING: Economic and Social Research Council, Medical Research Council.

JUSTIFICATION: This is the first randomised controlled trial to investigate the effectiveness of plain tobacco packaging, a tobacco control policy currently being considered by a number of jurisdictions worldwide.

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POS4-107

PLAIN PACKAGING ABOLISHES ELICITATION BUT NOT REINFORCEMENT OF INSTRUMENTAL TOBACCO-SEEKING

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INTRODUCTION: Plain packaged cigarettes appear to show weaker capacity to motivate smoking-related behaviour as compared with branded cigarettes, but the mechanisms underlying this effect are unclear. One possibility is that plain packaging degrades the discriminative stimulus properties of tobacco products, reducing the capacity of these stimuli to elicit instrumental tobacco-seeking. Another possibility is that plain packaging reduces the perceived reinforcement value of tobacco as an outcome, thereby reducing instrumental tobacco-seeking. **METHODS:** These accounts were tested in two experiments undertaken at the University of Bristol, with a convenience sample of adult smokers (Experiment 1, n = 23, Experiment 2, n = 121). In Experiment 1, smokers were trained on a concurrent choice procedure, in which they learned that two responses earned branded cigarettes and chocolate, respectively, before images of plain and

branded packs were tested for capacity to elicit the tobacco choice in extinction. In Experiment 2, smokers completed the same procedure except that concurrent choice was between cigarettes from either plain or branded packs versus chocolate. **RESULTS:** Both experiments found that images of branded packs elicited tobacco choice but images of plain packs did not. By contrast, overall concurrent choice preference in Experiment 2 was not different between plain and branded packs, but this preference measure did correlate with cigarettes smoked per day. **CONCLUSIONS:** The failure of plain packs to elicit tobacco-seeking suggests that plain packaging degrades the discriminative stimulus properties of tobacco products. By contrast, equivalent tobacco preference between plain and branded packs suggests no difference in the reinforcement value of these pack types, despite the preference measure being demonstrably sensitive to dependence level.

FUNDING: Economic and Social Research Council, Medical Research Council.

JUSTIFICATION: Plain tobacco packaging is a tobacco control policy currently being considered by a number of jurisdictions worldwide and this study investigates the mechanisms by which plain packaging might alter smoking behaviour.

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POS4-108

CHANGING TRENDS IN TOBACCO USE AMONG ONTARIO YOUTH

Roberta Ferrence, Ph.D.*, Ontario Tobacco Research Unit, University of Toronto and Centre for Addiction and Mental Health

Background: New data from the 2013 Ontario Student Drug Use and Health Survey (OSDUHS) show significant changes in patterns of tobacco and nicotine use among Ontario students. **Methods:** The OSDUHS is one of the longest ongoing surveys of students in the world, collecting data on Ontario students biannually since 1977. In 2013, 10,272 students in Grades 7-12 completed questionnaires on their substance use and other behaviors (63% response). New questions on waterpipe and electronic cigarette use were added in 2013. **Results:** Among students in grades 7-12, past year use of waterpipe was higher (9.7%) than cigarette use (8.5%) and smokeless tobacco use (5.7%). Rates of lifetime use for waterpipe and smokeless tobacco were only slightly higher than past year use (11.2% vs 9.7% and 6.9% vs 5.7%), suggesting that students are more likely to continue use once tried or to have started recently. Cigarette use in past year, however, was less than half of lifetime use (8.5% vs 20.0%). Similar proportions of users smoked cigarettes daily in the past year (38%) or used waterpipe (36%) or smokeless tobacco (30%) 10 or more times in the past year. Of students in grades 9-12, 14.6% reported lifetime use of electronic cigarettes, comprised of 4.1% with nicotine and 10.5% non-nicotine. **Conclusions:** Students now use a range of traditional and alternative products, alone or in combination, in various indoor and outdoor venues. Waterpipe use is associated with very high levels of toxicants; electronic cigarette use has limited research on hazards, but there is increasing evidence for concerning health effects of nicotine. The use of these unregulated tobacco and tobacco-like products has increased substantially among youth in a very short time, accompanied by aggressive marketing campaigns, misinformation about safety, easy availability, and relaxed indoor air restrictions in many communities. As well as contributing to expansion of use of new products, the lack of regulation and increase in "social exposure" may lead to increased acceptability of all tobacco, nicotine and tobacco-like products, including cigarettes.

FUNDING: The Ontario Tobacco Research Unit receives funding from the Ontario Ministry of Health and Long-term Care.

JUSTIFICATION: Increases in use of unregulated non-traditional tobacco products among youth has important implications for new regulatory policies.

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POS4-109

PERSONALITY AND SELF-DETERMINATION THEORY IN SMOKING BEHAVIOR CHANGE

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Individual differences in personality traits have been examined as predictors of smoking behavior change. However, inconsistent and weak effect sizes have been reported, and less is known about motivational mechanisms of action. Using Self-Determination Theory, this study examined autonomous, controlled, and introjected motivation as mediators of the effect of personality traits on quit attempts and cessation maintenance. Daily smokers (N = 255; 57% male; 65% African American) were recruited from the community and randomly assigned to one of three interventions (brief advice, health education, and motivational interviewing). Participants completed survey measures of demographics, the Eysenck Personality Questionnaire – Revised Brief Version (Extraversion and Neuroticism), and the Treatment Self-Regulation Questionnaire (Autonomous, Introjected, and External Motivation). Quit attempt was assessed using the Timeline Follow-Back Method and cessation was assessed using 7-day point prevalence at month 3 (during intervention sessions) and month 6 (follow-up). At baseline Extraversion was significantly related to Autonomous Motivation ($r = .13$, $p < .05$), while Neuroticism was significantly related to Introjected Motivation ($r = .15$, $p < .05$). At month 6 Extraversion showed a significant direct effect on quit attempts, while Neuroticism did not show any significant direct effects on smoking behavior changes. However, Sobel tests showed that Neuroticism had significant indirect effects via Introjected and External Motivation on quit attempts and cessation maintenance at month 3 and month 6. The results elucidate contradictory findings on the relationship between personality traits and smoking behaviors by considering mediation effects. Although autonomous motivation has been shown to be the most powerful form of motivation for fostering long-term smoking cessation, it may be more effective to enhance introjected and controlled motivation to promote smoking cessation for smokers who have a high level of neuroticism. This study was supported by grant R01 CA133068 from the National Cancer Institute, and Pfizer provided Varenicline.

FUNDING: This study was supported by grant R01 CA133068 from the National Cancer Institute, and Pfizer provided Varenicline.

JUSTIFICATION: Individual differences in personality traits can be considered to tailor smoking intervention.

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POS4-110

PREVALENCE AND DETERMINANTS OF UNAIDED QUIT ATTEMPTS IN THE US: RESULTS FROM THE 2010-2011 TOBACCO USE SUPPLEMENT OF THE CURRENT POPULATION SURVEY

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Background: While several studies have reported the prevalence of unaided attempts to quit smoking, little is known about determinants of such unaided quitting. Our aim was to report the prevalence and examine sociodemographic determinants of unaided quit attempts using nationally representative data in the US. Methods: We used data from the 2010-11 Tobacco Use Supplement of the Current Population Survey. We limited the analysis to current daily smokers who made a quit attempt in the past year and former smokers who were daily smokers one year prior to the survey (n=9080). An unaided quit attempt was defined as attempting to stop smoking without the use of nicotine replacement therapy, Varenicline, Bupropion, telephone quit lines, one-on-one counseling, stop smoking clinics, or web-based programs. Results: About 56% of the sample made an unaided quit attempt. Younger age was associated with a higher probability of making an unaided quit attempt ($p < .001$). Males were more likely than females to make an unaided quit attempt ($p = .006$). African Americans were

more likely than members of other races to make an unaided quit attempt ($p < .001$). Lower education was associated with a higher probability of making an unaided quit attempt ($p < .001$). Occupation was associated with making an unaided quit attempt ($p < .001$) such that professionals had the lowest and the unemployed had the highest probability of making an unaided quit attempt. Lower nicotine dependence (HSI) was associated with a higher probability of making an unaided quit attempt ($p < .001$). Discussion: We found that most quit attempts are unaided. Compared to others, younger people, males, African some racial/ethnic minority groups, unemployed people, those with lower educational attainment, and those who are less nicotine dependent were more likely to make an unaided smoking cessation attempt. Given that smoking cessation aids such as pharmacotherapies and counselling enhance the chances of successful cessation, public health policies and programs should target the population groups that are more prone to make unaided quit attempts and encourage them to use or provide them with subsidized cessations aids.

FUNDING: No funding.

JUSTIFICATION: The findings from this study can inform public health policies and programs related to smoking cessation.

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POS4-111

IMPULSIVITY AND CRAVING

Laura E. Martin*, University of Kansas Medical Center, Vlad Papa, University of Kansas Medical Center

Background: Impulsivity is a multidimensional personality characteristic associated enhanced sensitivity to reward, which can lead to placing greater emphasis on immediate rewards compared to long-term consequences. Behavioral studies demonstrate that cigarette smokers have increased levels of impulsivity compared to non-smokers. Craving for cigarettes can be measured using the Questionnaire of Smoking Urges (QSU-Brief) that separates craving into two factors 1) craving associated with increasing positive affect and 2) craving associated with decreasing negative affect. The current study used behavioral measures of impulsivity as well as functional magnetic resonance imaging (fMRI) to examine the interaction between impulsivity and craving for cigarettes. Methods: Thirty-two smokers who smoked at least 10 cigarettes per day were included in the neuroimaging analysis. Craving was measured immediately before fMRI session using the QSU-Brief. During the fMRI scanning session, participants completed a delay discounting task as well as questionnaires assessing impulsivity such as the Barratt Impulsiveness Scale (BIS-11) and Behavioral Inhibition/Behavioral Activation Scales (BIS/BAS). Results: Craving associated with increasing positive affect showed correlations with measures of impulsivity including the BIS-11 and the reward responsiveness subscale of the BAS. Craving associated with decreasing negative affect was correlated with BIS-11 and BIS. Craving associated with increasing positive affect was correlated with brain activation in the putamen. Discussion: The results showed correlations between craving and behavioral measures of impulsivity as well as brain activations in limbic regions of the brain that have been associated with impulsive decision making. Moreover these results varied based on craving associated with increasing positive affect compared to craving to relieve negative affect. Specifically craving associated with increasing positive affect was correlated with reward responsiveness and increased brain activation during reward based decision-making whereas craving associated with relieving negative affect was associated with behavioral inhibition.

FUNDING: R00 DA025153

JUSTIFICATION: By increasing our understanding of the relationships between impulsivity and craving, the current study can inform treatment applications and may lead to future studies that improve treatment outcomes.

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POS4-112
EFFECTS OF SMOKING CESSATION ON POSTPARTUM DEPRESSION

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Cigarette smoking is a risk factor for postpartum depression; that is, women who smoke during pregnancy report more depressive symptoms, including clinically-significant levels, compared to nonsmokers or those who quit. While correlational studies have confirmed robust associations between smoking and risk for postpartum depression, whether smoking cessation decreases depression risk has not been established. The purpose of the present study was to use data from controlled clinical trials on voucher-based incentives for smoking cessation to examine whether smoking cessation directly decreases depressive symptoms in recently postpartum women. Participants were 289 women who were smokers at the start of prenatal care. Women were randomly assigned to receive vouchers contingent on biochemically-verified smoking abstinence (n=167) or a control condition where vouchers were given independent of smoking status (n=122). Incentives were available from study entry through 12wks postpartum, with a follow-up assessment at 24 wks. BDI scores and smoking status were assessed at two antepartum and five postpartum assessments. Chi-square tests and ANOVAs were used to compare dichotomous and continuous variables, respectively. Incentives increased abstinence rates above control levels antepartum and postpartum: (late-pregnancy assessment: 37% vs 11%; 2wk: 33% vs. 15%; 4wk: 31% vs. 12%; 8wk: 25% vs 10%; 12wk: 22% vs. 7%; 24wk: 15% vs 3%; all $p < .001$). Average BDI scores among those assigned to contingent vouchers were significantly lower than controls from weeks 2-12 postpartum (2wk: (F(1, 231) = 5.75, $p < .05$); 4wk: (F(1, 241) = 9.11, $p < .005$); 8wk: (F(1, 232) = 7.78, $p < .01$); 12wk: (F(1, 238) = 6.30, $p < .05$). Incentives also significantly reduced the proportion of women with BDI scores in the clinical range (i.e., BDI > 16) at weeks 4-12 postpartum, all $p < .05$). In addition to increasing smoking abstinence, voucher-based incentives for smoking cessation decrease postpartum depression. This effect compliments the significant improvements in birth outcomes and breastfeeding duration reported previously with this intervention.

FUNDING: R01DA14028, R01HD075669, P20GM103644, T32DA07242

JUSTIFICATION: This study shows a causal relationship between smoking cessation and decreased postpartum depression, confirming prior correlational studies.

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POS4-113
ASSESSING RELATIONS AMONG MATERNAL SMOKING DURING PREGNANCY, SOCIOECONOMIC STATUS, AND PSYCHOLOGICAL DISTRESS: ANALYSIS WITH STRUCTURAL EQUATION MODELING

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Background. Maternal smoking during pregnancy (MSDP) is a pervasive public health concern. Despite medical and societal sanctions, 9% to 30% of pregnant women smoke in the United States, with rates highest in disadvantaged populations. Consistent with this disparity, two key correlates of MSDP in studies conducted to date are low socioeconomic status (SES) and psychological distress (e.g., stress, depression). Yet, studies to date have assessed these relations using inconsistent operational definitions of SES and varying psychological symptoms, precluding the ability to easily generalize findings beyond the study samples, and no study to our knowledge has assessed the comprehensive nature of these relations in a structural equation model (SEM) including a mixture of measured and unobserved (latent) variables. Purpose. The purpose of this study was to assess a comprehensive SEM in which latent variables representing multiple indicators of SES and psychological distress predict MSDP, including not smoking, quitting, and continued smoking during pregnancy. We were also interested in whether psychological distress mediates the SES relation with MSDP. Methods. Timeline Followback interviews along with biochemical verification was employed to assess MSDP in a diverse sample of 132 pregnant women. Results. Consistent with past studies, continuing pregnancy smokers and women smoking and quitting

during pregnancy were more likely to have low education and income, and to have symptoms of psychological distress. However, only SES, not psychological distress affected MSDP in the SEM. Conclusions. This is among the first studies to use a comprehensive measure of maternal smoking during pregnancy, and to model relations among SES, psychological distress, and MSDP in a SEM and using a diverse sample with a comprehensive MSDP assessment. Our finding highlights the need to tailor MSDP prevention and intervention initiatives to lower SES women.

FUNDING: This study was funded by the National Institutes of Health (R01 DA019558 to L.R.S.)

JUSTIFICATION: Socioeconomic status is a critical yet frequently overlooked factor in health risk behaviors.

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POS4-115
THE EFFECT OF PRODUCT CHARACTERISTICS ON PERCEPTIONS OF ELECTRONIC CIGARETTES AMONG CANADIANS

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Background Although e-cigarettes containing nicotine are prohibited in Canada, e-cigarettes with and without nicotine are widely available for sale. Evidence regarding the perceptions of these novel products is needed to understand how they are viewed and why they may be used by various subpopulations. For instance, it is unknown whether Canadians are using products with nicotine and how manufacturer claims may affect patterns of product use among smokers and non-smokers. The current study sought to examine the influence of product characteristics on perceptions and interest in trying e-cigarettes, including flavours, nicotine content, and health warning statements. Methods An online discrete-choice experiment was conducted with 1,188 Canadians aged 16 years and older. Participants were recruited using an online commercial panel (GMI). Following a brief survey, participants completed a series of discrete-choice tasks, in which they viewed a choice set with e-cigarette product images that featured different attributes: flavour, nicotine content, health warnings, and price. For each choice set, participants were asked to select one of the products or indicate "none of the above" with respect to the following outcomes: interest in trying, better taste, less harm, and usefulness in quitting smoking. The attributes' impact on choices for each outcome was analyzed using multinomial logistic regression. Results Health warnings were the most important attributes influencing participants' intentions to try e-cigarettes (41%) and perceptions of product quit efficacy (39%). Flavour (48%) was the strongest predictor of perceptions of product taste. Finally, flavour (36%) and health warnings (35%) significantly predicted perceptions of product harm. Conclusions The findings can help to inform regulatory strategies to promote more effective nicotine regulation.

FUNDING: This research was supported by the Canadian Institutes of Health Research Training Grant in Population Intervention for Chronic Disease Prevention: A Pan-Canadian Program (Grant #: 53893) (Czoli), the Propel Centre for Population Health Impact, a CIHR New Investigator Award (Hammond), and a Canadian Cancer Society Research Institute Junior Investigator Research Award (Hammond).

JUSTIFICATION: The study is the first to test consumer perceptions of health warnings for e-cigarettes, providing evidence that is urgently needed to guide regulatory action.

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POS4-116
LEVELS OF NNAL AMONG CANADIAN TOBACCO USERS

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Background Tobacco-specific nitrosamines (TSNAs) are potent human carcinogens found in tobacco smoke. At present, there are wide variations in TSNA levels in cigarettes across countries. For instance, Canadian cigarettes have significantly lower TSNA levels than US-blended cigarettes, including NNK [4-(methylnitrosamino-1-(3-pyridyl)-1-butanone], due to the different tobacco blend and curing process. However, the extent to which this variation translates into differences in human exposure and risk remain unclear. The current study sought to examine TSNA exposure at the population level by assessing nationally representative measures of urinary NNAL [4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol], a metabolite of NNK, among Canadian tobacco users. Methods Urinary measures of NNAL were collected as part of the Canadian Health Measures Survey, conducted in 2007-2009, a nationally representative study of 5,604 Canadians. A sub-sample of 2,481 participants aged 12-79 were randomly selected for the analysis of urinary nicotine metabolites and NNAL. 541 tobacco users were identified based on a urinary cotinine concentration of 50 nanograms per millilitre or higher and self-reported consumption of at least one cigarette per day. Geometric mean concentration of urinary total NNAL was calculated for tobacco users. Results The mean urinary total NNAL amongst Canadian tobacco users was 68 picograms per millilitre. Study findings indicated a significant relationship between NNAL concentrations and urinary cotinine ($p < 0.01$). Conclusions The study findings provide a nationally representative characterization of TSNA exposure among Canadian tobacco users. These findings are consistent with US data and experimental studies suggesting marked differences in TSNA exposure between US and Canadian tobacco markets, despite similar patterns of tobacco use. In the absence of epidemiological data, it is not known whether these differences in exposure translate into differences in risk.

FUNDING: This research was supported by the Canadian Institutes of Health Research Training Grant in Population Intervention for Chronic Disease Prevention: A Pan-Canadian Program (Grant #: 53893) (Czoli), the Propel Centre for Population Health Impact, a CIHR New Investigator Award (Hammond), and a Canadian Cancer Society Research Institute Junior Investigator Research Award (Hammond).

JUSTIFICATION: This study provides data on in vivo exposure to tobacco-related carcinogens amongst Canadians, which is needed to accurately examine the impact of these toxins on human health.

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POS4-117
SMOKING ATTRIBUTABLE MORTALITY IN THE AMERICAN INDIAN/ALASKA NATIVE POPULATION

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Smoking-attributable fractions and smoking-attributable deaths among AI/AN and white populations were calculated for persons living in Indian Health Service Contract Health Services Delivery Area counties in the United States. Smoking prevalences are based on Behavioral Risk Factor Surveillance System data. Relative risks are based on the Indian Health Service AI/AN-U.S. Mortality Database. We examined differences in smoking-attributable mortality between AI/AN and white populations for five major causes of smoking-related deaths and for all-cause deaths during 2001-2004 and 2005-2009, by sex and age. Results: current smoker prevalence was higher among AI/ANs than among whites during 2001-2004 and 2005-2009. The largest difference was 18.0 absolute percentage points, observed for men during 2001-2004. That difference had decreased to 10.6 percentage points by 2005-2009. Among women, the absolute difference in current smoker prevalence was 8.8 percentage points during 2001-2004 and 13.2 percentage points during 2005-2009. Consistent with this higher prevalence, the proportion of smoking-attributable deaths in the AI/AN population was higher than in the white population during both time periods. Conclusions: Higher smoking

rates and higher proportions of deaths attributed to smoking among AI/ANs than among whites underscore the need for comprehensive tobacco control programs that reach the AI/AN population.

FUNDING: Funding was provided by the Centers for Disease Control and Prevention, Office on Smoking and Health.

JUSTIFICATION: This study highlights the disparity in smoking rates between AI/AN and white populations, the excess mortality suffered by the AI/AN population, and the need for more effective tobacco control interventions in the AI/AN population.

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POS4-118
BUPROPION XL HAS THE SAME EFFECTIVENESS AND SIMILAR SIDE EFFECT PROFILE AS BUPROPION SR WHEN USED FOR SMOKING CESSATION AMONG CANCER PATIENTS

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Background: Bupropion is a non-selective inhibitor of dopamine transporters and norepinephrine transporters and an antagonist of neuronal nicotinic acetylcholine receptors. Studies have shown that bupropion promotes smoking cessation and reduces nicotine craving and other withdrawal symptoms. Bupropion is available in three formulations: Immediate Release (IR), sustained release (SR) and extended release (XL). The XL (once daily dosing) has equal efficacy with the SR formulation (twice daily dosing) for treating depression. No studies comparing the two formulations for the treatment of smoking have been published. Methods: In a naturalistic open label study conducted at MD Anderson Cancer Center's Tobacco Treatment Program (TTP), we compared the effectiveness and the side effect profile of the two formulations (SR vs. XL) in cancer patients who were being treated for smoking. We analyzed 7-day point prevalence abstinence at end-of treatment (EOT; 12-weeks) and at the 3- and 6-month follow-up periods. The sample consisted of patients who were prescribed bupropion XL or SR alone or in combination with nicotine replacement from September 2006 to November 2012. We also analyzed the side effect profile difference between the medications. Results: A total of 406 patients were prescribed either bupropion SR or XL (75% white; 58% female), 11.8% were lost to follow up (they were treated as smokers). From the total sample, 136 (33.4%) received bupropion XL alone, 74 (18.2%) received bupropion XL with NRT, while 117 (28.8%) received bupropion SR alone and 79 (19.5%) received bupropion SR with NRT. Regardless of whether those who took NRT were included, there were no significant differences in abstinence rates at EOT or at 3 or 6 months follow up between XL and SR, using intent to treat model. Further, there were no significant differences in spontaneously reported side effect profiles between patients on XL compared with SR. Conclusion: Our data did not reveal a difference between bupropion XL and SR formulations in terms of effectiveness or side effect profiles among cancer patients attempting to quit smoking.

FUNDING: No funding

JUSTIFICATION: If replicated, these findings would allow clinicians and researchers to use once per day dosing instead of twice per day with same effectiveness and theoretically better adherence.

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POS4-119
FORMATIVE RESEARCH FOR A SMOKE-FREE HOMES
INTERVENTION (SFH) FOR LOW-INCOME LATINO HOUSEHOLDS

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Background: Tobacco-related interventions for low income Latinos have largely focused on cessation for individuals and not on eliminating smoking in homes and vehicles. Aim: To collect qualitative data to help adapt a SFH intervention that has succeeded in non-Hispanic families seeking United Way 211 referral services. Method: We recruited convenience samples of smokers (n= 26) and non-smokers (n= 18) who live with at least one person with a discordant smoking status in Houston or San Diego. Interviews by bilingual, bicultural graduate students were recorded, transcribed and translated. Analysis produced household profiles and themes. Results: Samples were predominantly female, low education, Spanish speakers. New themes were the role of inter-generational relationships, culture, and communication patterns among household members. Storylines for novelas were 1) non-smoking mother with a no-smoking ban whose more acculturated teenage son smoked when she wasn't home, 2) a woman's strong ethic of respect for her smoking partner or parent who pays the rent, 3) smokers' respect for smoking bans to protect children, and 4) nonsmokers' deference for smokers as guests, elders, and heads of household. Asking smokers to refrain from smoking in homes or vehicles seemed to be confounded with asking them to quit smoking. Protection of others' health focused exclusively on young children, even when respondents mentioned other smoking-related health conditions that affected non-smoking adults. As with other groups we found misconceptions about "safe" indoor smoking and approval of bans in public places. Conclusion: This research provides insight into the importance of multigenerational household composition to consider when adapting SFH intervention materials for low income Latinos. Differences in acculturation and power dynamics within these households also must be considered.

FUNDING: This work was funded thanks to a National Cancer Institute (NCI) grant.

JUSTIFICATION: This research provides insight into the importance of multigenerational household composition to consider when adapting SFH intervention materials for low income Latinos.

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POS4-120
IS THE LATINO-ANGLO NRT GAP CLOSING? PRELIMINARY
EVIDENCE FROM COLORADO

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Background: Evidence-based treatments for smoking cessation are generally underutilized among nonwhite and socioeconomically disadvantaged smokers. In 2001, a Colorado population-level survey found that Latino smokers reported higher prevalence of quit attempts than Anglos but were less likely to use nicotine replacement therapy (NRT). The current study investigated the status in 2012 of this and related disparities in cessation behaviors among Latinos and Anglos. Methods: The Attitudes and Behaviors Survey (TABS) on Health is a random cross-sectional population-level telephone survey conducted every three to four years. In 2012, the sample (n=14,998) included 318 Latino and 2032 Anglo current smokers or past-year quitters. Bivariate and multiple logistic regression were used to evaluate associations between ethnicity and factors known to influence smoking cessation, such as provider advice to quit, NRT use, prescription medication use (i.e., bupropion, varenicline), and counseling; multivariate analyses were

adjusted for covariates. Analyses used complex-sample weights to produce unbiased population-level estimates. Results: As in 2001, Latinos in 2012 were significantly more likely than Anglos to have made a past-year quit attempt (65.3% vs. 50.7%) however this difference became attenuated and no longer significant after adjustment age, sex, education, poverty status, health status, and number of cigarettes smoked per day. In bivariate analysis, Anglos were nearly twice as likely as Latinos to use NRT in the most recent quit attempt; however, there were no Anglo-Latino differences in NRT use after adjustment for age, sex, education, poverty status, health status, and number of cigarettes smoked per day. Among past-year quit-attempters who were smoking ≥10 cigarettes per day, one-third used NRT in the quit attempt among both Anglos and Latinos. There was no significant Anglo-Latino difference in prescription medication use or counseling. Conclusions: A substantial disparity in NRT underuse among Colorado Latino quit-attempters appears to be overcome. Further research is needed to determine whether the same trend has emerged nationally.

FUNDING: Colorado Department of Public Health & Environment

JUSTIFICATION: Public health efforts in Colorado should continue to promote evidence-based treatments for smoking cessations including NRT use however there is no longer the need to specifically focus on disparities between Anglos and Latinos.

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POS4-121
SMOKING PATTERNS AMONG YOUNG ADULTS: WIDENING
GAMPS BETWEEN STUDENTS AND NONSTUDENTS

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Background: Young adults ("YA," aged 18-24 years) are an important target population for tobacco control because they have the highest smoking rates compared to other ages and because roughly half of regular smoking prevalence emerges during this developmental period. Smoking prevalence in the adult population as a whole is much higher among those with lower socioeconomic status (SES) than it is among other adults, but this pattern is not well established among young adults. The current study compared YA smoking behaviors between students and nonstudents, using newly available state-level data. Methods: The Attitudes and Behaviors Survey (TABS) on Health is a random cross-sectional population-level telephone survey conducted every three to four years. YA respondent data were analyzed from survey years 2001 (n=1312), 2008 (n=739), and 2012 (n=1424). Design-based chi-squared tests were used to compare students vs. nonworking nonstudents vs. working nonstudents on smoking prevalence, number of cigarettes smoked per day, quit attempts, cessation strategies, and outcomes. Analyses used complex-sample weights and design-based analytic methods to produce approximately unbiased population-level estimates. Results: Between 2001 and 2012, overall smoking prevalence declined among young adults in Colorado, but the decline was significant only among students. Nonstudents smoking rates were roughly twice as high as student smoking rates, and the gap widened from 2001 (40.7% vs. 24.0%) to 2012 (38.4% vs. 18.0%) as nonstudent rates held steady while student rates declined. In 2012, nonstudents were also less likely than students to have made a past-year quit attempt (62.7% vs. 69.9%) and more likely to use chewing tobacco (6.2% vs. 1.5%). Working nonstudents were more likely than students to allow smoking in their personal vehicles (49.4% vs. 27.8%) and homes (9.4% vs. 4.4%). Conclusions: Although smoking declined during 2001-12 among college-aged students in a U.S. state, it remained severely elevated across the period among nonstudent young adults. Engagement of this population in smoking cessation remains a priority public health concern.

FUNDING: Colorado Department of Public Health and Environment

JUSTIFICATION: This research identifies a sub-population of young adults to target for anti-smoking campaigns

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POS4-122

SMOKERS ARE LESS LIKELY TO VOTE: RESULTS FROM A COLORADO POPULATION-BASED SURVEILLANCE SYSTEM

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Background: A few studies have found that smokers express less trust in government and lower membership in organizations than nonsmokers. We analyzed newly available cross-sectional data from a U.S. state to see whether smoking status was associated with voting in a presidential election, trusting people generally, or trusting various social institutions. **Methods:** The Attitudes and Behaviors Survey (TABS) on Health is a random cross-sectional population-level telephone survey conducted every three to four years. In 2012, a randomly chosen sub-sample (n=5,222 of 14,998) completed an interview section on voting behaviors and attitudes. The sub-sample was categorized by smoking status (current daily, current nondaily, former+never ("nonsmokers")), and analyzed descriptively and in logistic regression models. Analyses used complex-sample methods to obtain approximately unbiased population-level estimates. **Results:** Voting was most common among nonsmokers and least common among daily smokers (74.9% of daily smokers, 83.3% of nondaily smokers, 89.9% of nonsmokers). Adjusted for potential confounders, daily smokers remained significantly less likely to vote than nonsmokers (OR=0.55, 95%CI: 0.34-0.91); nondaily smokers did not differ from nonsmokers (OR=1.32, 95%CI: 0.58-3.01). Daily smokers were also significantly less likely to feel that most people could be trusted (36.5%) than nondaily smokers (42.6%) and nonsmokers (55.1%) (p<0.0001), and had less trust in businesses, the police, the government, the criminal justice system, lawyers, financial institutions, and Wall Street. **Conclusions:** In a U.S. state, active daily smoking predicted nonvoting behavior and greater mistrust of people and institutions. Further research is needed to determine whether the findings are temporally or geographically limited, explore underlying mechanisms, and learn how the result might help inform smoking cessation initiatives.

FUNDING: Funding for the surveillance was received by the Colorado Department of Public Health and Environment

JUSTIFICATION: To better understand attitudes and behaviors regarding social capital and trust between smokers and nonsmokers.

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POS4-123

A PRELIMINARY EVALUATION OF A SMARTPHONE APPLICATION TO AID SMOKING CESSATION (SF28)

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Background and Aims: Smartphone 'apps' are potentially wide-reach, very low-cost aids to smoking cessation but no evaluations have been published to date. SF28 (SmokeFree28) is an app that sets smokers a target of achieving 28 days smoke free as a platform for lasting abstinence. It provides users with a graphic depiction of progress towards that goal and a toolbox of supportive applications to help them achieve it. This study aimed to provide a preliminary evaluation of SF28 in terms of short-term abstinence rate, characteristics of users and their usage patterns. Based on population-level data, a 4-week abstinence

rate significantly greater than 15% was set as a target to merit further development and further evaluation. **Methods:** Data were automatically collected by the app and uploaded to the server between August 2012 to August 2013. After consent was obtained, participants' socio-demographic characteristics, cigarette consumption, history of quit attempts, and weekly expenditure on cigarettes were assessed on registration. Logins and abstinence were recorded following the target quit date. Participants were included in the analysis if they were aged 16 years or over, smoked cigarettes at the time of registration, had set a quit date on or after the current date, and had used the app at least once on or after their target quit date. The primary outcome measure was having logged into the app and recorded abstinence for at least 28 days. Users who ceased logging in were considered to have resumed smoking. **Results:** 1,170 smokers met the inclusion criteria. The 28-day abstinence rate was 18.9% (95% CI 16.7%-21.2%). Compared with smokers in England trying to stop unaided, SF28 users tended to be younger, more likely to be female, more likely to be in non-manual occupations, smoke more cigarettes per day and spend more on cigarettes. Users who lasted 28 days after the quit date averaged 8.5 logins. **Conclusion:** The short-term success rate and usage patterns of SF28 suggest that it may aid in smoking cessation and merits further development and evaluation.

FUNDING: The research was conducted at University College London, London, UK. This project was funded by National Centre of Smoking Cessation and Training (NCSCCT), London, England.

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