SYM 1A
AN OVERVIEW OF THE LONG-TERM EFFECTS OF PRENATAL TOBACCO EXPOSURE ON CHILD OUTCOMES AND RECENT FINDINGS FROM THE MATERNAL HEALTH PRACTICES AND CHILD DEVELOPMENT PROGRAM

Marie D. Cornelius, Ph.D.*, Nancy L. Day, Ph.D., Gale A. Richardson, Ph.D., Lidush Goldschmidt, Ph.D., University of Pittsburgh School of Medicine

The introductory portion of this symposium will critically review research findings on the effects of prenatal tobacco exposure on child outcomes. The outcomes reviewed will include findings on child growth, cognitive, behavioral, and neuropsychological measures. Recent unpublished findings will also be presented from ongoing studies of the Maternal Health Practices and Child Development Program of research at the University of Pittsburgh School of Medicine. This program of research includes three large cohorts of women who were recruited during pregnancy, and with their children, have been followed and measured over time. In the oldest cohort (PH: N. Day) of adult women and their offspring, the last completed assessment occurred when the children were 14 years old. Data will be presented on the relations between prenatal tobacco effects and achievement and behavior at age 6 and 10 years. In another cohort of adult women and their offspring (Pt: G. Richardson), prenatal tobacco effects on behavioral and neuropsychological measures at seven years will be described. In the most recent cohort of teenage mothers and their offspring (Pt: M. Cornelius), prenatal tobacco effects on measures of language, behavior, emotionality, attention and activity at six years will be presented. In addition, tobacco effects from both the prenatal period and the current environment will be addressed. Consistencies in findings across the cohorts will be highlighted.

This study was supported by NIDA (DA09275, DA03872; DA08916), NICHD (HD38890), NIAAA (AA06666).

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SYM 1B
EARLY DEVELOPMENTAL MECHANISMS: PRENATAL EXPOSURE TO CIGARETTES, INFANT BEHAVIOR AND THE EARLY PARENTING OF PREGNANT SMOKERS

Lauren S. Wakschlag, Ph.D.*, Department of Psychiatry, University of Chicago

Prenatal smoking is associated with increased risk of Conduct Disorder (CD) and smoking in offspring, but mechanisms by which this occurs are poorly understood. A developmental/transactional framework for examining this issue will be presented. Hypothesized developmental pathways will be delineated including identifying potential behavioral precursors during infancy and examining how exposure-related vulnerabilities interact with child and family risk factors associated with maternal smoking. Data will be presented from a longitudinal study of behavioral effects of prenatal smoking—the first of its kind to combine repeated, self-reported and biochemical measurement of prenatal exposure to cigarettes with laboratory-based, observational assessment of infant behavioral regulation and parenting. The association of exposure to infant behavioral regulation will be presented, including infant negative reactivity, self-regulatory capacity and responsiveness to parental input in regulation of distress, sustained attention, and novelty-seeking. In keeping with findings of sex differences in studies of older youth, sex differences during infancy will also be examined. The early parenting of persistent smokers will be compared to that of spontaneous quitters and non-smokers, based on observational ratings of maternal intrusiveness, impulsivity and responsiveness to infant distress. Potential mediating factors of early parenting will be explored. Implications of these findings for future research on developmental pathways from smoking during pregnancy to youth CD and smoking will be discussed.

This study was conducted while the author was at the University of Chicago. It was supported by NIDA grant K08-DA-0030 to Dr. Wakschlag and a grant from the Shaw Foundation to the Department of Psychiatry.

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Symposium:

**SYM 1C**

**EFFECTS OF PRENATAL TOBACCO EXPOSURE ON INFANT RESPONSES TO STRESS**

Laura R. Stroud, Ph.D.*, Raymond Niaura, Ph.D., Karen Law, Monica Bocanegra, B.A., Linda Lagasse, Ph.D., Barry Lester, Ph.D., Brown Medical School, Stephen Buka, Sc.D., Harvard School of Public Health

Maternal smoking during pregnancy (MSDP) has been linked to nicotine dependence and other adverse outcomes in offspring. However, little research has examined neurobiological mechanisms underlying these associations in humans. Given links between stress, physiological responses to stress, and smoking, one potential mechanism underlying the adverse effects of prenatal tobacco exposure is dysregulation of offspring stress responses. We compared adrenocortical stress reactivity in infants exposed and unexposed to MSDP. Participants were pregnant women and their healthy newborns (36-42 weeks). The NICU Network Neurobehavioral Scale (NNNS; comprehensive neurobehavioral examination) was administered to exposed and unexposed newborns within 48 hours after delivery. Salivacortisol was assessed at baseline and approximately 15 minutes following completion of the NNNS. We found significant differences in adrenocortical reactivity between exposed and unexposed newborns. In a second study, we will examine differences in physiological and behavioral responses to a neurobehavioral exam in infants from the second generation of subjects from the National Collaborative Perinatal Project, a prospective study of the prenatal antecedents of pediatric, neurological and psychological disorders of childhood. Results suggest that prenatal tobacco exposure may disrupt certain stress response systems, and that nicotine may sensitize pathways involved in the stress response. Results have implications for pathways to nicotine dependence in exposed offspring.

Supported by pilot grant from Brown Department of Psychiatry, and NCI P50CA84719.

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**SYM 1E**

**GENERAL DISCUSSION OF MECHANISMS UNDERLYING ADVERSE EFFECTS OF PRENATAL TOBACCO EXPOSURE**

Raymond Niaura, Ph.D.*, Brown Medical School, Neal Benowitz, Ph.D., University of California, San Francisco

The discussants will synthesize across disciplines and presentations, highlighting implications for future research in this area. Dr. Niaura will discuss clinical implications of the presented work; Dr. Benowitz will discuss implications from a pharmacological perspective. Both discussants will moderate questions and discussion from the audience.

Supported by NCI P50CA84719.

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**SYM 1D**

**THE EFFECTS OF PRENATAL NICOTINE EXPOSURE ON COGNITIVE FUNCTION IN RATS**

Ed. Lavin, Ph.D., Duke University Medical Center, Durham, NC

**SYM 2S**

**REINVIGORATING BEHAVIORAL THERAPIES FOR SMOKING CESSION**

John R. Hughes, M.D.*, University of Vermont and Saul Shiffman, Ph.D., Univ of Pittsburgh/Pinney Associates (co-chairs), Tim Baker, Univ of Wisconsin, Lisa Onken, Ph.D., National Institute on Drug Abuse, Sharon Hall, Univ. of California at San Francisco, Ed Lichtenstein, Ph.D., Oregon Research Institute

The amount of research on behavioral therapies for smoking cessation has declined dramatically plus new innovations have been scarce. The purpose of this symposium is to offer reasons for this decline and possible solutions. The first paper (Dr Shiffman) will describe the history and current status of research on behavioral therapies using both empirical and observational data. The second paper (Dr Baker) will describe recent advances in basic behavioral science that could be used to develop new behavioral therapies. The third paper (Dr Onken) will describe how NIDA revitalized behavioral research on drug dependence. These three papers (15 min each) will be followed by a panel (Drs Baker, Hall, Onken and Lichtenstein + Drs Hughes and Shiffman as moderators; 45 min). The panelists will not give a prepared talk nor comment on the papers presented but rather we will open it up to the audience for questions/comments to which the panelists will respond. Given the time limits, the symposium will focus on research needs for new contents for behavioral therapies rather than new means of dissemination of behavior therapies. The co-chairs will summarize the suggestions of the presenters, audience and panelists and send them to governmental and voluntary research funding agencies and post them on SRNT listserve.

Supported by NIDA Senior Scientist Award DA-00490 (JH).

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SYM 2A  THE STATE OF BEHAVIORAL SMOKING CES SATION RESEARCH: WHERE ARE THE NEW APPROACHES?
Saul Shiffman, Ph.D.*, University of Pittsburgh & Pinney Associates; John R. Hughes, M.D., and Josue Keely, Ph.D., University of Vermont

Successful treatment of smoking is an essential part of tobacco control. Smoking cessation has received considerable and growing research attention. Indeed, a tally of literature collated by the Cochrane Collaboration shows dramatic increases in treatment research activity over the last two decades. However, the development activity has been unbalanced: there has been avid and growing research on pharmacological modalities, while the proportion of research devoted to behavioral treatment has declined steadily, dropping by two thirds. Moreover, a qualitative analysis of research over the past two decades suggests that behavioral treatment research has veered towards experimenting with new vehicles for delivery and dissemination of existing treatments and away from developing innovative treatment approaches. At the same time, analysis of outcomes in behavioral smoking cessation trials suggests that outcomes of treatment are static or declining, suggesting that methods being applied and tested are not resulting in progressive improvement in outcomes. Innovation in behavioral treatment is sorely needed. We argue that there is a compelling need to reinvigorate behavioral research, perhaps by drawing upon new findings from basic research in behavioral science.

Supported by NIDA Grant DA06084-09 (SS) and NIDA Senior Scientist Award DA-00490 (JH) and NIDA Training Grant 07242 (JK).

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SYM 2B  REVITALIZING BEHAVIORAL TREATMENT RESEARCH AT NIDA
Lisa Onken, Ph.D.*, National Institute on Drug Abuse

This presentation will describe the growth of the National Institute on Drug Abuse’s (NIDA’s) Behavioral Therapies Development Program (BTDP), a comprehensive program supporting all stages of behavioral treatment research (including combined behavioral and pharmacological treatment research) for addictive disorders. In the mid-late 80’s, before the inception of the BTDP, there was a paucity of behavioral treatment research at NIDA. Currently, however, behavioral treatment research at NIDA is among NIDA’s largest and most successful programs of research. In this presentation, the history and rationale of the BTDP will be discussed, and the Stages of behavioral treatment research will be described. Strategies for promoting the success of the program (e.g., building the program while at the same time improving the quality of the science) will be discussed, with the goal of identifying general strategies for building programs of behavioral intervention research.

Supported by National Institute on Drug Abuse.

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SYM 2C  BASIC BEHAVIORAL SCIENCE RESEARCH: RELEVANCE TO TOBACCO DEPENDENCE
Timothy B. Baker, Ph.D.*, The Center for Tobacco Research and Intervention, University of Wisconsin–Madison

Recent behavioral and cognitive neuroscience research has yielded information of possible relevance to our understanding and treatment of tobacco dependence. There are basic anomalies in the field of tobacco dependence research, anomalies that may be obstacles to the development of new and efficacious treatments. Among these anomalies are the following: low correlations among markers of tobacco/smoking motivation, continued tobacco use despite self-reports of little or no reinforcement derived from smoking, an inconsistent relation between tobacco withdrawal symptom severity and relapse, and finally, smokers’ lack of insight into the determinants of their smoking. Basic research on affective processing may provide insight into these anomalies. Research will be reviewed from a variety of areas: “hot” vs “cool” information processing, mere exposure effects, as well as basic research on avoidance learning. This research reveals how unconscious affective processing may influence behavior and decision making, how affects bias or restrict attentional processes, how affects prime particular response options, how affects demand processing priority, and how the presence of drug in the body may become a safety signal. These findings will be presented and discussed in light of their implications for understanding tobacco motivation and for treating tobacco dependence.

Supported by Transdisciplinary Tobacco Use Research Center Award, CA 84724.

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SYM 3S  EVALUATING SYSTEMS CHANGES TO INCREASE TOBACCO CESSATION RATES: FINDINGS FROM ADDRESSING TOBACCO IN MANAGED CARE
Susan J. Curry, Ph.D.*, University of Illinois at Chicago, Michael C. Fiore, M.D., M.P.H., Paula Keller, M.P.H., University of Wisconsin Medical School

Health care organizations play an integral role in promoting tobacco cessation. The U.S. Public Health Service clinical practice guideline Treating Tobacco Use and Dependence (U.S. Department of Health and Human Services, 2000) outlines several systems-level strategies for health care administrators, insurers and purchasers that can help create an organizational culture that promotes tobacco dependence treatment. Addressing Tobacco in Managed Care is a Robert Wood Johnson Foundation-funded research program that evaluates innovative systems-level changes promoting tobacco dependence treatment in managed care organizations. Managed care organizations and researchers have collaborated to measure the impact of systems-level changes on patient and provider-level outcomes pertaining to tobacco dependence treatment (e.g. quit attempts, use of pharmacotherapy, documentation of advice to quit).

The symposium will report the findings from four evaluation projects funded through the Addressing Tobacco in Managed Care program. Systems changes evaluated through these projects include provision and marketing of a smoking cessation pharmacy benefit, provision of performance-based financial incentives, use of a patient registry and proactive telephone counseling for smoking cessation, tobacco user identification systems, clinic system changes in conjunction with neighborhood-based interventions, and academic detailing. Following the presentations, the panelists will discuss the impact of systems changes on the delivery of tobacco dependence treatment in managed care organizations and discuss the unique challenges and opportunities encountered by engaging in such collaborative research.

This program is funded by a grant from The Robert Wood Johnson Foundation.

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Academic detailing has been used with some success, albeit almost exclusively with physicians. The object of this research program was to determine whether academic detailing resulted in tobacco cessation systems changes in dental offices participating in a dental managed care organization (MCO). Dentists were randomly assigned to one of two conditions. The intervention arm utilized academic detailing techniques including three educational visits/office. This was compared with usual practice control dentists. A sampling frame of eligible dentists in four states in the Northeast was obtained from the DMO. Of 355 eligible dentists, 75 agreed to participate and were randomly assigned to either the intervention or control condition. The detailing sessions averaged nine minutes in duration. Detailing sessions appear to increase provider knowledge and confidence over time, 10% of providers indicated at the first visit that they lacked knowledge, this decreased to 0% by the third detailing visit. However, meeting with the dentists in their offices was challenging. Only 33% of in-office contacts included the dentist-subject, 7% were with the dental hygienist, and 70% were with the office manager or receptionist. Resistance to detailing, defined as 1) reluctance to schedule the first visit; 2) skepticism about tobacco cessation counseling; or 3) the belief that patients would not cooperate was detected at 22% of the visits. Resistance decreased by one-half from visits 1-3. Face-to-face academic detailing is very labor intensive and can only succeed if contact is frequent and continuous.

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Raymond G. Boyle, Ph.D., Leif I. Solberg, M.D., HealthPartners Research Foundation, Sanne Magnan, M.D., Ph.D., Nina Alesci, M.P.H., Blue Cross Blue Shield of Minnesota, and Gestur Davidson, Ph.D., Minnesota Department of Human Services.

In this presentation we report the results of a randomized trial nested within a natural experiment evaluating the introduction of a smoking cessation pharmacy benefit. In 1998, two health plans simultaneously initiated coverage for smoking pharmacotherapies. They collaborated to evaluate utilization, quit attempts, and quitting.

Samples of members who smoke were identified and surveyed before and one year after the benefit's introduction. Pre- and post-benefit surveys gathered information on demographics, and smoking behavior. Multi-level logistic regression models were applied to test for the effect of the benefit.

A total of 2327 smokers completed a baseline and follow-up survey 1 year post-benefit. Overall, smokers with the benefit (n=1560) reported increased use of bupropion (p<0.004) but not nicotine products (p=0.40) compared to those lacking the benefit (n=767). The benefit was not associated with any significant effect on attempts to quit smoking or actual quitting (p=0.66), except among those aware of the benefit. This subgroup of smokers were significantly more likely to use the benefit, to make quit attempts, and to quit smoking. Specifically, there was a 4.4 percentage point increase (p<0.02) in the prevalence of quitting among those with knowledge of the benefit but no difference in 6-month prevalence of quitting (p<0.31).

These findings are discussed in the context of previous findings and the opportunities for health plans to create demand for covered services such as cessation medications.

This research was supported by a grant from The Robert Wood Johnson Foundation.

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Grace Hill Health Centers in St. Louis provide care to predominantly minority, low-income residents of urban neighborhoods. Grace Hill (a) empaneled a multidisciplinary, trans-agency work group (b) to use Plan-Do-Study-Act approaches to rapid system changes (c) both to improve clinic-based smoking cessation services and to increase peer and neighborhood support for quitting and nonsmoking. In preliminary data after the 1st year, exit interviews of smokers indicated Grace Hill had increased Key Clinical Smoking Cessation Services (e.g., Asked if I smoke, Offered help in quitting), but interviews also indicated comparable increases in comparison clinics. For Peer and Neighborhood Services (e.g., Availability of programs in the neighborhood, Encouragement and Cooperation from neighborhood residents), exit interviews indicated an increase for Grace Hill neighborhoods and no change for control neighborhoods (p for interaction <.05). Among a cohort completing exit interviews at baseline and telephone surveys 1 year later, only 9% reported having quit smoking, but these tended to report higher levels of Peer and Neighborhood Services for quitting than did those who continued to smoke (p<.10). Quitting tended to be more common (11%) among those attending the Grace Hill clinics than among those attending the comparison clinics (6.4%, p <.20). Preliminary results indicate that neighborhood health centers serving severely disadvantaged groups can improve clinic- and peer/neighborhood-based services for smoking cessation. Results from the 2nd year will be available for presentation at the convention.

Supported by the Robert Wood Johnson Foundation.

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Raymond G. Boyle, Ph.D., M.P.H.*, Robert Jeddeloh, M.D., Larry An, M.D., Harry Lando, Ph.D., Peter Hannan, M.Stat., Carmen Hall, M.S., Shu-Hong Zhu, Ph.D.

OBJECTIVE: To evaluate the effects of: 1) provision of financial incentives for superior clinical performance and 2) availability of a patient (smoker) registry and proactive telephone counseling system for smoking cessation.

DESIGN: A three-condition group randomized design. Conditions are represented by: 1) control, 2) financial incentives for clinic sites reaching pre-set performance targets, and 3) financial incentives for clinic sites reaching pre-set performance targets combined with access to a centralized patient (smoker) registry and intervention system.

SETTING: Forty clinics of a large multi-specialty medical group practice in the Midwest.

MAIN OUTCOME MEASURES: Smoking cessation clinical practice patterns (identification of smokers, provision of advice to quit, offer of assistance in quitting) and patients’ smoking cessation behaviors (i.e., smoking cessation rates).

RESULTS: Patients’ tobacco use status was significantly (p<0.01) more frequently identified in clinics with opportunity for incentives and/or who had access to a registry than in clinics in the control condition. Other clinic practice pattern improvements did not differ statistically significantly between the experimental conditions. Patients visiting clinics with opportunity for incentives and who had access to the counseling programs quit smoking significantly more often (p<0.001) than patients in the control condition. Other patient smoking cessation behavior outcomes did not statistically significantly differ between the experimental conditions.

CONCLUSIONS: Additional research is needed to identify conditions under which such organizational support processes result in significant health care quality improvement and warrant the investment.

Supported by The Robert Wood Johnson Foundation.

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**SYM 4A**  
**EFFECTS OF NICOTINE ON CLONED HUMAN NEURONAL NICOTINIC RECEPTORS**

Jon Lindstrom, Department of Neuroscience, Medical School of the University of Pennsylvania, 217 Stemmler Hall, Philadelphia, PA 19104-6074

A few AChR subtypes are likely to play significant roles in behavioral effects of nicotine. Alpha4beta2 AChRs are the predominant brain subtype with high affinity for nicotine. Alpha3beta4 AChRs play a major role in autonomic ganglion transmission, while Alpha3beta2 AChRs may play a smaller role. Alpha6 subunits are closely related in sequence to alpha3, and are found only in aminergic neurons in the brain, along with other ACHR subunits. Alpha6 may be strategically located to contribute to addiction and other behavioral effects of nicotine. Alpha7 forms homomeric AChRs found both central and peripheral neurons.

We have found that nicotine is potent at activating and desensitizing alpha4beta2 AChRs and increasing the amount of these AChRs. Higher concentrations of nicotine are required to activate or desensitize alpha3 AChRs. The amount of alpha3beta2 is greatly upregulated by nicotine, but alpha3beta4 is not. Alpha6 forms functional AChRs in combination with beta4, but not with beta2 alone. Alpha6 functions better in complex combinations such as alpha6beta4. In all of these cases, nicotine is a partial agonist. Alpha6 also efficiently assembles with alpha3beta2 or alpha4beta2 to form AChRs on which nicotine is a full agonist. Nicotine has low potency for activating alpha7 AChRs, but high potency at desensitizing them. Nicotine-induced upregulation of alpha7 is usually small. Pharmacological and electrophysiological properties of AChR subtypes are relatively independent of the cells in which they are expressed. However, the efficiency with which various AChR subtypes are assembled, expressed on the cell surface, or upregulated by nicotine can depend greatly on cell type. These differences may reflect regulatory mechanisms normally involved in development and synaptic plasticity.

Supported by the NIH and the STRC.

CORRESPONDING AUTHOR: Jon Lindstrom.

**SYM 4B**  
**DIFFERENTIAL REGULATION OF NEURONAL NICOTINIC RECEPTOR SUBTYPES**

Amy Mach, Martha I. Dávila-García, Veronica S. Ascarrunz and Kenneth J. Kellar, Department of Pharmacology, Georgetown University School of Medicine, Washington, D.C. 20007

Chronic exposure to nicotine differentially affects neuronal nicotinic receptor subtypes found in rat brain and sympathetic nervous system ganglia. Thus, the alpha4beta2 receptor subtype in brain is increased, while the receptors in the adrenal gland and superior cervical ganglia, which have characteristics of an alpha3beta4 subtype are not increased. Several models exist for studying nicotinic receptor pharmacology, function and regulation. A naturally occurring cell line derived from a rat adrenal gland pheochromocytoma that expresses multiple nicotinic receptor subtypes composed of combinations of alpha3, alpha5, alpha7, beta2 and beta4 subunits. These PC12 cells allow studies of different receptor subtypes in the same cells. When PC12 cells are exposed to nerve growth factor (NGF) they differentiate, taking on the morphological characteristics of sympathetic nervous system neurons, including extension of neurites. Moreover, when grown in the presence of NGF, the number of nicotinic receptors labeled by [3H]epibatidine increases 5-fold, and there is a marked increase in receptor function. This NGF-induced increase in receptors is independent of differentiation, since differentiation of the cells with the PKC inhibitor staurosporin does not increase the receptors. Conversely, when PC12 cells are exposed to nicotine they do not differentiate, but the number of receptors increases by 4-fold. In cells exposed to the combination of NGF and nicotine, the number of receptors increases >10-fold, suggesting that the two treatments affect different receptor populations. This is supported by changes in the pharmacology of the receptor binding sites under the different conditions. The differential regulation of these nicotinic receptor subtypes may have important consequences for development and function of the nervous systems.

Supported by NIDA grants DA06486 and DA12976.

CORRESPONDING AUTHOR: Kenneth J. Kellar.

**SYM 4C**  
**NICOTINIC MECHANISMS INFLUENCE SYNAPTIC PLASTICITY**

John A. Dani, Daoyun Ji, Remigijus Lape, Fu-Ming Zhou; Division of Neuroscience, Baylor College of Medicine, Houston, Texas, USA 77030, jDani@bcm.tmc.edu

Nicotinic mechanisms influence attention, memory, cognition, and addiction. In mouse hippocampal slices, we have found that the induction of synaptic plasticity, arising via generally accepted mechanisms, is modulated in multiple ways by the activity of nicotinic acetylcholine receptors (Ji et al. 2001 Neuron 31:131). Properly timed nicotinic activity at pyramidal neurons boosted the induction of long-term potentiation via presynaptic and postsynaptic pathways. On the other hand, nicotinic activity on GABAergic interneurons inhibited nearby pyramidal neurons, and via fast inhibition prevented or diminished the induction of glutamatergic synaptic potentiation. The synaptic modulation was dependent on the location and timing of the nicotinic activity. Loss of these synaptic mechanisms may contribute to the cognitive deficits experienced during Alzheimer’s diseases, which is associated with a loss of cholinergic projections and with a decrease in the number of nicotinic receptors. It is also likely that these synaptic mechanisms are altered by the low levels of nicotine obtained from tobacco (Dani et al. 2001 Neuron 31:349).

The work was supported by the National Institute on Drug Abuse (DA09411 and DA12681) and by the National Institute of Neurological Disorders and Stroke (NS21229).

CORRESPONDING AUTHOR: John A. Dani.
INNOVATIONS IN PHARMACOTHERAPY FOR THE TREATMENT OF TOBACCO DEPENDENCE: POPULATION NEEDS AND PRE-CLINICAL IMPLICATIONS

Robin Mermelstein, Ph.D.*, University of Illinois at Chicago; Sharon Hall, Ph.D., University of California, San Francisco; Jed E. Rose, Ph.D., Duke University and Veterans Affairs Medical Centers; Saul Shiffman, Ph.D., University of Pittsburgh and PinneyAssociates; William A. Corrigan, Ph.D., Centre for Addiction & Mental Health, Canada

Increasing rates of successful quitting among current smokers remains public health’s best hope for reducing tobacco’s toll in the next 30 years. Even though the majority of smokers in much of the developed world report that they are interested in quitting, too few smokers try to quit and too few avail themselves of treatment. New and improved treatments are needed. This symposium discusses the need for treatment and presents several clinical research programs evaluating new smoking cessation treatments. The discussant addresses basic mechanisms that are or can be engaged by various treatment approaches. The first presenter will set the context with a presentation on population-level evidence from the U.S. on the longitudinal patterns of quitting and smoking behavior, highlighting the need to increase success rates since quit attempts are generally very rare. The next three speakers present data from three new approaches to cessation treatment. The range of innovations is broad, from an evaluation of extended therapy with an agent approved and indicated as an antidepressant but with proven efficacy for smoking cessation (nortriptyline), to an innovative approach to combining nicotine with an agonist to boost efficacy (nicotine plus mecamylamine in a transdermal patch), to a new form of NRT. The session will close with the discussant remarking, from a perspective of pre-clinical nicotine science, on what lessons can be gleaned about mechanisms of treatment and ideas for further research based on these clinical studies.

Dr. Shiffman provides consulting services to GSKCH on an exclusive basis on issues related to smoking control.

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THE NATURAL HISTORY OF CESSION AND RELAPSE: TREATMENT IMPLICATIONS

Robin Mermelstein, Ph.D.*, The University of Illinois at Chicago

Despite increased attention to cessation treatments and new developments over the past decade, population-based surveys show a decline in cessation activity during the last decade. The decline occurred in both attempts to quit and in long-term success (NCI, 2000). Population-based data also suggest that heavier smokers (25+ cigarettes/day) are less likely to try to quit and to be successful. It is clear that efforts to improve cessation rates need to target both motivation to quit, especially among heavier smokers, and treatment efficacy and effectiveness. Studies of the natural history of the cessation process may provide us with insights into factors to consider when developing new treatments. This paper will present data on cessation trends, as well as on the process of cessation, relapse, and recycling, focusing on the length of time between quit attempts, the natural recovery process after a relapse, smokers thoughts about quitting, and quitting again after failed attempts, and their willingness to make repeat attempts using similar methods or medications. Data presented will be from both population-based surveys, as well as more intensive, longitudinal studies of smokers in treatment. To achieve maximum effectiveness, new treatments may need to go beyond increasing initial cessation rates, but also be sensitive to the longitudinal patterns of slipping, relapsing, and recovery, and consider the longer-term process of maintaining abstinence. Moving beyond considering cessation as episodic treatment and more into considering treatment from a chronic disease management perspective may be needed for improving longer-term cessation rates.

This work was supported in part by NHLBI grant HL42485 and NCI grant #42760.

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MECAMYLAMINE/NICOTINE TREATMENT FOR SMOKING CESSATION: GENDER DIFFERENCES

Jed E. Rose, Ph.D.*, Eric C. Westman, M.D., and Frederique M. Behm, Duke University and Veterans Affairs Medical Centers

In three studies we have explored the potential of the nicotinic antagonist mecamylamine when used in combination with nicotine replacement (NRT). Because of the small sample sizes in these studies, and consequently limited statistical power, an analysis of pooled data was conducted to examine the consistency of a possible gender influence on the efficacy of mecamylamine therapy used in conjunction with NRT. Data from a total of 291 subjects who participated in the three randomized, double-blind, placebo-controlled studies of mecamylamine were compiled. A logistic regression analysis was conducted, with continuous abstinence as the dependent variable; independent variables were pre-cessation mecamylamine (mecamylamine vs. placebo), pre-cessation nicotine (21 mg vs. 0 mg), gender (male vs. female) and the interactions terms for gender X mecamylamine, gender X nicotine, and nicotine X mecamylamine. The results indicated a significant gender X mecamylamine interaction (chi-square=4.01, p=0.045), with women showing a larger differential enhancement of smoking abstinence in response to mecamylamine treatment than men. The overall abstinence rates for women were 44.2% for mecamylamine vs. 15.6% for no mecamylamine (chi-square=10.24, p<0.001). For men the rates were 40.2% in the pre-cessation mecamylamine condition vs. 35% without mecamylamine (ns, chi-square=.33, p=0.6).

Studies were supported by the National Institute on Drug Abuse and The Medical Research Service of the Department of Veterans Affairs. The first author is holder of patent rights that have been licensed to Elan Corp. for development of mecamylamine/nicotine treatment.

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EXTENDED VERSUS BRIEF NORTRIPTYLINE TREATMENT

Sharon M. Hall*, Ph.D., Victor I. Reus, M.D., Gary Humfleet, Ph.D., and Ricardo Munoz, Ph.D., University of California, San Francisco

In a 2 X 2 design, we compared nortriptyline vs. placebo and brief (12 weeks) vs. extended (52 weeks) treatment. All participants received psychological group treatment up to week 12 and 8 weeks of nicotine patch. Extended treatment included monthly individual counseling up to month 11, and telephone checks two weeks after each counseling session. We hypothesized that participants receiving extended nortriptyline would be more likely to attain abstinence than participants in any of the other treatment conditions. N=160. Data from 108 participants are available at weeks 12, 24, and 36; data for 86 participants at week 52. For n=108, men=62%; Caucasians=79%; 22% have a history of Major Depressive Disorder (MDD). Extended treatment, especially with active drug, produces high CO-verified abstinence rates: At week 52, abstinence rates are (with missing data coded as smoking in parentheses): Extended nortriptyline=67% (60); brief nortriptyline=20% (18); Extended placebo=53% (32) and brief placebo=29% (29). As expected, differences between brief and extended treatments collapsed over drug are not significant at week 12. They are significant at weeks 24, 36, and 52. Extended treatment also enhances differences between active and placebo drug. There are no significant differences between active and placebo drug in the brief treatment conditions after week 12. In the extended conditions, differences are significant between active and placebo drug at weeks 24, 36, and 52. The mechanism by which extended treatment works appears to be primarily maintenance of 12 week abstinence, although a few new abisters are recruited at later time points. In the placebo extended condition, no participant who was smoking at week 12 achieved abstinence at later assessments. In the extended nortriptyline condition, three participants who were smoking at week 12 achieved abstinence at later assessments.

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SYM 5D  
EFFICACY OF A NEW NICOTINE LOZENGE FOR SMOKING CESSATION
Saul Shiffman, Ph.D.*, Pinney Associates and the University of Pittsburgh; Carolyn Dresler, M.D., GlaxoSmithKline Consumer Healthcare

Since nicotine gum was introduced in the 1980s, nicotine replacement therapy has become the most widely used pharmacological smoking cessation treatment. Some smokers prefer acute oral dosing forms, but many smokers reject chewing gum. A new oral dosage form, a lozenge, was developed, which delivers approximately 25% more nicotine than the gum. The efficacy and safety of 2 mg and 4 mg nicotine lozenge for smoking cessation were assessed in a randomized, double-blind, placebo-controlled trial with 1818 smokers in the UK (n=965) and US (n=853). Smokers were randomly assigned to active or placebo lozenge, with dose based on reported time to the first cigarette of the day (4 mg for ≥30 minutes after waking, otherwise 2 mg). Treatment with active lozenge resulted in significantly greater 28-day abstinence (CO-verified) at 6 weeks, both for 2 mg lozenge (46.0% vs. 29.7%, OR = 2.10 [1.59-2.79], p<0.0001) and 4 mg lozenge (48.7% vs. 20.8%, OR = 5.69 [2.74-9.86], p<0.0001). Significant treatment effects were maintained for a full year. Smokers who used more lozenges achieved significantly better treatment effects. Use of active lozenge also resulted in reduced craving and withdrawal. Adverse events resembled those seen with nicotine gum, with few serious adverse effects, and. The nicotine lozenge is a safe and effective new treatment for smoking cessation, in both low- and high-dependence smokers.

This study was supported by GlaxoSmithKline Consumer Healthcare (GSKCH). Dr. Shiffman provides consulting services to GSKCH on an exclusive basis on issues related to smoking control.

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SYM 6A  
COMPARISON OF EFFECTIVENESS OF A DENTAL SCHOOL BASED NICOTINE DEPENDENCE PROGRAM TO DENTAL HYGIENE STUDENT LEAD TOBACCO INTERVENTION COUNSELING
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It has been established that dental hygienists are capable of conducting successful tobacco interventions. The purpose of this study is to compare the effectiveness of brief tobacco interventions conducted by student dental hygienists during routine oral prophylaxis appointments (DH) to effectiveness of more intensive and costly interventions conducted by dental and dental hygiene faculty members working in a dental college based nicotine dependence program (NDP) as measured by number of patients who quit. Also, dental hygiene alumni were surveyed to determine if tobacco cessation was incorporated into their practices after graduation. Self-reported quit rates of smokers obtained from each program (NDP vs. DH) at the 3 week intervals were compared. (NDP n=42 and DH n=38) A Chi-Square test was used to analyze the data.

Forty-five percent of patients counseled at the NDP quit as compared to 28% from the DH as measured by self-report at the 3-week follow-up interval. The difference between the two groups was not statistically significant (p=0.11) Results of a five-year follow-up study of dental hygiene alumni (N=152, response rate = 66%) who were in tobacco cessation reported that 99% have incorporated tobacco cessation into their clinic practice and felt they were well trained to perform this service. Quit rates between the two groups were not statistically significant but this finding could be due to small sample size and given quit rates of the two groups which programs can produce average to above average quit success rates based on type of intervention but the DH student based program is less expensive and time consuming. Results also revealed that incorporating tobacco cessation interventions into the dental hygiene curriculum has produced dental hygiene practitioners who conduct this service as a routine part of clinic practice.

Funding for this research was provided by the UT Health Science Center, Memphis, Dept of Dental Hygiene.

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SYM 6B  
HELPING HARD-CORE SMOKERS QUIT: SOME LESSONS LEARNED IN A DENTAL SETTING
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Craving is the most prominent and bothersome symptom experienced during nicotine withdrawal, especially among hard-core smokers. In this study, a brief, 10-item version of the Questionnaire of Smoking Urges (QSU; Tiffany and Drobes, British J Addiction 86:1467-1476,1991) was administered to 112 smokers enrolled in a comprehensive, dental-school setting smoking cessation program. All patients were treated by the author using the modified protocol of the Mayo Clinic Model. Treatment included individual counseling, psychoeducation, and use of nicotine polacrilex gum, nicotine transdermal patches, or a combination of both nicotine replacement products. In this group of patients: the average age was 43.15; 63 were women; they began smoking at 15.3 years; they averaged smoking 27.82 cigarettes/day; and they had made 4.40 previous quit attempts. The results of this study showed that the QSU Tiffany Scale reliably captured multidimensional features of self-reported craving. (Cox et al, Nicotine & Tobacco Research 3(1):7-16,2001). Selecting a group of high-in-treatment QSU scorers and using other parameters, the author studied a group of 12 of the most resistant smokers. A study of this group showed that the key to effective cessation treatment is to assess the individual's readiness for change and to adjust motivational strategies to fit individual needs. In the first few weeks of treatment of hard core smokers, nicotine replacement therapy (NRT), often using multiple modalities, must be used to deal with nicotine addiction issues. NRT, properly used, can help the patient manage and control the strong physical urges and cravings that are common during the early phases of the quit process. Concurrently, psychological considerations and social factors must also be dealt with. This presentation will describe clinical cases of some hard core patients and discuss treatment regimens. It will include several examples of alternative treatment planning strategies, including harm reduction.

Funding for this research came from the Ph.D. program at Purdue University, West Lafayette, Indiana (Dr.s Cox and Tiffany) and from the Department of Oral Biology, Indiana University, Schools of Dentistry and Medicine and the Nicotine Dependence Program, Indianapolis. (Preventive Dentistry Research Fund # 32-D008-07-7).

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**SYM 6C**  
**BIOMARKER ACTIVITY AND THE ROLE OF VIRUSES IN CARCINOGENESIS**

George Taybos *, Karen Crews, Roger Johnson, Sigurds Krollis, Ronald Holton, Arthur Hume, Mark Olson, Donald Sittman, David Brown, Thomas Payne; University of Mississippi Medical Center School of Dentistry, Jackson, Mississippi

Smokeless tobacco use first became a health issue in 1986 when the Surgeon General released a report entitled The Consequences of Using Smokeless Tobacco. More than thirty carcinogens have been identified in smokeless tobacco. In animal models, NNN and NNK induced tumors of the cheek, palate and tongue. Several oncogenes have been implicated in oral carcinogenesis. The over expression of oncogenes is not sufficient to cause malignant transformation. The critical event is the inactivation of tumor suppressor genes. The tumor suppressor gene, p53, is mutated in 70% of adult solid tumors. Mutation of p53 allows the cell with damaged DNA to propagate the genetic alterations to other generations of cells. The relationship between viruses and malignancies is well established. The most common viruses that we are exposed to are the herpes viruses, Epstein-Barr viruses and the cytomegaloviruses. Smokeless tobacco alone may not induce cancerous changes in the oral cavity; however, when combined with HSV infections, the development of precancerous or cancerous lesions occurred in 50% of the tested animals. HSV type 1 and smokeless tobacco act synergistically in oral carcinogenesis. In combination with tobacco use, HPV type 16 infection can result in an oral cancer. The p53 tumor suppressor gene interacting with the oncogenic protein E6 of the HPV results in the rapid degradation of the p53 protein. The objective of our research is to survey the effect of smokeless tobacco on the expression of an array of known cancer-related genes and to evaluate the amplification of the major herpes viruses (HSV-1, HSV-2, CMV, and EBV), and Human Papilloma Virus (HPV) in a single tube screening assay. A tissue scraping will be collected from the smokeless tobacco lesion and from the opposite arch and unaffected tissue (no smokeless tobacco lesion). The research and findings will be discussed.

This research was funded by The Partnership for a Healthy Mississippi through the ACT Center (A Comprehensive Tobacco Treatment Center).

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**SYM 6D**  
**TOBACCO CESSATION THROUGH DENTAL OFFICE SETTINGS: FIFTEEN YEARS OF RESEARCH**

Judith S. Gordon*, Ph.D., and Herbert H. Severson, Ph.D., Oregon Research Institute, Eugene, Oregon

There is increasing interest in more broadly inclusive public health interventions that involve low-cost self-help materials and minimal support from professionals as an alternative to clinical cessation programs. Dental Health Care Workers (DHCWs) are a largely untapped resource for providing advice and brief counseling to tobacco-using patients, and there are good reasons to believe that they can be effective. The results of our randomized clinical trials have shown that a brief dental office-based intervention can be effective in helping ST-using patients to quit, and smokers to reduce their use and become more ready to quit. A third clinical trial tested the effectiveness of two methods of disseminating the smokeless tobacco intervention to DHCWs throughout the Western United States. Workshops were more effective than self-study in effecting behavior change, although our analyses indicate that self-study was more cost-efficient. These studies have demonstrated the viability of using dentists and dental hygienists to provide brief cessation advice and supportive materials in the context of regular oral health visits to encourage their patients to quit. The results of these studies also support the timeliness of further dissemination and diffusion of this program to practitioners, dental schools and dental hygiene programs.

This research was supported by grants from the National Institutes of Health.

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**SYM 6E**  
**TOBACCO USE CESSATION IN THE FEDERAL HEALTH SERVICES DENTAL SETTING**

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Studies have shown that tobacco use among incoming military members to be as high as 53% (Williams, et al, Military Medicine, 1997; Williams, et al, REACH, Navy Medicine, March-April 2001). Also, when compared to the civilian community, tobacco use is higher among all other current and prior military members. In response to this, the Veteran’s Health Administration (VHA) and the Department of Defense (DoD) put together a team to develop a tobacco use cessation guideline for the primary care setting. This guideline was recently introduced as the VHA/DoD Clinical Practice Guideline for Primary Care Tobacco Use Cessation (TUC) on 19 Sep 2001 via a live multi-media (global) satellite broadcast. This guideline is applicable to all primary care providers and staff members in the medical and dental setting. The release of this guideline and the accompanying TUC Tool Kit also provides an opportunity to assess the status of tobacco cessation efforts supported by both the Department of Defense Military Healthcare System and Federal Health Service Dental Providers. In order to measure the TUC working knowledge of Federal dental healthcare providers and staff members, the United States Army Center for Health Promotion and Preventive Medicine (USACHPPM) instituted a survey to measure various aspects of TUC in the practice of military and federal health service dentistry. This survey looked at all areas of dental practice to include administrative leader, dentists, dental hygienists, dental assistants, and other dental personnel. The survey also looked at the type, amount, and frequency of TUC provided to patients seen in the dental setting. Additionally, the survey looked at whether the dental facility offered referrals or provided on-site TUC for patients interested in quitting. The results of this survey, which are delayed in being collected due to the events of 11 Sep, will be provided during the Symposium.

Funding provided by the United States Army Center for Health Promotion and Preventive Medicine.

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**SYM 7S**  
**NEUROBIOLOGY OF NICOTINE DEPENDENCE**

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Nicotine is thought to be the primary substance in tobacco that contributes to addiction. Identifying the anatomical, physiological and genetic factors that contribute to nicotine dependence in the brain is critical for understanding the steps leading to tobacco use. We will explore the potential contributions of these factors to positive and negative behaviors related to nicotine dependence. In the first presentation Dr. William Corrigall will describe the neuronal pathways that are involved in nicotine reinforcement in the brain. In the second presentation, Dr. Anthony Caggiula will discuss the role of environmental cues in the acquisition, extinction and reinstatement of nicotine self-administration in rat. In the third presentation, Dr. M. Imad Damaj will describe a mouse model for nicotine physical dependence and the involvement of opiate receptors in nicotine withdrawal. In the fourth presentation, Dr. Allan Collins will discuss the relationship between nicotine acute sensitivity and and genetic vulnera- bility to nicotine dependence. Finally, Dr. Henry Lester will present data on nicotine responses in mice carrying hypersensitive alpha nicotinic receptors making those mice a promising model of dependence.

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SYM 7A  PATHWAYS FOR NICOTINE REINFORCEMENT IN THE BRAIN
W.A. Corrigall1,2, K.M. Coen1, K.L. Adamson1, J. Zhang1, A.J. Lanca1, D. Martens1, Centre for Addiction and Mental Health1, and Departments of Physiology2 and Pharmacology3, University of Toronto

The voluntary self-administration of a drug is viewed as a key element of dependence, and a long-standing goal of neuroscience research in this area has been to identify the CNS targets through which drugs, including nicotine, act to sustain this behavior in laboratory animals. Like other dependence-producing drugs, nicotine acts at least in part through the mesolimbic dopamine system. In so doing, nicotine appears to interact with nicotinic receptors on or near the dopamine neurons in the ventral tegmental area (VTA). In addition, we have shown that nicotine also acts in the brain stem, through the pedunculopontine tegmental nucleus (PPTg). Identification of these targets for self-administered nicotine allows detailed studies of the local circuitry involved in the reinforcement of nicotine self-administration. Using micro-pharmacological techniques to deliver selective neurochemicals to focal areas of the brain, we have found that manipulations of the inhibitory neurotransmitter gamma amino-butyric acid (GABA) within the VTA and the PPTg have greater effects on nicotine than on cocaine self-administration. In contrast, a number of other micropharmacological manipulations had little impact on nicotine self-administration of the two drugs. These observations suggest that there is specificity to the effects of GABAergic agents with respect to nicotine. Secondly, glutamatergic mechanisms also seem to play a major role in nicotine self-administration, a conclusion again based on pharmacological studies. These behavioral effects are consistent with our anatomical studies that have used immediate early gene activity to identify neurons among cues, nicotine and the operant behavior. The enhancement of bar pressing the local circuitry involved in the reinforcement of nicotine self-administration. The potential integration of these elements into a neuronal circuitry for nicotine reinforcement will be discussed. Supported by NIDA (DA 08577).

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SYM 7B  THE ROLE OF ENVIRONMENTAL CUES IN THE ACQUISITION, EXTINCTION AND REINSTATEMENT OF NICOTINE SELF-ADMINISTRATION IN RATS
A.R. Caggiula4,5, E.C. Donny6, N. Chaudhri7, R. White1, A. Sved1, K.A. Perkins7, S. Booth1, M. Gharib1, A. Hoffman1, L. Clements1, Departments of 1Psychology 2Neuroscience & 3Psychiatry, University of Pittsburgh, 4University of Pittsburgh Cancer Institute and 5The Johns Hopkins School of Medicine

Environmental stimuli associated with drugs of abuse are believed to play a major role in the motivation to take drugs, dependence and relapse. In the present research, we explored the role of cue-dependent cues in the acquisition, extinction and reacquisition of nicotine self-administration in male rats. Rats self-administering IV nicotine with environmental cues signaling drug availability and drug delivery acquired the behavior more rapidly and achieved higher response rates than animals self-administering nicotine without cues. After acquisition, the continued presence of cues resulted in prolonged resistance to extinction following nicotine withdrawal. Reacquisition after extinction was more rapid when cues were reinstated than when nicotine was reintroduced. We have also explored the contingency relationships among cues, nicotine and the operant behavior. The enhancement of bar pressing framework of contingent cue presentation but not non-contingent nicotine infusions: non-contingent infusions of nicotine significantly enhanced bar pressing as long as cues were contingently related to the animal’s behavior. These results demonstrate the importance of systematically studying the role of non-pharmacological stimuli and learning in nicotine abuse. They also suggest the novel hypothesis that nicotine can enhance the reinforcing properties of other external stimuli that is not dependent on a predictable temporal association with either the stimuli or the behavior. These results may have implications regarding the pattern of nicotine delivery that is sufficient to promote and sustain smoking behavior. Supported by NIDA (DA-10464 and DA-12655).

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SYM 7C  SENSITIVITY TO NICOTINE: GENETIC APPROACHES HELP IDENTIFY ITS COMPLEXITY AND REGULATION
Allan C. Collins*, Theresa Tritto, Sarah McCallum and Michael J. Marks, Institute for Behavioral Genetics, University of Colorado, Boulder, CO 80309

Nicotine evokes a broad array of behavioral and physiological responses in humans and in laboratory animals. Many other “animal researchers” have focused their efforts on behaviors that may be measures of the reinforcing effects of nicotine. Much of our research has been somewhat contrarian. We’ve opted to study effects of nicotine that might be considered as examples of toxic responses. We opted to study these responses because studies done by Michael Russell and Lynn Kozlowski, among others, have shown that smokers restrict their tobacco intake when toxic responses emerge. Moreover, it is possible that sensitivity to these toxic actions after a first dose, or failure to develop tolerance with chronic exposure, may be important factors that influence “genetically-based vulnerability” to nicotine addiction. We will summarize some “old” and new data which show that sensitivity to nicotine is not, at least in the mouse, a one-dimensional phenomenon. Different responses are regulated by different genes and these responses segregate independently of one another. This leads to the conclusion that references to nicotine sensitivity must specify the response. Data obtained using classical genetic strategies, as well as data obtained with nicotinic receptor gene knockout mice, will be presented which identify likely nicotinic receptor subtypes that modulate the responses that we have measured. We will also provide data which show that chronic nicotine-induced upregulation of high affinity nicotine binding sites may not be a major cause of nicotine tolerance or addiction.

The work described here has been supported by a grant from the National Institute of Drug Abuse (DA-03194) a MERIT award from the National Institute on Alcoholism and Alcohol Abuse (AA-11156) and a Research Scientist Award to ACC (DA-00197).

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SYM 7D  NICOTINE RESPONSES OF KNOCK-IN MICE CARRYING HYPERSENSITIVE a4 NICOTINIC RECEPTOR
Carlos Fonck, Imad Damaj1, Raad Nashmi, Purnima Deshpande, Barbara Bowers5, Jeanne Wehner6, Johannes Schwarz, Cesar Labarca and Henry Lester*, Caltech, Pasadena, CA

We have confirmed the gain of function properties of the mutated a4 containing nicotinic acetylcholine receptors of our Leu9’Ser knock-in mice. These mice displayed a heightened pharmacological sensitivity to nicotine as an anaglesic and to nicotine-induced seizures. Animals heterozygous (hets) for the a4 mutation and their wild type littermates (WT) were evaluated in their response to nicotine using the tail flick and hot plate nociceptive behavioral assays. Mice were tested 2 hours before, and 15 minutes after a single subcutaneous nicotine injection, and the latency to avoidance of heat-based nociceptivestimuli was recorded. Nicotine increased the latency of the pain avoidance response in hets at 0.05 to 0.5 mg/kg, and in WT at 0.5 to 2 mg/kg. Hets displayed a 5.3 fold lower ED50 than WT. The specific nicotine binding site blocker mecamylamine (1 mg/kg) almost completely abolished the nicotine effects in both hets and WT. WT mice displayed a dose dependent increase in response times to nicotine injections when evaluated on the tail flick assay. Interestingly, their heterozygous littermates were unaffected by nicotine injections at 0.05 to 0.5 mg/kg. Hets, but not WT, displayed Straub tail and seizures with a dose-dependent decrease in latency at nicotine doses ranging from 1 mg/kg to 2 mg/kg. Seizures were observed in WT at nicotine concentrations of 10 mg/kg or higher. These data support the gain of nicotinic receptor function in our knock-in mice, the importance of the a4 subunit in mediating nicotine analgesia in the supraspinal responses measured in the hot plate, the minimal a4 modulation of the primarily spinal reflex-dominated pathway assessed by the tail flick assay, and the possible involvement of gain-of-function a4 receptors in epilepsy. The hypersensitive a4 knock-in mouse is a promising animal model for the acute effects of nicotine.

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SYM 7E  CHARACTERIZATION OF A MOUSE MODEL OF NICOTINE PHYSICAL DEPENDENCE

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A model for nicotine physical dependence in mice was developed in our lab. The withdrawal signs measured include somatic behavioral signs, hyperalgesia as measured by the tail-flick test and the hot-plate apparatus, and anxiogenesis as measured by the plus-maze. In this model, mice were continuously infused with 24 mg/kg/day of nicotine using surgically implanted osmotic mini-pumps for a duration of 14 days. Each mouse was tested for spontaneous withdrawal signs 18-24 hours after removal of the delivery device. In a second experiment, the model was utilized to measure the precipitation of the abstinence syndrome using mecamylamine, a non-competitive nicotinic antagonist. In both the spontaneous and precipitated withdrawal models, the observed behavioral signs were significantly higher than control groups. The spontaneous withdrawal syndrome was also characterized by measurable differences in nociception threshold and anxiety with decreased effects seen in the precipitated model. The results support our hypothesis that a withdrawal syndrome can be seen in mice, which can further aid in the study of the neurochemical mechanisms of nicotine dependence and the development of new strategies in smoking cessation.

Supported by grant # NIH DA- 05274.

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SYM 8A  GENETICS AND RESPONSE TO BUPROPION

Caryn Lerman, Ph.D.*, Leonard Epstein, Ph.D., Paul Wyleto, Ph.D., Janet Audrain, Ph.D., Larry Hawk, Ph.D., Angela Pinto, B.A., David Roth, Ph.D., Peter Shields, M.D., Raymond Niaura, Ph.D.

Animal and human twin studies have established that smoking, in part, is heritable. Studies have found associations of smoking with genes involved in the regulation of dopamine and serotonin; however, this has not been replicated in all studies. These results have laid the foundation for pharmacogenetic studies that examine whether specific genetic markers can be used to predict treatment response. Research on bupropion has found an association between the dopamine transporter gene and smoking. Based on data from 405 Caucasian smokers who participated in two placebo-controlled trials, we examined whether this and other genes moderate the effectiveness of bupropion. Since one hypothesized mechanism is the reduction of nicotine reinforcement, we conducted analyses in the total sample, as well as a subset of 301 early lapsers, with end-of-treatment 7-day point prevalence the primary endpoint. Comparisons of treatment effects by dopamine transporter genotype do not support an overall effect. However, among participants who lapsed, the effect of bupropion vs. placebo was small, but significant, only in smokers who had at least one 9 allele. No significant effect was found for the moderating effect of the CYP2B6 gene, which codes for an enzyme that metabolizes bupropion. However, among females, abstinence rates were 23% for placebo, 54% for bupropion group with wildtype genotype, and 63% for bupropion group with a mutation (poor metabolizers). Although this effect is small and of questionable clinical significance, it is intriguing because females have been found to metabolize bupropion more rapidly than males. These data will be augmented with additional genotypes and longer term follow-up data.

Supported by grants from the NCI: RO163562 and a Transdisciplinary Tobacco Use Research Center Grant.

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SYM 8B  SMOKING cessation WITH BUPROPION: ADHD AND WITHDRAWAL SYMPTOMS

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Many adults diagnosed with ADHD in childhood maintain ADHD symptoms in adulthood, and have been found to exhibit higher rates of substance and alcohol use, smoke at higher rates, and have reduced success at quitting than adults without ADHD. This study examines the role of ADHD symptoms on smoking behaviors and cessation outcomes in response to bupropion, in a community sample of 493 smokers (52% male; 44 years; 93% Caucasian). Participants completed a structured interview assessing past and current ADHD symptoms and measures of withdrawal symptoms throughout treatment and follow-up. Participants were randomly assigned to receive either 300 mg bupropion or placebo, taken for 10 weeks, in combination with either standard or cognitive-behavioral cessation treatment. Smoking outcome was defined as any smoking within seven days prior to 6-month follow-up. While 9% of the sample met criteria for childhood ADHD, 4.8% met age-adjusted diagnostic criteria for ADHD, with onset in childhood. Demographic variables, nicotine dependence, behavioral treatment, medication, and baseline ADHD symptoms were entered into a logistic regression, with lower nicotine dependence and bupropion associated with higher rates of abstinence. Controlling for baseline level of dependence, as well as psycho-social group and medication, withdrawal symptoms were greater for those with ADHD across treatment and six-month outcome than for those without ADHD. Baseline ADHD symptoms predicted withdrawal symptoms during quit week, over and above the effects of baseline dependence and bupropion.

This work was supported by NIDA grant R01-DA08511 (Bupropion SR provided by Glaxo SmithKline).

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SYM 8S  BUPROPION FOR TREATMENT AND PREVENTION OF RELAPSE TO SMOKING

Elizabeth E. Lloyd-Richardson, Ph.D., Brown University Centers for Behavioral & Preventive Medicine, Caryn Lerman, Ph.D., University of Pennsylvania Department of Psychiatry, Richard D. Hurt, M.D., Mayo Clinic Nicotine Dependence Center, Gary Swan, Ph.D., Center for Health Sciences, SRI International, Raymond Niaura, Ph.D., Brown University Centers for Behavioral & Preventive Medicine

Research has consistently supported bupropion SR as an effective treatment for smoking cessation. In fact, bupropion has demonstrated wide applicability across various populations. The objective of this symposium is to illustrate variation in treatment response with bupropion, exploring various moderators of bupropion treatment, as well as investigating the effectiveness of bupropion in preventing relapse to smoking. Dr. Elizabeth Lloyd-Richardson will discuss the relationship between adult ADHD and withdrawal symptoms to treatment response in a double-blind placebo controlled trial of combined bupropion and cognitive-behavioral therapy. Dr. Caryn Lerman will present new research that evaluates the effectiveness of the dopamine transporter gene on bupropion treatment response. While bupropion has shown widespread effectiveness, Dr. Gary Swan will discuss the heterogeneity of treatment response with bupropion, in an effort to stimulate discussion of the primary sources of such variation. Presenting results from two new studies, Dr. Richard Hurt will provide evidence for the effectiveness of bupropion as an aid for relapse prevention in newly abstinent smokers. Dr. Raymond Niaura will moderate questions and discussion from the audience, as well as discuss implications for the future synthesis of genetic, pharmacological, and psychological moderators of bupropion for smoking cessation and relapse prevention.

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SYM 8C  HETEROGENEITY OF SMOKING CESSION OUTCOMES IN RESPONSE TO BUPROPION SR

Gary E. Swan, Ph.D.1, Harold Javitz, Ph.D.1, Tim McAfee, M.D., M.P.H.2, Lisa M. Jack, M.A.3, Sue Curry, Ph.D.2, Sallie Dacey, M.D.1, 1Center for Health Sciences, SRI International, 2Center for Health Studies, 3Center for Health Promotion, Group Health Cooperative

Little is known about the heterogeneity of responsiveness among smokers to bupropion SR. The present study sought to examine this heterogeneity in a large sample of smokers recruited from a large health system, screened for contraindications randomized to one of four combinations of treatment (either telephonic proactive counseling or a tailored mail-based approach in combination with either 150 mg or 300 mg bupropion SR taken for eight weeks), and assessed on a comprehensive set of relevant smoking characteristics prior to treatment. Smoking outcome at three months was defined as any smoking within the 7 days prior to follow-up contact. Those receiving 300 mg were significantly more likely to be abstinent than those receiving 150 mg, OR = 1.18; 95% CI, 1.05-1.32. Classification and regression tree analysis identified heterogeneity of outcome among individuals, and classification results that minimized rates of misclassification were retained. Among those receiving 150 mg, seven subgroups were identified with abstinence rates ranging from 45% to 14.1%. Among those receiving 300 mg, abstinence rates ranged from 48.4% to 15.7% across seven identified subgroups. This amount of variation in treatment responsiveness to two dosages of bupropion SR suggests that more work needs to be done to understand the underlying bases for such wide variation among smokers receiving this form of pharmaceutical aid for cessation.

Research supported by grant CA71358 from the National Cancer Institute. Bupropion SR provided by Group Health Cooperative Pharmacy.

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SYM 8E  GENERAL DISCUSSION AND IMPLICATIONS FOR FUTURE CLINICAL RESEARCH WITH BUPROPION AND SMOKING OUTCOME

Raymond Niaura, Ph.D.*, Brown University Centers for Behavioral and Preventive Medicine, The Miriam Hospital

The discussant will synthesize across the presentations, highlighting implications for future research in the area of moderators of response to both smoking cessation treatment and relapse prevention with bupropion.

Supported by grants from NHLBI.

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SYM 8D  BUPROPION FOR PHARMACOLOGIC PREVENTION OF RELAPSE TO SMOKING

Richard D. Hurt, M.D.,* Mayo Clinic Nicotine Dependence Center

Bupropion has been studied for prevention of relapse to smoking in two studies after initial abstinence was achieved by open-label treatment. In the first study, 58.8% of 784 subjects were abstinent from smoking at the end of 7 weeks of open-label bupropion treatment. Subjects were randomly assigned to bupropion (300 mg/d) or placebo for 45 weeks. Point prevalence smoking abstinence at the end of the double-blind bupropion phase (week 52) was 55.1% versus 42.3% (p=0.008) and at week 78, 47.7% versus 37.7% (p=0.034) in the bupropion and placebo groups, respectively. There was no significant difference at week 104. The median time to relapse was significantly greater for bupropion recipients than for placebo and weight gain was significantly less in the bupropion group than in the placebo group at study weeks 52 and 104. In this study, the sites were experienced in smoking intervention trials.

In the second study, 31% of 578 subjects were abstinent from smoking at the end of 8 weeks of nicotine patch therapy (doses up to 44 mg/d) tailored to baseline smoking rate. Subjects were randomly assigned to bupropion (300 mg/d) or placebo for 6 months. At the end of the double-blind bupropion phase (6 months after randomization), point prevalence smoking abstinence rates were 28% and 25% in the bupropion and placebo groups, respectively. In this study, the sites were oncology investigational group practices.

CONCLUSION: Bupropion may be effective for pharmacologic relapse prevention in newly abstinent smokers but more studies are needed.

These studies were supported by the North Central Cancer Treatment Group (CA37404-14N) and study medication was provided by Elan Pharmaceutical and Glaxo SmithKline.

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SYM 9S  ETHICAL PERSPECTIVES ON COLLABORATION WITH THE TOBACCO INDUSTRY

Brion Fox, Center for Tobacco Research and Intervention, Joanna Cohen, Ontario Tobacco Research Unit, Kenneth Warner, University of Michigan, Lynn Kołodziewski, Pennsylvania State University, Mark Parascandola, National Cancer Institute

Interest in harm reduction as a tobacco control strategy has elevated the prominence of the ethical question of whether and under what circumstances tobacco researchers could collaborate with the tobacco industry. This conundrum has become more pressing as the industry has made efforts worldwide to begin such a dialogue. The reaction to these entrees has been a nearly universal rejection of the industry. This rejection is neither surprising nor inappropriate given the tobacco industry's history of manipulating scientific and policy processes. Nevertheless, permanently ostracizing the industry could work against legitimate public health goals such as promoting an open scientific dialogue and developing and encouraging the use of harm reducing products. To begin such a dialogue, however, could open a Pandora’s Box, where the hope of a better future is outweighed by the hazards of collaborating with an industry that works against the interests of the public’s health. To better understand what elements need to be in place that would favor collaboration, both within the research community and within the tobacco industry, this symposium will assemble a panel of four speakers and a moderator to analyze the question from four ethical perspectives: human rights, public health ethics, bioethics and business ethics. The moderator will pose questions to the panelists and entertain questions from the audience to further explore the ethical arguments of under what circumstances the tobacco research community might collaborate with the tobacco industry.

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HUMAN RIGHTS PRINCIPLES AND COLLABORATION WITH THE TOBACCO INDUSTRY

Lynn Kozlowski, Ph.D., Pennsylvania State University

This lecture applies the principle of the human right to receive truthful information on health to evaluate the ethics of collaboration with the tobacco industry. In the context of health, it is widely accepted that people have a fundamental right to be given correct information about products that influence their health. Cigarette companies have violated human rights, for example, by marketing lower-tar cigarettes as less dangerous while their own research showed that this was not true. This lack of concern for the health of smokers, and the suppression of and dispute of information that could inform smokers of the dangers of smoking, are significant human rights violations. Though this principle might seem to argue for no cooperation with the tobacco industry, this would be a simplistic position. For the sake of the same human right, non-industry tobacco researchers should view that they have an ethical obligation to honestly inform the public about health issues surrounding all tobacco products. Even if no money were taken from the tobacco industry, some would consider it an unethical collaboration with the industry to offer intellectual support for any tobacco industry based products. From the point of view of human rights, however, it is ethical to report that certain tobacco products substantially reduce health risks for smokers. Low-nitrosamine smokeless tobacco products, for example, are less dangerous than cigarettes (i.e., no lung cancer, no emphysema), and public health researchers should view it as unethical to withhold this information from cigarette smokers.

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A PUBLIC HEALTH PERSPECTIVE ON COLLABORATING WITH THE TOBACCO INDUSTRY

Kenneth Warner, Ph.D., University of Michigan

Until recently, tobacco control was an area of public health that had largely escaped the moral and philosophical ambiguity that characterizes many of the field’s undertakings. Oversimplifying, tobacco control was a battle of good vs. evil, with the side of the angels possessing few resources other than the righteousness of their cause and the intensity of their commitment fighting against history’s worst case of a profit-bloated industry run amuck. For 50 years the industry lied about its knowledge of the dangers of its product. Today, segments of the industry have dropped that ruse and now strive to develop and market novel tobacco products that it claims are less hazardous than conventional cigarettes, promote limited regulation, etc. The question arises, therefore, as to whether, and how, public health interests should cooperate with the industry in pursuit of better knowledge, less hazardous products, appropriate regulation, and dissemination of truthful information. To date, a “just-say-no” attitude has prevailed within the mainstream tobacco control community. Still, some feel a cautious urge to pursue a working relationship with the industry, given its superior knowledge of the technologies at issue, its large pool of resources and its purported willingness to consider government regulation.

From a public health perspective, the primary obstacle to be overcome prior to considering collaboration with the tobacco industry is evidence that effective protections will be in place against the prospect of industry misuse of any collaboration. This speaker will address these underlying public health principles and will present alternatives to direct collaboration that would serve the industry’s publicly avowed purposes without risking compromising the public’s health.

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A BUSINESS ETHICS PERSPECTIVE ON COLLABORATING WITH THE TOBACCO INDUSTRY

Brion Fox, J.D., Center for Tobacco Research and Intervention

In general, businesses are not immoral actors, but are governed by different ethical rules. Corporations are bound by corporate law and the needs of stakeholders, such as shareholders, who demand profit maximization. By understanding business ethics and how the rules differ from those governing public health practitioners, one can anticipate problems that may arise through collaboration and develop mechanisms to account for conflicts.

The CDC has established guidelines for such collaborations, but they may be insufficient to address collaboration with tobacco corporations which have a long history of immoral behavior. The record is replete with accusations that tobacco companies have violated laws regulating smuggling, racketeering, and anti-competitive behavior, and that they have failed to disclose product information and have manipulated consumers and regulators.

The tobacco industry may be remedying past immoral behavior, however. For example, the MSA includes provisions for eliminating trade organizations, making available internal documents, and other assurances of changed behavior. Some companies have also expressed an interest in pursuing harm reducing products. Under the assumption that one should not collaborate with an unethical actor, the question becomes: How does one determine if the tobacco industry has sufficiently changed? This speaker will argue that there are three preconditions: 1) an established set of business ethics for the tobacco industry; 2) evidence that the company will be held to those standards; and 3) evidence that operating under the CDC, or other guidelines, will protect researchers, the underlying research, and possible consumers of the research.

This work was supported by a Developing Leadership in Reducing Substance Abuse Fellowship from the Robert Wood Johnson Foundation.

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SYM 10A  EPIDEMOLOGY OF NICOTINE DEPENDENCE IN ADOLESCENCE

Denise Kandel, Ph.D.*, Columbia University and New York Psychiatric Institute

Very little is known about the epidemiology and natural history of nicotine dependence in adolescence. This presentation will review what is known on the basis of studies conducted on non-selected samples, whether in the general population or in schools; rates of dependence, gender and ethnic differences, age related changes in adolescence, rapidity of onset, relationship to daily smoking, potential risk and protective factors. Using as an illustrative example the analysis of the relationship between frequency of smoking and symptoms of dependence, differences between adolescents and adults and the potential contributions of epidemiological approaches to laboratory and animal studies will be highlighted. Issues crucial to further advances in the field will be discussed, including the definition and measurement of dependence, and the incorporation of biological measurement in field studies.

Support is provided by Grants DA-09110 and DA13288 and Research Scientist Award K05 DA 00081 from the National Institute on Drug Abuse.

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SYM 10B  LABORATORY RESEARCH WITH ADOLESCENT CIGARETTE SMOKERS

William A. Corrigall, Ph.D.* Martin Zack, Ph.D., CAMH and University of Toronto, and Tom Eisenberg, Ph.D., Virginia Commonwealth University

Adolescent smokers display some characteristic features of dependence, but the biobehavioral effects of smoking in this population have received limited attention. We have used a laboratory approach to investigate smoking in daily and non-daily cigarette smokers aged 12-18 years. Studies examined aspects related to dependence in overnight-abstinent smokers, including pre/post-smoking measures of physiological and subjective effects, information processing, and topography. Fagerstrom scores (FTND) were greater in daily than non-daily smokers. Salivary nicotine, expired-air carbon monoxide and puff volume confirmed inhalation and dosing. Self-reported intention and desire to smoke decreased after smoking, and subjective effects were generally related to the extent of current puffing. Puff topography did not differ between daily and non-daily smokers. These data show that adolescent cigarette smokers self-administer physiologically active doses of nicotine early in their smoking experience, and that measures of nicotine dependence appear to be a function of cigarette use. In another study, a modified Stroop task measured adolescents’ ability to inhibit attention to smoking-related cues during abstinence and after smoking, and the classical Stroop measured the ability to inhibit a generic pre-potent response (reading a verbal stimulus). Adolescents showed an impairment of inhibitory information processing similar to that reported for adult smokers. However, as with the data described above, the daily frequency of smoking in the subjects predicted the results, that is, the improvement in information processing on both the classical and the modified Stroop tasks. Implications and future directions will be discussed.

Supported by the Robert Wood Johnson Foundation.

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SYM 10C  ADOLESCENT AND ADULT RATS DIFFER IN BIOBEHAVIORAL RESPONSES TO NICOTINE

Martha M. Faraday, Ph.D.*, Brenda M. Elliott, M.S., Jennifer M. Phillips, B.S., Neil E. Grunberg, Ph.D., Uniformed Services University of the Health Sciences

Adolescence is a critical vulnerable period for initiation of tobacco use, with > 90% of smokers beginning to smoke before age 19. A large self-report literature suggests that people initiate and maintain smoking for psychosocial reasons but also to obtain nicotine’s behavioral and psychological actions (e.g., body weight and appetite control, stress relief, feelings of reward). Whether nicotine’s actions differ in the adolescent vs. the adult organism in ways that make adolescents particularly vulnerable to nicotine use and abuse, however, is not known and would be difficult to ethically determine in young human drug-naive subjects. This paper will present data from a series of experiments that tested the hypothesis that nicotine’s biobehavioral actions differ in adolescents vs. adults in a rat model. Using male and female Sprague-Dawley rats, we have found that adults and adolescents differ in responses to nicotine administered chronically (via osmotic minipump) as well as acutely (via acute injection). These biobehavioral differences include changes in feeding, body weight, locomotion, and elevated-plus maze performance. Overall, these data suggest that the adolescent responds differently to nicotine compared to the adult. These differences may be relevant to understand adolescent tobacco use vulnerability, tobacco use prevention, and early cessation.

Funding: This work was funded by Robert Wood Johnson Grant #036413 (DoD Grant G172DF).

CORRESPONDING AUTHOR: M. Faraday, Ph.D., Medical and Clinical Psychology, USUHS, 4301 Jones Bridge Road, Bethesda, MD 20814.
Animal models with adults have been used extensively to predict consumption of addictive substances in adult humans. Animal models of adolescent drug consumption are rare, however, with no published reports to-date regarding adolescent nicotine consumption. The mouse is an excellent model for examining the development of nicotine addiction in adolescence. For example, adult mouse models of nicotine exposure have been used effectively to demonstrate nicotine’s effects in reward-relevant brain regions, and have contributed to understanding the behavioral effects of nicotine. In light of the recent mapping of the mouse genome, mouse models provide a unique opportunity to reveal genetic contributions to nicotine addiction. However, behavioral models of adolescent nicotine consumption must be established before biobehavioral and genetic studies can be conducted.

This paper will present data from a series of experiments designed to establish a model of nicotine preference behavior by adolescent mice. Using an oral nicotine consumption paradigm previously developed for adult mice, we have found that adolescent male and female C57BL/6J mice consume nicotine orally and that they differ in their preference for nicotine in a 2-bottle choice test. Nicotine preference amounts also are associated with significant alterations in feeding and body weight that are consistent with the nicotine addiction literature on humans and rats. Our results suggest that oral nicotine consumption by adolescent mice delivers significant amounts of nicotine (indexed by serum cotinine levels) and that this mouse model can be used to evaluate the biobehavioral mechanisms of adolescent nicotine addiction.

This work supported by NIDA (DA15114-01).

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NI 1

NO ASSOCIATION BETWEEN FUNCTIONAL CATECHOL O-METHYL TRANSFERASE 1947 A->G POLYMORPHISM AND SMOKING INITIATION, PERSISTENT SMOKING OR SMOKINGcessATION

Sean P. David, M.D., S.M.*1, Elaine C. Johnstone, Ph.D.2, Siân Elin Griffiths, B.Sc.2, Michael F. Murphy, M.Sc.1, Patricia L. Yudkin, D.Phil.1, David C. Mant, M.Sc., M.B., Ch.B., M.Sc.1, Robert T. Walton, M.D.1, 1Brown University Center for Primary Care and Prevention, 2ICRF General Practice Research Group, 3University of Oxford Department of Primary Health Care

Nicotine stimulates dopamine release and activates dopaminergic reward neurons in central pathways giving rise to dependence. Catechol O-methyl transferase (COMT) inactivates extraneuronally released dopamine and is present in dopaminergic brain regions. A functional polymorphism (COMT 1947 A->G) resulting in increased enzyme activity has been associated with alcoholism and polysubstance abuse. We examined the relationship between the COMT 1947 A->G polymorphism and smoking initiation, smoking persistence, and smoking cessation. We genotyped 266 current smokers, 270 ex-smokers, and 265 lifetime non-smokers (never smokers), matched for age and gender, for the COMT 1947 A->G polymorphism. Smoking status was ascertained by self-report. There was no difference in genotype frequencies between never smokers and ever smokers (current + ex-smokers); between non-smokers (never + ex-smokers) and current smokers; or between current smokers and ex-smokers. These data suggest that the COMT 1947A->G polymorphism is not associated with smoking initiation, smoking persistence, or smoking cessation.

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NI 2

INTRAPERSONAL AND INTERPERSONAL INFLUENCES ON THE PROGRESSIONS OF ADOLESCENT ADDICTIVE SMOKING BEHAVIORS

Chaoyang Li, M.D., M.P.H., Mary Ann Pentz, Ph.D.

Objectives: Several studies showed that adolescent smokers had considerable levels of nicotine addiction. However developmental trend and factors related to adolescent addictive smoking behaviors are elusive. The present study examined the patterns and the predictors of adolescent smoking addiction progression over three time points. Methods: A sample of 2,053 junior high school students was surveyed longitudinally for three waves (baseline, 6 months, and 18 months) in Orange County, California during 1997-2000. Three measures (use tobacco within first 30 minutes of waking, ‘smoking more than 10 cigarettes daily’, and ‘smoked more than 100 cigarettes during lifetime’) and a simplified Fagerstrom Test for Nicotine Dependence (FTND) score were used to assess levels of adolescent nicotine addiction (regular smoking and addictive smoking). Predictors included demographic, psychosocial, and behavioral variables. Odds ratios (ORs) of nicotine addiction were estimated using generalized estimating equation (GEE) models that accounted for design effects. Results: A significant increasing trend of prevalence rates for regular smoking (Cochran-Armitage Z score = -6.36, p < .001) and addictive smoking (C-A Z score = -1.73, p = .04) was observed. Cross-sectional GEE analyses showed that male gender, intention to smoke at baseline, and number of smoking friends were significantly associated with high risk of regular and addictive smoking at time 2 and time 3; while intervention program was significantly associated lower risk. In longitudinal GEE models, time, time2, intention to smoke at baseline, number of smoking parents, and number of smoking friends were significantly associated with increasing risk of both regular and addictive smoking; in contrast, prevention program and refusal self-efficacy were significantly associated with decreasing risk. Conclusions: Psychosocial and behavioral factors may predict the progression of adolescent regular and addictive smoking. Enhancement of school-based tobacco prevention program and refusal self-efficacy may reduce the risk of adolescent addictive smoking.

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NI 3

SMOKER MISPERCEPTIONS ABOUT THE CHARACTERISTICS OF DIFFERENT NICOTINE DELIVERY DEVICES.


OBJECTIVE: To assess, in a nationally representative survey, smokers’ knowledge, attitudes, and beliefs regarding characteristics of different types of nicotine delivery devices.

METHODS: Data were collected with a 25-minute random-digit dialed telephone survey, conducted with a nationally representative sample of 1,046 adult smokers between May and September 2001.

RESULTS: Ninety-four percent of American smokers consider themselves to be adequately informed about the health risks from smoking. However, 53% believe that nicotine is a cause of cancer. Only 6% of smokers reported that they thought a lot about how smoking would affect their health when they started smoking, while 64% now think a lot about how smoking might affect their health now. Seventy-one percent of smokers surveyed believe that they will quit smoking, and 76% think they will quit before they experience a serious health problem caused by smoking. Most smokers were not aware of filter fiber fallout, but 87% believe that inhaled filter fibers would pose an additional health risk and 58% report that this new knowledge would make them want to quit more. 82% agreed that chewing tobacco is as likely to cause cancer as smoking cigarettes, while one-third of smokers reported that a person who smokes 5 cigarettes per day has the same risk of cancer as a non-smoker. With regards to nicotine replacement therapy, 74% of smokers believe that smoking while using the nicotine skin patch or gum is worse for your health than smoking alone, 44% of smokers believe that nicotine medications work by causing physical illness if used while smoking, and one-third reported that the nicotine skin patch was less likely to cause a heart attack compared with smoking cigarettes. Half of the smokers surveyed believe that high tar cigarettes are at least twice as likely to cause illness as those low in tar.

CONCLUSION: Despite smokers’ beliefs that they are adequately informed about the health risks from smoking, evidence suggests that smokers still hold several misconceptions about the risks of cigarettes and various other nicotine delivery devices.
AN ECONOMETRIC ANALYSIS OF TOBACCO CONTROL SPENDING

Lan Liang, Ph.D.*, Frank J. Chaloupka, Ph.D., and Kathryn Lerulli, Ph.D., University of Illinois at Chicago

The public is increasingly aware of the importance of environmental factors on an individual’s decision to smoke. Comprehensive tobacco control programs are part of the efforts that focus on altering the social and political context of smoking. ASSIST, IMPACT, and Smokeless States are three such programs that are funded nationally. Though different in their emphases, these programs all aim at changing the macro environment of tobacco consumption by funding a network of coalitions at the state and local level. This study evaluates the effectiveness of these programs on reducing cigarette sales and consumption.

Using data from 1990-1998, different state level cross-section and time-series models are estimated. The dependent variable is the per capita annual cigarette sales at the state level. The explanatory variable of interest is the per capita expenditure of these public tobacco control programs. Other explanatory variables includes state demographics, the economic dependence on tobacco of the state, and the existing state level tobacco control policies such as cigarette price, youth access laws, and clean indoor air laws. Estimates of decreases in per capita cigarette sales as a result of a 10 cents increase of the overall program spending per person ranges from 0.68 pack to 1.23 pack, that is, a 0.7 percent to 1.3 percent reduction. Our analysis shows that spending by different programs has varying effects in reducing cigarette sales. The results suggest that how the funds were spent and at what level the states were funded might have contributed to the differences.

Supported by a contract from Prospect Associates to the University of Illinois at Chicago.

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PAI-1  
**NICOTINIC ACETYLCHOLINE RECEPTOR BINDING, AND ANTINOCICEPTIVE PROPERTIES OF 2-EXO-2-(2'-SUBSTITUTED-3'-PHENYL-5'-PYRIDINYL)-7-AZABICYCLO[2.2.1]HEPTANES. NOVEL NICOTINIC ANTAGONIST**

F. Ivy Carroll, Jeffrey R. Lee, Hernán A. Navarro, Lawrence E. Brieaddy, Philip Abraham, M. I. Damaj, and Billy R. Martin

Novel nAChR agonists and antagonists are needed to further characterize the various nAChR subtypes and as potential pharmacotherapies for treating smokers. The alkaloid epibatidine was isolated from the skin of the Ecuadorian frog, Epipedobates tricolor, by Daly and co-workers and was found to have very high affinity for the alpha4,beta2 nAChR. Pharmacological studies show that epibatidine acts as a potent nAChR agonist. Although epibatidine is 200 times more potent than nicotine as an analgesic agent, it is also toxic acting in a limited therapeutic index. Nevertheless, it is an important lead structure for the development of potentially useful pharmacotherapy for treating nicotinic addiction. In this study we report the nAChR binding affinity and antinociception properties of several 2-exo-2-(2'-substituted-3'-phenyl-5'-pyridinyl)-7-azabicyclo[2.2.1]heptanes and compare the results to that of previously reported epibatidine analogs.

The 2-chloro-3-phenyl, 2-fluoro-3-phenyl, 2-amino-3-phenyl, and 2-dimethylamin-3'-phenyl analogs showed Ki values of 0.021, 0.24, 0.33, and 50.2 nM, respectively, at the alpha4,beta2 nAChR. The Ki values of optical isomers of the 2-fluoro-3'-phenyl analog were essentially identical to that of the racemic compound. The 2-fluoro-3'-phenyl analogs were not active in the tail-flick and hot-plate assays. However, the racemic compound as well as the (+)- and (-)-isomers did block the antinociceptive effects of nicotine in the tail-flick test after s.c. administration with AD50 values of 0.5, 1.0, and 0.08 mg/kg, respectively. Thus, the 2-fluoro-3'-phenyl analog of epibatidine is a novel nicotinic antagonist. To our knowledge this is the first epibatidine analog reported to show nAChR antagonist properties.

*This research was supported by the National Institute on Drug Abuse Grant DA12001.*

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PAI-2  
**INVOLVEMENT OF Alpha 7 nAChRs IN GENE EXPRESSION OF DOPAMINE BIOSYNTHETIC ENZYMES (TH AND GTPCH) IN RAT BRAIN**

Lidia Serova, Ph.D., and Esther L. Sabban*, Ph.D., New York Medical College; Lidia Serova, Ph.D., and Esther L. Sabban*, Ph.D., New York Medical College

The effects of different doses of nicotine and the involvement of alpha 7 nAChRs on gene expression of dopamine biosynthetic enzymes in the brain were examined. Sprague Dawley rats were given five injections of several concentrations of nicotine (0.08 to 1.6 mg/kg, twice daily). A significant dose dependent effect of nicotine was observed on tyrosine hydroxylase (TH) mRNA levels in the ventral tegmental area (VTA) and the substantia nigra (SN). In the VTA, even the lowest concentrations of nicotine were sufficient to elicit the maximal response in TH mRNA (300% increase). In the SN, 0.16 mg/kg nicotine was needed for maximal induction of TH mRNA (170% of control). Parallel to TH, the mRNA for GTP cyclohydrolase I (GTPCH), the rate-limiting enzyme in biosynthesis of its essential cofactor tetrahydrobiopterin, was increased in VTA.

Our previous study in PC12 cells indicated that alpha 7 nAChRs are involved in elevation of TH mRNA by nicotine (Gueorguiev et al., 2000, J. Neurochem, 75:1997-2005). Here, we examined their role in vivo. Pretreatment of rats with the specific alpha 7 nAChR antagonist, methyllycaconitine (4.2 mg/kg), prevented the nicotine triggered elevation in TH and GTPCH mRNA in both dopaminergic locations. Injections of the alpha 7 nAChR agonists, DMXB and 3-CA, kindly provided by Edwin Meyer, University Florida) raised TH mRNA levels in VTA and SN comparable to that observed with nicotine.

The results suggest that nicotine may regulate dopamine biosynthesis by altering expression of TH, as well as of its cofactor. In addition, the findings indicate that alpha 7 nAChRs plays a role in mediating the effect of nicotine on gene expression of dopamine biosynthetic enzymes in the brain.

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PAI-3  
**VACCINATION OF FEMALE RATS AGAINST NICOTINE REDUCES NICOTINE DISTRIBUTION TO FETAL BRAIN**

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Tobacco use is associated with adverse neonatal outcomes including low birth weight, increased mortality, and sudden infant death syndrome. Evidence suggests that nicotine is a contributor to some adverse outcomes in a dose related manner, such that a reduction in fetal nicotine exposure might improve outcomes. Immunization of adult male rats with a nicotine conjugate vaccine has been shown to reduce nicotine distribution to brain. The purpose of the current study was to determine whether vaccination of pregnant female rats could reduce the distribution of maternally administered nicotine to fetal brain. Female Sprague-Dawley rats (n=8) were vaccinated i.p with 25 μg of nicotine immunogen on days 0, 21 and 35, and then bred. On day 16-18 of gestation animals were anesthetized and received 0.03 mg/kg nicotine bitartrate (weight as base) containing 10 μCi of 3H-nicotine, via femoral vein catheter over 10 sec. Rats were sacrificed 5 min after the nicotine injection. Pregnant female control (non-vaccinated) rats (n=7) were similarly treated. All vaccinated rats had maternal serum nicotine-specific antibody titers of >1:6,000. Maternal serum nicotine concentrations were higher in vaccinated rats than in controls (82 ± 19 ng/ml, p <0.01), demonstrating binding and sequestration of nicotine in maternal serum. Nicotine concentrations were lower in both maternal brain (35 v. 59 ng/g, p<0.05) and fetal brain (3.4 v. 6.8 ng/g, p <0.05). These data suggest that maternal vaccination can reduce the early distribution of a single dose of nicotine to fetal brain.

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PAI-4  A PILOT STUDY CHARACTERIZING TWO NOVEL CYP2A6 ALLELES, CYP2A6*7 AND CYP2A6*8, IN VIVO

Rachel F. Tyndale, Ph.D., Chun Xu, M.D., Ph.D., Yushu Rao, M.S.c, Bo Xu, M.D., Ewa Hoffmann, M.Sc, and Edward M. Sellers, M.D., Ph.D., Centre for Addiction and Mental Health and Departments of Pharmacology, University of Toronto, Toronto, Canada, MSS 1A8

Human cytochrome P450 2A6 (CYP2A6) is the major enzyme responsible for the majority of the inactivation of nicotine (NIC) to cotinine (COT). CYP2A6 is polymorphically expressed due to multiple variations in the CYP2A6 gene that result in large interindividual differences in enzymatic activities towards substrates such as NIC and coumarin (COU). In the present pilot study we examined two novel allelic variants, CYP2A6*7 and CYP2A6*8, resulting from ile471Thr and Arg485Lue substitutions respectively. These exon 9 variants are in, or near to, substrate recognition site-6. Using established(*)-5 or newly created (*6-9) genotyping assays, we investigated the in vivo metabolism of two substrates, NIC and COU. Our pilot data indicate that CYP2A6*7 produces an enzyme that has decreased activity towards the substrate NIC (AUCs for NIC for the genotypes of *1/*1 (N=6), *1/*3 (N=1), *1/*7 (N=1), *4/*4 (N=2), and *4/*7 (N=3) are 1796, 1590, 3542, 6081, and 6751, and for COT are 14262, 16372, 10239, 8894, and 1288, respectively). CYP2A6*7 is able to 7-hydroxylase COU however COU metabolism is not able to discriminate among active genotypes. Our data suggest that the CYP2A6*7 is unlikely to affect catalytic activity in vivo. More subjects will be needed to fully characterize these variants in vivo. In conclusion, this represents the first in vivo characterization of a CYP2A6 allele, CYP2A6*7, which has reduced but not inactive metabolism of NIC.

This study was conducted while the first author was at Departments of Pharmacology, University of Toronto. Supported in part by NIDA grant DA06889.

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PAI-5  GENETIC INFLUENCES ON HEART RATE RESPONSIVENESS TO NICOTINE INFECTION

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We investigated the extent to which genetic factors contribute to change in heart rate (HR) following a 30 min infusion of intravenous deuterium-labeled nicotine and cotinine (0.5-2.0 μg/kg/min) in adult twin pairs (73 MZ and 35 DZ) of average age 39.9 years and BMI of 25.0. HR was measured at the beginning (0 min), during (5, 10, 20, 30 min), and following infusion (45, 60 min). At each time point, percent change from beginning HR was calculated and then adjusted for smoking status. In MZ twins, the intraclass correlations for percent change in HR was significantly greater than zero at all measurement points while in DZ twins, only those at 30, 45, and 60 min were greater than zero (all p < .05). The overall rate of change in HR over the first five time points during infusion and last three time points following infusion (calculated as the slope of the best-fitting regression line) was adjusted for age, BMI, gender, and smoking status. Genetic analyses suggested a modest amount of additive genetic variation in the rate of change of HR over the first five measurements during infusion (23.9%) while no evidence was obtained for genetic influence on HR change following infusion. This study is the first to demonstrate that sensitivity to nicotine as reflected in HR responsiveness to infusion has a small but detectable genetic component.

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PAI-6  FAMILIAL INFLUENCES ON SMOKING BEHAVIOR AND THE ROLE OF PERSONALITY

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Genetic effects on smoking behavior and personality have been well established. However, the extent to which the magnitude of personality deviation might account for the familial transmission of cigarette smoking [never (NS), regular/non-heavy smoking (RS), regular/heavy smoking (HS)] has not been systematically examined. We tested for gender differences in the extent to which Cloninger’s TPQ and Eysenck’s EPQ personality measures would mediate familial influences on smoking. Data obtained from a mailed-questionnaire-survey conducted in 1988/1989 of 2680 male and female Australian twin-pairs (946-MZF, 401-MZM, 541-DZF, 223-DZM, 569-DZO) were analyzed using logistic-regression. Moderate (50-75th percentile) and high (75th percentile) levels of novelty seeking (NS) predicted RS and HS (odds ratios: ORs=1.49-6.67). For women only, moderate (OR=1.39) and high (OR=1.49) levels of extraversion (E) predicted RS, while high levels of neuroticism (N) predicted RS (OR=1.39) and HS (OR=2.15). For men only, high N influenced HS (OR=1.87), while low (-25th percentile) and moderate levels of reward dependence (RD) remained significantly associated with smoking (ORs=1.48-2.88). However, the degree of similarity of MZ compared to DZ same-sex twin-pairs for risk of RS (women: MZF-OR=17.21; DZF-OR=4.27; men: MZM-OR=11.74; DZM-OR=3.91), and as well as HS (women: MZF-OR=345.99; DZF-OR=15.65; men: MZM-OR=54.77; DZM-OR=5.27) compared to never-smoking, remained substantially unchanged, after controlling for these personality variables. Attention to levels of personality traits may be informative when examining smoking behavior, but cannot account for observed genetic influences.

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PAI-7  A NEGATIVE AFFECT BIAS IS ASSOCIATED WITH FAMILIAL SMOKING

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Substantial evidence supports a strong genetic influence on smoking behavior. However, little is known about the mechanisms that mediate the genetic risk for smoking. Several researchers have suggested that affective information processing may be mechanistically related to the inherited risk of becoming a smoker. In the present study, we examined the relationship between reactivity to standard emotional cues and a continuous index of familial smoking, which serves as a proxy for the genetic risk of smoking. In particular, we predicted a negative affect bias among smokers and non-smokers with a greater proportion of smokers in the family. Subjects (n=32; ages 18-30) were presented with thirty pleasant, neutral, and aversive cues using Lang’s affective picture viewing paradigm. Subjective and psychophysiological indices reflecting valence and arousal dimensions of affect were obtained in response to each picture. As predicted, subjects with an increased satiation of familial smoking reported greater negative affect in response to aversive pictures (r=-.33), and they displayed greater skin conductance responses during exposure to these cues (r=.30). In addition, the startle blink may be elicited by acoustic probes presented during neutral affect pictures was increased as a function of familial smoking (r=.58). Overall, these findings support the hypothesis that smoking risk is associated with a negative affect stimulus and response bias. The present family-based study is limited in its ability to differentiate genetic from environmental influences. Nonetheless, the findings suggest that affective information processing may yield valid endophenotypes associated with genetic factors in smoking.

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PA1-8  NICOTINIC RECEPTOR MECHANISMS AND COGNITIVE FUNCTION IN SCHIZOPHRENAIA

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Cigarette smoking rates in schizophrenia are higher than in the general population. Self-medication of clinical and cognitive deficits, abnormalities in brain reward pathways, and genetic and environmental factors may explain this co-morbidity. This study addresses the hypothesis that cigarette smoking by schizophrenics may remediate cognitive deficits associated with the disorder, such as visuospatial working memory (VSWM). We are studying an overnight smoking abstinence and reinstatement paradigm in an outpatient laboratory setting. Using a within-subjects design, schizophrenic and control nicotine-dependent smokers are pre-treated with 0.0, 5.0 and 10.0 mg/day of the nicotinic receptor antagonist mecamylamine (MEC) in a counterbalanced fashion during three separate test weeks at least one week apart. Cognition, clinical symptoms and tobacco craving are assessed at smoking baseline, after overnight smoking abstinence (12 hours) and after smoking reinstatement.

MEC did not significantly alter smoking parameters compared to placebo in either group. After overnight smoking abstinence, plasma nicotine was undetectable in both groups. In SCZ (n=8) subjects, deficits in VSWM were worsened by overnight smoking abstinence and partially reversed by smoking reinstatement. Pre-treatment MEC (5.0 mg/day) blocked the effects of smoking reinstatement on VSWM. In contrast, in CON (n=9) smokers, overnight smoking abstinence did not alter VSWM, but smoking reinstatement impaired VSWM. MEC pre-treatment dose-dependently blocked this impairment in VSWM by smoking reinstatement. Our preliminary findings suggest that cigarette smoking may improve cognitive deficits in schizophrenia, and that nicotinic receptor mechanisms may mediate smoking-related improvements in cognitive function in schizophrenia.

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PA2-2  BUPROPION ATTENUATES THE AVERSIVENESS OF MECAMYLAMINE-PRECIPITATED NICOTINE WITHDRAWAL IN THE RAT

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While buproprion is known to be an effective aid in smoking cessation, less is known about its mode of action. This analysis tested whether buproprion prevents small lapses (<7 days, followed by a return to abstinence) from leading to full relapses (7 contiguous days of smoking). Participants were 303 smokers who enrolled in a placebo-controlled clinical trial of buproprion. This question was approached using Cox-regression with time-varying covariates, which allowed us to separate the effects of lapses during treatment and follow-up, and look at interactions of those lapses with drug treatment. Overall, 87% of participants reported a lapse within the 10 week treatment period, while 46% reported a full relapse. Small lapses predicted a relapse (Hazard Ratio = 7.63, P=0.000). However, lapses that occurred while taking buproprion appeared to lead to relapse at the same rate as lapses in the placebo group. Also, lapses that occurred following treatment led to relapse at the same rate as those occurring during treatment. Thus, while buproprion is an effective smoking cessation aid, it does not appear to prevent lapses from leading to relapses.

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PA2-3  THE INFLUENCE OF DEPRESSIVE SYMPTOMS ON BUPROPION-AIDED SMOKING CESSION

Delwyn Catley, Ph.D.1, Kari Jo Harris, Ph.D., M.P.H., Kolawole S. Okuyemi, M.D., M.P.H., Matthew S. Mayo, Ph.D., Jasjit S. Ahluwalia, M.D., M.P.H., M.S., University of Kansas Medical Center

Numerous studies have established an association between depressive symptoms and smoking behavior. Furthermore, anti-depressant medications such as buproprion have also been found to be efficacious in assisting smokers to quit. The purpose of this study was to examine the influence of depressive symptoms on treatment outcome in a recently completed randomized controlled trial of buproprion-SR among 600 African American smokers (70% female, mean age = 44). We examined the association between depressive symptoms and smoking cessation and level of smoking over time. Participants were randomized to 7 weeks of treatment with buproprion or placebo. Depressive symptoms were assessed using the Center for Epidemiological Studies Depression scale (CES-D) at 1 week and 6 weeks (end of treatment) after quit day. Longitudinal analyses were conducted using mixed linear models and GEE to predict smoking level and smoking cessation, respectively. Results revealed that depressive symptoms were significantly associated with level of smoking (p < .0001) and quitting (p < .0003) over time. Models examining the potential moderating effect of depressive symptoms with a treatment group x depressive symptoms interaction term were not significant. Analyses also provided no indication that treatment effects were mediated by changes in depressive symptoms. Rather, both treatment group and depressive symptoms had significant independent effects on outcomes. Results suggest that although depressive symptoms are related to smoking, depressive symptoms do not interact with buproprion treatment in affecting outcomes.

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A COMPARISON OF SUSTAINED-RELEASE BUPROPION AND PLACEBO FOR SMOKING CESSATION IN AFRICAN AMERICANS

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African Americans disproportionately suffer greater smoking attributable morbidity and mortality. Few clinical trials for smoking cessation in African Americans have been conducted, despite a different profile of both smoking and quitting. Our objective was to compare a sustained-release form of bupropion HCl with placebo for smoking cessation among African Americans.

We conducted a double-blind, placebo-controlled, randomized trial from February 1999 to December 2000. Participants were recruited by targeted media and health care providers at a community-based health center.

Six hundred African American adult volunteers who smoked 10 or more cigarettes per day were randomly assigned to receive seven weeks of bupropion SR 150 mg bid (n=300) or placebo (n=300). Brief motivational counseling was provided in-person at baseline, quit day, weeks 1 and 3, and end of pharmacotherapy (week 6) and by telephone at day 3 and weeks 5 and 7. The primary outcome was biochemically confirmed 7-day point prevalence abstinence at 6 weeks and 6 months following quit day.

Confirmed abstinence rates at the end of seven weeks of treatment were 36.0% and 19.0% (p<0.001), and at 6 months were 21.0% in the bupropion group and 13.7% in the placebo group (p=0.018). Those on bupropion SR experienced a larger reduction in depressive symptoms, and after controlling for continuous abstinence, gained less weight.

Bupropion SR was effective for smoking cessation among African Americans and may be useful in reducing the health disparities associated with smoking.

National Cancer Institute #R01 CA77856 and Glaxo-Wellcome, Inc. provided study medication.

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EVALUATING THE EFFECTIVENESS OF NRT THERAPY IN A POPULATION: PRELIMINARY OUTCOME (20 MONTHS)

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Interventions for smoking cessation are typically evaluated on reactively recruited clinical trials. However, to have an impact in a general population, the efficacy of the intervention should also be evaluated in a representative sample. NRT alone and in combination with behavioral interventions has been evaluated and shown to be effective in clinical trials. However, the efficacy of NRT in general populations is unknown. All members of a large New England VA were contacted. Interviews were completed with 3239 identified smokers and 2054 agreed to participate and returned the informed consent (64%). Subjects were randomly assigned to one of four interventions conditions in an additive design: Stage-matched manuals (MAN), MAN plus NRT (NRT), NRT plus Expert System Intervention (EXP), and EXP plus Telecommunications (TLC), a computer-based automated telephone counseling system. In the three NRT conditions, the goal was to prepare the maximum number of smokers for NRT. There were four assessments: Baseline, 10 Months, 20 Months, and 30 Months. The point prevalence cessation rates at 20 months were MAN, 15.2%; NRT, 12.8%; EXP, 18%; and 17.2%. The MAN results are comparable to previous studies. The NRT condition produced cessation rates far below those reported in clinical trials. The EXP condition produced results slightly below previous studies. The TLC contribution is difficult to evaluate in the context of the other interventions.

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PA3-1  CORRELATES OF SMOKING MENTHOL CIGARETTES AMONG AFRICAN AMERICANS
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African Americans have higher tobacco-related morbidity and mortality and are more likely to smoke menthol cigarettes than their white counterparts. It has been suggested that the excess morbidity is related to their smoking menthol cigarettes. This secondary analysis examined differences between African American menthol and non-menthol smokers on their smoking characteristics and success with smoking cessation.

The study sample consisted of 600 African American smokers enrolled in a double-blind, placebo-controlled, randomized trial to assess the efficacy of bupropion for smoking cessation. Menthol (n=471) and non-menthol (n=129) smokers were compared on sociodemographic and smoking characteristics, expired carbon monoxide, salivary cotinine, Fagerstrom Test of Nicotine Dependence, stages of change, and abstinence rates at 6 weeks and 6 months.

Menthol smokers were younger (42 vs 53 years), more likely to be female (74% vs 57%), and more likely to be employed (78% vs 66%) compared to non-menthol smokers (all p<0.01). Cigarette satisfaction (57% vs 50%, p=0.15) and taste (50% vs 40%, p=0.05) were rated higher by menthol smokers. The two groups were similar on the other characteristics examined. After controlling for treatment, menthol smokers remained less likely to quit at the end of 6 weeks of pharmacotherapy (28% vs. 42%, p=0.01), and at 6 months follow-up (21% vs 27%, p=0.21), compared to non-menthol smokers.

Smoking of menthol cigarettes is associated with lower rates of short-term cessation, thereby putting menthol smokers at greater risk from the health effects of smoking. Future studies should examine why quit rates are lower for smokers of menthol cigarettes.

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PA3-3  HOW CIGARETTE ADVERTISEMENTS TARGETED AT SPECIFIC RACIAL/ETHNIC GROUPS, WOMEN AND YOUTH MAY INFLUENCE THEIR SMOKING BEHAVIOR
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Tobacco use is sustained by many factors including nicotine addiction, psychological, social and environmental factors such as advertising. Evidence suggests that tobacco advertising can influence smoking behavior, and thus may contribute to the initiation and maintenance of smoking. Tobacco use is the leading preventable cause of disease and death in this country, killing more than 430,000 people annually. Therefore, understanding how tobacco advertising influence smoking behavior will help curtal this epidemic.

The tobacco industry commonly uses an advertising strategy called segmentation to target specific audiences. In comparison to general advertising, this type of targeted advertising may have a greater effect on some populations because it provides these audiences with ads suitable to their behavior, demographic and psychological characteristics. Billions of dollars are spent on tobacco advertising annually. According to the FTC, the five largest cigarette manufacturers spent $8.24 billion on advertising and promotional expenditures in 1999 as compared to $6.73 billion spent in 1998. The industry's spending on magazine advertising increased from $281.3 million in 1998 to $377.4 million in 1999. It is likely that smoking behavior is influenced by the substantial amount of advertising expenditures and sophisticated marketing techniques employed by the industry. To determine how the industry acquires certain markets, this study conducted a content analysis of magazines from years 1998 and 1999 that had high rates of readership by four racial/ethnic groups (Whites, African Americans, Asian Americans and Hispanics), women and youth. A number of categories were analyzed for each magazine including number of cigarette advertisements, size of ad, cigarette brand, and selling propositions. Advertising expenditure data by brand was also collected for each magazine. Findings from this study will help determine how cigarette advertising in magazines contributes to the different patterns of tobacco consumption observed in specific populations. In turn, these findings will assist in the development of more effective countermarkting and cessation strategies targeted for these populations.

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PA3-2  MENTHOL PHARMACOKINETICS IN AFRICAN-AMERICAN WOMEN FOLLOWING MENTHOL CIGARETTE SMOKING
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Menthol smokers had significantly higher cotinine levels, higher cigarette puff volumes, and shorter time to the first cigarette of the day compared to nonmenthol smokers. While human studies have measured menthol exposure following oral menthol administration, plasma levels following smoking dosing via smoking in African American women cigarette smokers. Participants also provided qualitative descriptions of menthol cigarettes. In the GCRC, 6 women smoked two cigarettes of their usual brand consecutively. Venous blood samples for menthol assay were drawn prior to the first cigarette, at mid-point and completion of both cigarettes and multiple times after completion of the second cigarette. A modification of GC/MS assay for the quantification of l-menthol using stable isotopically labeled internal standard in human plasma was used. Average age of participants was 29.7 years, 13.5 y smoking history, 14.8 cpd on average and 166 ng/ml plasma cotinine. All smoked the same cigarette brand. Average time to first cigarette was 2.5 min. Average menthol content of their cigarette brand was 2.34 mg per cigarette. No unconjugated menthol was detected in circulation post-cigarettes. Following enzyme hydrolysis, plasma menthol was detected at the completion of the second cigarette in 3 of 6 women. Peak plasma levels ranging from 93 to 134 ng/ml occurred 3 to 15 minutes after completion of the second cigarette. Menthol half-life was 11.3 min (SD=4.4). Twenty-four hour urine samples during ad lib menthol cigarette smoking were collected from 3 participants in which 1.442, 2.385, and 2.844 mg menthol were excreted within 24 hr. In comparison to nonmenthol cigarettes, subjects described menthol cigarettes as “more filling.” The unique needs of menthol smokers may suggest that a tailored tobacco dependence treatment approach should be considered.

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PA3-4  RISK FACTORS FOR CONTINUED SMOKING IN EARLY ADULTHOOD AMONG PREGNANT TEENAGERS
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Recent reports indicate that tobacco use is increasing among pregnant teenagers. This prospective study examines factors that predict continued smoking into adulthood.

Pregnant teenagers (n=344) were interviewed during their first and third trimesters (Avg. age: 16.2 years) and reinterviewed as young adults (Avg. age: 23.0 years). Seventy percent were African-American. By the sixth follow-up year, 84% had become pregnant at least one more time with an average gravidity of 3 (range: 1-9). Nearly 47% were smokers during the first trimester, and 58% smoked during the third trimester. In their early adult years, 61% were smokers. Forty percent continued smoking into young adulthood (stable smokers); 7% quit. The average daily cigarettes among the teenage girls who quit was 6.8 and among the stable smokers was 10.0 (p<0.05). Twenty percent became smokers between teenage and adult years.

The stable smokers (n=137) were compared to all other women. Factors measured during pregnancy that were related to stable smoking (mother’s education, negative drinking consequences, attention problems, delinquency, aggression, friends’ smoking, alcohol and marijuana use) were considered in a multiple logistic regression. Significant predictors were: having friends who smoked; alcohol use; fewer years of mother’s education; and more negative drinking consequences.

Factors measured in the adult years that were related to stable smoking (education, smoking in household, life events, anxiety, hostility, self-esteem, current alcohol use) were considered in multiple logistic regression. Significant predictors were: more household smokers; less education; and more life events.

Many pregnant teenagers smoke and a large proportion continue to smoke into adulthood. Prevention strategies that target those girls who are at highest risk for continued smoking may prevent future offspring from being exposed during gestation.

This study was supported by NIDA (DA09275).

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PA3-5

RELATIONSHIP OF ONSET OF CIGARETTE SMOKING DURING COLLEGE TO ALCOHOL USE AND DIETING CONCERNS: RESULTS FROM THE YOUNG WOMEN’S HEALTH SURVEY

Karen K. Downey, Cynthia S. Pomerleau, Candace L. Kurth, & Dean D. Krahn

Little is known about specific risk factors for late onset smoking (initiation after college entry) among college women. We investigated this issue in women who responded to a survey of women’s health behavior, administered during freshman orientation and again during their senior year. Never Smokers (NS; n=374), Early-Onset Smokers (EOS; n=52) and Late-Onset Smokers (LOS; n=64) were compared on dieting concerns, mood problems, alcohol-related problems, and frequency of binge drinking episodes. By the senior year of college, 55% (64/116) of those who had smoked in the past month had started smoking during college, although this LOS group was significantly more likely than the NS group to have experimented with cigarettes prior to college. All groups showed significant increases in alcohol-related problems and significant decreases in dieting concerns over the course of the study. NS and EOS, but not LOS participants, showed significant increases in depression and frequency of binge drinking over the course of the study. Elevated dieting concerns at college entry were a significant risk factor for smoking onset during college, whereas indicators of problem drinking covaried with smoking status, with levels for LOS resembling those of NS at college entry, but approximating those of EOS by the end of the study. Group differences in depression did not reach significance at either time point. Results suggest that prevention efforts should target nonsmokers with high dieting concerns early in college, while smoking cessation intervention efforts may need to target not only smoking, but also problematic alcohol use among college women.

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PA3-6

CHARACTERISTICS OF LOW-LEVEL SMOKERS

Andrew Hyland, Hamed Rezaishiraz, Joseph Bauer, Michael Cummings

BACKGROUND: Low-level smokers may be loosely defined as occasional or non-dependent smokers. The proportion of “some day smokers” nationally has increased by nearly 20% between 1997 and 2000. The purpose of this analysis is to describe and compare low-level versus heavier smokers.

METHODS: Data from Community Intervention Trial for smoking cessation (COMIT) were used in this analysis. Cross-sectional tobacco use telephone surveys were performed in 22 North American communities in 1988 and 1993. In addition, a cohort of 13,415 smokers was identified in 1988 and followed until 1993. Low-level smokers in this analysis were considered as those smokers who reported smoking 5 or fewer cigarettes per day and the prevalence of low-level smoking was assessed in both 1988 and 1993. Characteristics of low-level smokers and the relationship between low-level smoking and future smoking behavior were assessed.

RESULTS: The percent of the smokers who were low-level smokers increased by 10% between 1988 and 1993 (7.4% to 8.1%). Factors significantly associated with low-level smoking were younger age, female gender, Hispanic ethnicity, black or Asian race, beginning smoking later in life, having their first cigarette of the day at least 30 minutes after waking, using other forms of tobacco, having lower desire to quit, a lower likelihood of using nicotine replacement therapy, and having stronger community-level clean indoor air policies. Compared with heavier smokers, low-level smokers had similar rates of making a quit attempt; however, they were much more likely to achieve successful cessation.

CONCLUSION: Low-level smokers are a growing segment of the smoker population and have different characteristics than heavier smokers, which may have implications for future tobacco control prevention and treatment strategies.

PA3-7

FIRST NATIONAL ESTIMATE OF PREVALENCE OF TOBACCO SALES TO MINORS


The Synar Amendment requires states to conduct inspections of retail tobacco outlets to ensure compliance with laws prohibiting sales to youth. Methods used in these checks have been so variable that national estimates of prevalence of sales cannot be inferred. This study provided the first national prevalence estimate.

Stores, communities and states were sampled using a stratified, multistate clustered design. In July and August, 2001, 33 teens (ages 16-17) performed compliance checks in 1,538 stores in 75 communities in 15 states, using one of two uniform protocols (consummated or unconsummated purchases). All carried valid ID’s which they presented when asked, and were truthful about their ages.

Teens were able to buy in 36.3% of attempts (95% CI 33.9,38.7). Sales rates were equivalent with consummated or unconsummated purchase protocols (p=0.21). Stores located in states with high Strength of Tobacco Control Scores were significantly less likely to sell those in states with weaker programs (p<0.01). Age and/or ID was requested in 85.7% of attempts. This was found to be the best predictor of refusing to sell (p<0.01), but clerks still sold in 26.4% of attempts when youth presented valid ID’s and/or correct age.

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PA3-8

DOES A COMPREHENSIVE TOBACCO CONTROL PROGRAM EFFECT EVERYBODY EQUALLY?

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Data from the 1990, 1993, 1996, and 1999 California Tobacco Surveys, a large population-based cross-sectional telephone survey, were analyzed to assess the impact of the CA-TCP across socio-economic groups in California over time. In 1990, near the beginning of the anti-tobacco media program, 45.4% of smokers in the lowest and 48.2% in the highest income quartiles reported that they had seen or heard something against smoking, compared to 87.9% of the lowest and 89.8% of the highest income smokers in 1999. There were no differences in understanding or agreeing with the media campaign messages. By 1999, over 50% of smokers had complete smoking bans in their homes. In 1990, less than 20% of California smokers were non-daily smokers; by 1999, nearly 30% of smokers did not smoke daily. In 1999 approximately 40% of smokers reported that they made a quit attempt in the past year; by 1999 nearly 50% of smokers attempted to quit. Across each of these outcome measures, there were no differences between smokers in the lowest and highest income quartiles. Nonetheless, differences in the level and rate of decrease in smoking prevalence between income groups were significant. This paper explores possible explanations for the differences in smoking prevalence, which persist despite evidence from intermediate outcomes that the CA-TCP reached and influenced smokers equally across income groups.

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**PA4-1**

**ADOLESCENT-ONSET NICOTINE SELF-ADMINISTRATION IN RATS**

Edward D. Levin, Amir Rezvani, Daniel Montoya, and H. Scott Swartzwelder

Although the great majority of tobacco addiction begins during adolescence, little is known about differential nicotine effects in adolescents vs. adults. The impact of beginning nicotine self-administration during adolescence cannot be determined in humans. The same genetic and environmental factors that promote nicotine addiction may also cause people to start smoking earlier. Although randomized experimental studies to determine the impact of starting nicotine use at different ages cannot be ethically conducted in humans, the rat model of nicotine self-administration can be used to determine how the age of onset impacts self-administration intensity. Rats began training for nicotine self-administration at 30 (adolescent-onset, N=17) or 60 (adult-onset, N=9) days of age. The rats were first trained to lever press for food, then for food and nicotine (0.03 mg/kg/infusion) and finally for nicotine alone. After approximately ten days of training the rats were tested for maintenance of nicotine self-administration. The rats self-administered nicotine over a period of four weeks (five days per week). On the first two days of each week they received the benchmark dose of 0.03 mg/kg/infusion, and received variant doses of 0.01 or 0.09 mg/kg/infusion on the remaining three days in a counterbalanced order. Adolescent-onset nicotine self-administration caused significantly (p<0.05) greater chronic levels of self-administration of the benchmark nicotine dose (0.03 mg/kg/infusion) compared to adult-onset nicotine self-administration. Adolescent-onset rats averaged 10.1 infusions/session while adult-onset rats averaged 5.4 infusions/session. The differential self-administration was consistent over time with significant (p<0.05) increases in adolescent-onset rats during both weeks 1-2 and 3-4. Adolescent-onset nicotine self-administration caused higher levels of nicotine intake, which may underlie greater dependence.

Supported by #DA11943.

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**PA4-2**

**FIRST REACTIONS TO CIGARETTES AND PROBLEMS WITH ALCOHOL IN FEMALE ADOLESCENT TWINS**

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Previous work has shown a genetic association between alcohol dependence and different aspects of cigarette smoking, including nicotine dependence, in adult and adolescent twins. Retrospective ratings of dizziness after first cigarettes have been found to correlate with regular smoking and progression to dependence on nicotine, and to show moderately high heritability in twin data. Here we examined the question of whether recalled dizziness after first cigarettes is associated with problems with alcohol, using telephone interview data on measures of DSM-IV dependence on alcohol and nicotine and the use of these substances in over 3,300 female adolescent twins, 13-20 years of age, recruited using Missouri state birth records. Controlling for age and either regular smoking or DSM-IV nicotine dependence, there remained a significant association between the experience of dizziness with first cigarettes and alcohol problems (in both cases, odds-ratio = 1.45, 95% CI: 1.1-1.9). Dizziness rating contributed substantially to twin pair concordance for alcohol problems (unadjusted odds ratio=13.04, 95% CI: 8.71-19.51; adjusted odds ratio, controlling for dizziness rating, = 5.35, 95% CI: 3.43-8.35). Our results suggest that initial reactions to cigarettes may be a heritable trait associated with increased vulnerability to dependence on both nicotine and alcohol.

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**PA4-3**

**IMPACT OF TOBACCO USE ON BRAIN FUNCTION IN ADOLESCENTS**

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Although public health efforts have resulted in a decline in the number of adult tobacco users, the number of adolescents becoming regular tobacco users has increased. Given the heightened educational demands encountered during adolescence, enhancement of brain function by nicotine may contribute to the initiation and maintenance of regular tobacco use during this time.

In this study, the effect of recent tobacco use and of nicotine abstinence on activation of neural circuits that mediate performance of tasks involving verbal working memory and selective attention is being examined in adolescent smokers using fMRI. Subjects are studied after recent tobacco smoking and after 24 hours of abstinence from tobacco use. During scanning, subjects perform an auditory n-back task with two levels of working memory load and two levels of selective attention load.

Twelve subjects (age 16.8 +/- 1.2 years) studied to date smoked 15.4 +/- 8.8 cigarettes per day and had expired air CO levels of 14.0 +/- 6.4 ppm prior to the recent smoking scan and 4.2 +/- 1.7 ppm prior to the abstinence scan (t=5.2, p<0.0004). Subjects correctly identified 71-92% of targets across all conditions.

fMRI data show an interaction between recency of tobacco use and verbal working memory load in the left prefrontal cortex, left caudate nucleus, and right hippocampus, such that these regions show significantly greater activation during the high working memory load condition after recent smoking than after 24 hours of abstinence. These data suggest that recent tobacco use may modulate activation of brain circuitry mediating verbal working memory in adolescent tobacco users.

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**PA4-4**

**SITUATIONAL VERSUS INTRA-INDIVIDUAL CONTRIBUTIONS TO ADOLESCENTS’ SUBJECTIVE MOOD EXPERIENCES OF SMOKING**

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Adolescents’ subjective experiences of smoking, such as mood changes, are likely to be a function of both intra-individual factors (e.g., genetics) and contextual (situational) factors. This study used ecological momentary assessments to examine the relative contributions of these two factors to mood changes following smoking in 100 adolescents (58% female; 65% white). We hypothesized that mood changes after smoking would become more predictable (greater variance attributed to intra-individual factors) as smoking experience increased, and that this relationship across smoking experience would be linear. Adolescents were divided into 3 groups based on lifetime smoking experience: 1) smoked < 5 cigarettes in life; 2) 6-99 cigarettes; 3) > 100 cigarettes. Participants used hand-held computers for 7 consecutive days to record smoking events, moods, and situational contexts, yielding 517 smoking events. Using random-effects regression models, we calculated the intra-class correlation (ICC) coefficients as a measure of intra-individual differences. For positive moods, there was a significant linear increase in the variance attributed to intra-individual factors (ICC) as smoking level increased; for the least experienced smokers, 0% of the variance in positive moods was due to intra-individual factors, compared to 21% for the 100+ lifetime smokers. For negative moods, however, there was neither a significant change in mood nor a significant difference across groups. For the 100+ lifetime smokers, only 2% of the variance in negative mood change could be attributed to intra-individual factors.

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PA4-5

PSYCHIATRIC AND SMOKING CORRELATES IN TEEN SMOKERS

A. Thiri Aung, M.D.*, David H. Epstein, Ph.D., Nandita Thatte, B.S., Monique Ernst, M.D., Ph.D., and Eric T. Moolchan, M.D., TTATRC, NIDA/IRP

Nicotine dependence is associated with psychiatric disorders. We describe the smoking correlates of teen smokers with and without psychiatric disorders presenting for smoking cessation treatment. Sixty-six teen smokers between 13 and 17 years of age were screened with the Diagnostic Interview for Child and Adolescent-DSM IV prior to treatment. Dependence and withdrawal symptoms measured at the time of study entry were assessed using the Fagerstrom Test of Nicotine Dependence questionnaire (FTND) and the Minnesota Withdrawal questionnaire (MW). Psychiatric disorders were diagnosed in 65.2% (43/66) of the sample. ODD [35.5% (22/62)], CD [14.5% (9/62)], eating disorders [14.5% (9/62)], OCD [11.5% (7/62)] and ADHD [6.5% (4/62)] were the most common diagnoses. No significant differences were found between teens with psychiatric diagnoses and control in age, race, gender, tobacco consumption, nicotine dependence, or number of prior quit attempts. However, they had longer smoking histories (3.70 yrs ± 1.54 vs. 2.00 yrs ± 0.76; p=0.016), reported more smoking enjoyment (74.64% ± 26.65 vs. 52.50% ± 37.41; p=0.046) and had higher total MW scores (13.3 vs. 9.7; p=0.052) than non-comorbid teen smokers, even though the number of cigarettes smoked per day was similar in both groups. To examine a more homogeneous comorbid sample, the analysis was repeated in those with externalizing behaviors only (n=32; ADHD, CD or ODD). Results were similar to those of the whole sample, i.e., greater withdrawal scores (13.9 vs. 10.3; p=0.048). Our results highlight the importance of addressing psychiatric disorders when tailoring cessation programs for teen smokers.

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PA4-6

ASSESSING TOBACCO DEPENDENCE AMONG ADOLESCENT SMOKERS: CONCORDANCE AMONG THE FTND, DSM-III-R, AND DSM-IV

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Previous research has demonstrated the discordance of commonly used instruments to diagnose tobacco dependence among adults. We analyzed data from teen smokers requesting assistance for smoking cessation. Participants were 68 smokers (mean age 15.2, SD 1.4) who scored at least 5 on a phone-screen Fagerstrom Test for Nicotine Dependence (FTND). The sample was 79% female and 21% African-American. Tobacco dependence was assessed again on site using FTND (mean score 7.1, SD 1.3), DSM-III-R and DSM-IV criteria. More “cases” were diagnosed by DSM-IV criteria (n=62) than by DSM-III-R criteria (n=57); expressed in terms of Cohen’s kappa, agreement between the DSM-III-R and DSM-IV was moderate but greater than chance (kappa = 0.54; 95% CI 0.24 - 0.83). Neither set of criteria showed above-chance agreement with the FTND. For the DSM-III-R, the best agreement occurred at an FTND cutoff of ≥7 (kappa = 0.71, 95% CI 0.62 - 0.79) and the best agreement occurred at an FTND cutoff of ≥6 (kappa = 0.71, 95% CI 0.62 - 0.79). FTND cutoffs of ≥6 and ≥7 diagnosed 60 and 46 “cases,” respectively. These findings provide preliminary evidence of discordance between instruments used to evaluate tobacco dependence among teens requesting cessation. In further analyses, we will look more closely at the sources of disagreement between the DSM-III-R and DSM-IV, and examine differential predictors of “caseness” on the DSM-IV and the FTND. We will also examine various modifications of the Fagerstrom questionnaires that were administered to the same pool of participants.

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PA4-7

VIEWING TOBACCO USE IN MOVIES PREDICTS ADOLESCENT SMOKING BEHAVIOR

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To determine if viewing tobacco use in movies predicts trying smoking among adolescents, we conducted a follow-up survey of students in 15 Vermont and New Hampshire middle schools. At baseline, we measured exposure to tobacco use in movies by counting the number of tobacco use occurrences in 601 recent popular movies and then asking each student if s/he had seen a unique list of 50 movies, randomly selected from the larger sample. Based on the movies seen, we summed the number of tobacco use occurrences and divided exposure roughly into 4 quartiles. Complete data were obtained from 3236 never smokers at baseline, of whom 85% were interviewed by telephone 13 to 24 months later. The primary outcome was having tried smoking during the follow up period.

Students at baseline had seen an average of 16 movies on their list of 50, from which they viewed a median of 82 tobacco use occurrences. At follow-up, 10.1% reported that they had tried smoking. Trying smoking was significantly associated with exposure to movie tobacco use: 4.5% of those exposed to fewer than 50 tobacco use occurrences tried smoking compared to 17.2% of those exposed to > 150 occurrences (p < 0.0001). This association remained significant even after controlling for other social influences and sociodemographic, personality and parenting characteristics. Compared with adolescents who viewed fewer than 50 tobacco use occurrences, the adjusted relative risk for trying smoking was 1.52 for those who viewed 51-100 occurrences, 1.83 for 101-150 occurrences, and 1.93 for > 150 occurrences. Assuming a causal relationship, 19.4% of smoking initiation among this cohort is attributable to viewing tobacco use in movies.

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PA4-8


Deirdre Lawrence, Pebbles Fagan, Cathy Backinger, and James T. Gibson

Data on young adult smokers, aged 18-24, are often reported as part of the adult sample, yet this population may be uniquely different from adults 25+. Although 89% of smokers initiate smoking before the age of 18, examining smoking among 18-24 may provide a window of opportunity to intervene with those still at risk for initiation and those already smoking. This study used data from the NCI-sponsored Tobacco Use Supplement to the Current Population Survey (TUS-CPS), a national household survey, to examine socioeconomic variables associated with the prevalence, frequency and intensity of smoking among young adults (n = 15,394). Socioeconomic variables included gender, race/ethnicity, employment, occupation, metropolitan status, region, and hours worked per week. Among young adults, 26% were current smokers and 20% were regular daily smokers. Current smokers were more likely to be male (29%), White (31%)-or American Indian (35%), blue collar (34%) or service workers (32%), and unemployed (36%). Similar trends were observed among regular daily smokers. Differences in cigarette consumption were also observed. Of the self-respondents, 32% were light smokers (< 10 cpd) and they were more likely to be female (36%), white-collar workers (41%), live in the western region of the US (48%), and live in metropolitan areas (36%). Hispanics (63%) were more likely to be light smokers compared to all other racial/ethnic groups. These data suggest that specific cessation strategies are needed to prevent young adults smokers from progressing to heavy smoking. Since, 74% of the young adults were never or former smokers, interventions are also needed to prevent initiation or relapse among young adults who are often targeted by the tobacco industry.

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PA5-1

PROACTIVE RECRUITMENT OF PREGNANT SMOKERS INTO CESSATION SERVICES THROUGH THE HEALTHCARE SETTING

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Pregnant smokers who are having difficulty quitting smoking might well benefit from cessation services. Especially in light of various limitations on the use of medication during pregnancy, the role of behavioral treatment is particularly important. However, as with other populations of smokers, few pregnant smokers seek out services on their own. This project tests a method of proactive recruitment of such women through their doctors’ offices.

Physicians from three local healthcare systems (through a collaboration known as the Partnership for Smoke-Free Families) assessed smoking status for all new obstetric patients and encouraged smokers to call the California Smokers’ Helpline (CSH) for counseling. After two weeks CSH proactively contacted those who had not yet called and attempted to enroll them into the program. This study confirms the importance of proactive recruitment among this population. Of 1,064 obstetric patients, 3% called for counseling on their own, a rate similar to the help-seeking reported from a survey of California smokers (2.5% had participated in cessation counseling in the previous year). However, proactive recruitment of these pregnant smokers resulted in many more women receiving services. Although 23% of women refused service and 30% were not reached by phone, over 32% did agree to enroll in counseling and another 12% chose self-help materials. By collaborating with healthcare providers almost half of these pregnant smokers received urgently needed help, suggesting that proactive recruitment is a very promising strategy for intervention.

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PA5-2

MOTIVATION TO QUIT SMOKING AND PHYSICIAN INTERVENTION FOR FAMILIES OF HIGH RISK INFANTS

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Babies treated in the Special Care Nursery (SCN) have a high prevalence of respiratory problems including broncho-pulmonary dysplasia and reactive airway disease resulting in an increased vulnerability to the morbidity effects of environmental tobacco smoke. In Rhode Island more than 20% of new mothers and pregnant women smoke. We assessed the prevalence of smoking and interest in quitting among families of babies in the SCN.

Trained research assistants recruited 336 participants (mothers n=235, household members=101), including non-smokers (n=206), current smokers (n=76) and recent ex-smokers (quit <1 year, n=52). Demographics included: mean age=29.8, SD=7.5. Education: 26% HS graduate, 26.5% college graduates. Ethnicity: 70% white, 15% Hispanic, 7% African-American.

Results showed that mothers (M=7.8, SD=2.36) were more motivated to quit smoking than fathers (M=6.3, SD=2.65) (F=2.7, p<0.05). Mothers (71%) were more likely than fathers and other household members (60%) to be asked about their smoking by the physician (F=25.2, p<0.01). Individuals who had quit for ≥24 hours in the previous year were more highly motivated to quit smoking (F=15.1, p<0.0001). Older subjects and those whose physicians had asked about smoking, were more likely to perceive health risk from smoking (r=0.21, p=0.05), and were more willing to speak with a counselor about their smoking (F=8.6, p<0.01). The SCN provides an opportunity to intervene with mothers and other household members who smoke, thus improving their health and the health of their fragile new babies.

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PA5-3

SMOKING CESSATION PREFERENCES: A COMPARISON OF HIGH SCHOOL SMOKERS’ AND NON-SMOokers’ BELIEFS

Kelli-an G. Lawrance, Ph.D., and Heather E. Travis, B.A.(hons)*, Brock University.

School-based smoking cessation programs often utilize a peer led approach. Based on the assumption that some of these peer leaders are non-smokers, it raises the question of whether non-smokers can comprehend smokers’ preferences for smoking cessation. This study surveyed 1,746 non-smokers and 541 regular smokers from five high schools in South-Eastern Ontario about how smokers would prefer to quit smoking. When presented with a list of 11 approaches to quitting smoking, the proportions of smokers and non-smokers supporting each approach differed, x2(20, N=1974) = 83.06, p < .05. Of interest, three times as many non-smokers (11.2%) as smokers (3.9%) believed that group programs would be the preferred approach. Conversely, only half as many non-smokers (14.3%) as smokers (29.2%) thought smokers would prefer to quit on their own. Quitting with a friend and quitting with a group of friends were selected by similar proportions of both groups (42.2% and 43.0%). The percentage of smokers who would want their school to hold a challenge to quit smoking was less than non-smokers believed (54.5% vs. 68.5%, respectively). While most smokers stated a preference for quitting in the winter, a majority of non-smokers predicted that smokers would want to quit in the summer. These findings suggest that smokers’ preferences for self-directed, independent approaches to quitting are not necessarily recognized by non-smokers, who are more likely to perceive group programs with adult involvement as smokers’ preferred approach to quitting.

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PA5-4

EFFECTS OF EARLY SMOKING EXPERIENCES ON ADOLESCENT SMOKING BEHAVIOR

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Previous studies among adults indicate that those who become smokers may become more sensitive to the positive effects of nicotine upon initial exposure than those who remain non-smokers, while unpleasant experiences are equally likely to occur in both. These relationships have not been examined previously among adolescent smokers. The smoking habits of the student population (N=1,910; 76% White, 8% African-American, 51% male) of a Michigan high school was surveyed. Response rate was 75%. Among current and ex-smokers (N=283), an instrument assessing eight dimensions of initial smoking experience produced two consistent factors: Positive Experiences (PE) and Negative Experiences (NE). Quit rates were lowest in the highest PE tertile (10.8%) and greatest in the lowest PE tertile (30.0%) (p<0.01). Similarly, those in the highest PE tertile smoked more cigarettes/week (M=35.4) than those in the lowest (M=16.6) (p<0.01). Nicotine Dependence scores were greater in the highest PE tertile than in the lowest tertile (p<0.001). NE tertiles showed no association with quit rates, cigarette consumption, or Nicotine Dependence. Current smokers in the lowest NE tertile were more likely to be in the Precontemplation stage than those in the highest (p<0.01) and less likely to be in the Contemplation stage (p<.05). PE level was unrelated to stage. Consistent with findings in adults, type and strength of early smoking experiences appear to influence current smoking behavior among teens. This information may be useful in improving interventions.

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PA5-5

GIFT (GUIDELINE IMPLEMENTATION FOR TOBACCO) STUDY


AHCPR released a Smoking Cessation Clinical Practice Guideline in 1996. The objective of GIFT is to test an organizational strategy (OS) to increase compliance with the Guideline. Twenty VA medical centers were randomly assigned to 1) usual practice (UP), or 2) organizational support (OS) that provided consultation to promote routine intervention for tobacco users. OS emphasized identification of smokers, brief intervention, and drug therapy. A random sample of patients was identified at baseline (n=5793) and another sample was identified one year later (n=1890). A cohort of smokers was followed (n=763). Data were collected by telephone survey, medical record review, mail survey of primary care and smoking cessation clinic leadership, and from the national Pharmacy Benefits Management database. Response rates for the telephone surveys were 79.3%-87.4%. At baseline, 23.6% of subjects were current smokers. After one year, 84.3% of baseline smokers in the OS group reported being asked at their last visit about smoking status (McNemar OR=0.84, for ?asked? at baseline vs. follow-up), compared to 80.34% in the UC group (McNemar OR=0.75, P(difference in OR)=0.77). In the OS group, 44.0% of the smokers reported they were provided counseling at a recent visit (McNemar OR=2.67 for ?counsel? at baseline vs. follow-up), compared to 42.2% in the UP group (McNemar OR=1.19, P(difference in OR)=0.014). In OS sites, the rate of treatment with pharmacological therapy and courses of treatment/patient increased, while they decreased in UP sites (P=0.017, and P=0.038, respectively). The one-year cessation rate was 11.4% in the OS group, compared to 13.2% in UP (P=0.51). The OS intervention significantly increased the delivery of behavioral and pharmacological treatment for tobacco dependence. The data failed to demonstrate, however, an increase in the one-year smoking cessation rate.

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PA5-6

IDENTIFYING BARRIERS TO ENTERING SMOKING CESSATION TREATMENT IN A COMMUNITY SAMPLE OF HEAVY SmOKERS

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Research with cigarette smokers suggests that the majority of smokers quit smoking without assistance from a formal smoking cessation treatment program. Research also suggests that those individuals who continue to smoke have higher rates of comorbid psychopathology that tend to decrease the likelihood of successful cessation. These “recurrent” smokers are also the most likely to require professional assistance. However, even when such services are made available, few smokers enter programs, and recruitment into smoking cessation studies has grown increasingly difficult. The present study examined why smokers do not utilize community resources more frequently. The sample (n = 265) was drawn from Baton Rouge, LA. Participants completed questionnaires regarding smoking status and beliefs about smoking cessation treatment programs and were paid $6 for participation. Of the 169 participants (64%) that returned the questionnaires, 68% were Caucasian and 29% were African-American, with a mean age of 36. Mean smoking rate was 26 cigarettes/day, for a mean of 19.5 years, mean Fagerstrom Test for Nicotine Dependence (FTND) was 6.5, mean carbon monoxide (CO) level was 27.8 ppm, and mean number of past quit attempts was 3. Seventy-nine participants (48%) were categorized as being precontemplators, 60 participants (36%) as contemplators, and 27 (16%) as prepared to quit smoking. Responses to 38 items representing possible reasons for not entering smoking cessation programs were analyzed using Principal Components Analysis using varimax rotation. These items were generated using both empirical and anecdotal sources. A 5-factor solution accounted for 43% of the variance, and the following themes emerged: 1) unwillingness to quit smoking; 2) work & time pressures; 3) lack of information about professional help; 4) mobility & transportation problems; 5) belief that professional help is unnecessary. Data were examined for differences among gender and ethnic groups. Common barriers to treatment entry were identified and suggest ways to facilitate utilization of treatment resources in communities. Issues of external validity were addressed and suggest that this Louisiana sample was similar to smokers in other communities across the United States.

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PA5-7

FACTORS MEDIATING USE OF A SMOKING CESSATION TREATMENT (SCT) BENEFIT: EVIDENCE FROM WISCONSIN

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BACKGROUND: The 2001 Public Health Service Guideline, Treating Tobacco Use and Dependence, and the Healthy People 2010 recommend health insurance coverage for SCT. In 2001, the State of Wisconsin added insurance coverage for SCT to the health insurance package for more than 200,000 State employees, yet relatively few smokers have sought out this treatment. This analysis examines variables that may play a role in mediating the use of SCT benefits. Results may point the way toward health promotion activities that enhance the effectiveness of insurance coverage for SCT.

METHOD: Data came from the 2001 Consumer Assessment Health Plan Survey (CAHPS), a telephone survey of 5,865 State of Wisconsin enrollees, randomly selected and stratified by health plan, from a sample of 11,989 State.

RESULTS: Smoking prevalence in the State employee population was about 14%. About 23% of smokers were aware of the new SCT benefit; about 32% percent of aware smokers report that they had obtained at least one SCT. Among all aware smokers, SCT users were healthier, younger, exhibited lower educational achievement, and were more likely to have a regular doctor, to have used a doctor within the past year, and to have received a clinician-provided 5As. Results suggest that encouraging smokers to quit and raising smokers’ awareness of benefit availability are key to utilizing an SCT benefit.

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PA5-8

A PROSPECTIVE STATE OF THE ART SURVEY OF USE PATTERNS IN PATIENTS USING THE NICOTROL® INHALER

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A key question about the nicotine inhaler is its incidence of misuse, harmful use and dependence. A total of 673 nicotine inhaler users were surveyed at baseline, one, three, six, and seven months. All interviews were conducted by Computer Assisted Telephone Interviewing (CATI) or Internet surveys. Subjects were asked about cigarette use, inhaler use, symptoms and problems with inhaler use, attempts to stop, or reduce inhaler use, use of other smoking cessation therapies and concerns of others about their inhaler use. The principal investigators developed ICD-10/DSM-IV-based algorithms for misuse, harmful use, and dependence on the inhaler. All potential dependence cases were subject to a clinical interview by an expert in nicotine dependence. Initial measurements at the first follow-up revealed that 69 (13%) of users reported using the inhaler and smoking repeatedly on the same day (i.e. concomitant use), and 22 (4%) reported using the inhaler for non-cessation reasons (e.g. reduction), and 41 (8%) reported both concomitant use and use for other than labeled clinical use. However, there were no reported cases of harmful use. Seven (1%) inhaler users were suspected of dependence but after clinical review, none were found to be dependent. We conclude that abuse and dependence associated with the nicotine inhaler is small to nonexistent.

Study funded by McNeil Consumer Healthcare, Pharmacia Consumer Healthcare and a Senior Scientist Award (Dr. Hughes) from the National Institute on Drug Abuse (DA-00490).

PA6-1  CIGARETTE-ATTRIBUTABLE MORBIDITY IN THE UNITED STATES

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BACKGROUND: Well documented estimates of cigarette-attributable mortality have been published for the United States; however, little is known about the morbidity disease impact of tobacco use in the population.

OBJECTIVE: The primary goal of this study is to estimate the number of people alive today with a disease caused by cigarette use by state and demographics and to compare the morbidity and mortality cigarette-attributable-disease distribution in the population.

METHODS: Data from the 1990 Census, the 1994 Behavioral Risk Factor Surveillance System, and the 1988-1994 National Health and Nutrition Examination Survey were used to estimate the number of people alive with cigarette-attributable disease. Morbid conditions considered are heart attack, stroke, chronic bronchitis, emphysema, and cancers of the lung, esophagus, cervix, bladder, mouth/pharynx, and kidney.

RESULTS: An estimated 8.2 million people have a morbidity condition attributable to their current or past cigarette use. California had the largest number of people with cigarette-attributable conditions (868,065), while the District of Columbia had the fewest (8,888). The most prevalent conditions were chronic bronchitis (41%), emphysema (26%), and heart attack (21%), while lung cancer represented only 1% of cases. The prevalence of cigarette-attributable morbidity was greater for older persons, males, and whites.

CONCLUSION: For each cigarette-attributable death in a given year, an estimated 20 people have a cigarette-attributable morbidity condition. These data have implications for cigarette use surveillance, health resource allocation, and risk communication.

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PA6-2  TRUE 4-AMINOBIPHENYL DOSAGES DELIVERED TO CIGARETTE SMOKERS

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Some primary aromatic amines (AA), e.g., 4-aminobiphenyl (4-ABP), are established bladder carcinogens found in tobacco smoke. This study focuses on smoke dosages as a determinant of carcinogen exposure. Changes in individual smoking behavior due to changes in cigarette design over recent decades have been shown to impact on the actual uptake of nicotine. To determine how these changes affect bladder cancer risk, it is important to establish actual exposure to AA. Thus, we recruited 46 cigarette smokers, assessed their smoking topography for their customary brand of cigarette, and reproduced the latter on a smoking machine to generate mainstream smoke (MS). Aromatic amines were extracted and purified with a newly developed method prior to derivatization and analysis by GC-MS. On average, the recruits in this study smoked one pack of cigarettes per day (FTC nicotine and tar yields: 1.0 mg and 14 mg/cigarette, respectively), drawing from each cigarette 610 mL of smoke (12 puffs of 50 mL). The MS yields of 4-ABP, as determined by simulating human smoking behavior, were 1.6-fold higher than the yields obtained with the FTC machine-smoking method (5.24 ng/cigarette vs 3.30 ng). The correlation between nicotine, 4-ABP, as well as smoke carcinogens implicated in lung carcinogenesis (NNK and BaP) will also be presented and the implication of the findings will be discussed.

This study was conducted while the first author was at the American Health Foundation. Supported by PHS grants CA-68384 and CA-17613.

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PA6-3  NICOTINE REPLACEMENT TO REDUCE CIGARETTE CONSUMPTION IN SMOKERS WHO ARE UNWILLING TO QUIT: A RANDOMIZED TRIAL

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The objective of this study was to assess whether nicotine replacement therapy, administered in a real life situation, reduced cigarette consumption in smokers who were not prepared to quit smoking. Daily smokers of 20+ cigarettes per day who had no intention to quit smoking in the next 6 months were recruited from the general population and randomly assigned to either a 6-month treatment of nicotine (choice between a 15 mg nicotine patch, a 4 mg nicotine gum, and/or a 10 mg nicotine inhaler, n=265), matching placebo products (n=269), or no intervention (n=389). Products were sent to participants by mail. Education was limited to a booklet. Of 923 participants, 879 (95%) were followed up after 6 months. Mean baseline consumption was 30 cigarettes per day in all groups. At 6 months, cigarette consumption decreased by a median of 10 cigarettes per day in the nicotine group, 7.5 in the placebo group, and 2.5 among controls (p<0.04 for all pair-wise comparisons). Smoking cessation rates were low (2 - 4%) and did not differ significantly between groups. Quit attempts were less frequent among controls (21%) than in the nicotine (28%, p=0.04) and placebo (27%, p=0.08) groups. In conclusion, nicotine replacement therapy helped smokers reduce their cigarette consumption and maintain this reduction over 6 months, but a large part of this reduction was attributable to a placebo effect. Nicotine treatment for smoking reduction had no detectable impact on smoking cessation.

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PA6-4  EFFICACY OF THE NICOTINE INHALER IN SMOKING REDUCTION

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BACKGROUND: Many smokers are unable or unwilling to quit, but would like to reduce smoking. There is evidence that reduced exposure to tobacco smoke benefits health, but neither attempting to cut down unaided nor switching to low tar/low nicotine cigarettes effectively reduce exposure because smokers compensate to maintain 'normal' nicotine levels. However, NRT could be used to achieve and maintain reduced smoking, which may motivate smokers to completely quit.

OBJECTIVES: Study smoking reduction, defined as self-reported reduction in daily cigarettes smoked by ≥50% compared to baseline from week 6 to month 15, biochemically verified by measuring expired CO. The effect of smoking reduction on cardiovascular risk factors and on cessation was also evaluated.

STUDY DESIGN: This double blind, placebo-controlled study recruited 429 healthy adult smokers who smoked ≥20 cigarettes/day and who had smoked for ≥3 years. Participants could use the inhaler whenever they felt the urge to smoke, with the aim of reducing smoking as much as possible.

RESULTS: Treatment with nicotine inhaler is more effective than placebo for reducing smoking. Risk factors for cardiovascular disease were moderately improved in subjects who succeeded in reducing their smoking. Using the nicotine inhaler consistently with smoking over a period of 12 months is well tolerated. Final 15 month results will be presented.

This study was supported by Pharmacare Consumer Healthcare.

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PA6-5

COMPREHENSIVE ASSESSMENT OF TOBACCO RISK KNOWLEDGE

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Studies of the public’s understanding of smoking risks have been numerous, but have lacked a conceptual framework guiding the choice of topics covered. This project developed and tested an in-person interview designed to provide a comprehensive, theory-based assessment of the public’s knowledge. The interview covers: 1) the nature and likelihood of ill effects from smoking cigarettes; 2) personal risk and factors determining personal risk, and 3) the ease or difficulty with which harm can be avoided. Using this interview, data were collected from a random sample of teens (15-19 years of age, from a listed sample of households containing this age group) and adults (over 19, from an RDD sample), equally divided between smokers and nonsmokers (N=809).

Results revealed general acceptance that smoking is unhealthy, even by smokers. However, respondents could not state more than two illnesses caused by smoking; had significant misperceptions of lung cancer and emphysema; underestimated the frequency of deaths caused by smoking compared to other causes of death; under-estimated the degree to which smoking increases the risk of lung cancer and heart disease. Significant subgroups of smokers believed that there are patterns of smoking that hold little risk and believed that their own smoking pattern was less risky than that of the average smoker. Although acknowledging that quitting is difficult, smokers greatly overestimated the likelihood that they would be successful. The data indicate that neither smokers nor nonsmokers possess the knowledge needed to make informed decisions about smoking cigarettes.

The project was supported by the Robert Wood Johnson Foundation.

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PA6-6

A RISK COMMUNICATION AID INCREASES RISK PERCEPTION AND QUITTING READINESS IN NONWHITE SMOKERS

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Despite numerous public health campaigns to inform the public of smoking risks, smokers fail to acknowledge their personal vulnerability. In this study, 240 smokers were randomized to receive a generic smoking cessation brochure or a smoking risk communication aid. The primary outcomes measured were risk perception and stage of change. Multivariable logistic regression was used to adjust for baseline variables and to assess for effect modification. Subjects with elevated risk perception were more likely to be in an advanced stage of change than subjects with low risk perception (OR 4.5, 95% CI 2.0,10.0). By study arm, there was no unadjusted difference in smoking risk perception between the control and intervention arm. However, a significant interaction was found for nonwhites in the intervention arm (OR 4.0; 95% CI 1.1,15.2; likelihood-ratio test p=0.039). Nonwhites in the intervention arm were more likely to report increased risk perception than nonwhites in the control arm (OR 2.6, 95% CI 1.1,6.3). Overall, there was no difference in stage of change between control and intervention group. There was a significant interaction between nonwhite race and study arm (OR 4.0, 95% CI 1.1,14.4;likelihood-ratio test p=0.030). The adjusted odds ratio for nonwhites in the intervention group compared to nonwhites in the control group was 2.2 (95% CI 0.9,5.2). This smoking risk communication aid increased smoking risk perception and quitting readiness in a nonwhite subgroup. Further research is needed to better understand the implications of racial differences in smoking risk perception and communication.

This study was conducted while the first author was at the University of Pennsylvania. Supported by a PHS National Research Service Award #T32HP1002607 and by The Council on Health Promotion and Disease Prevention of the University of Pennsylvania School of Medicine.

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PA6-7

EFFECTIVENESS AND COST BENEFIT OF THE AHORQ CLINICAL PRACTICE GUIDELINE FOR PREGNANT.SMOKERS IN MEDI CAID MATER NITY CARE

Richard Windsor, Lesa Woodby, Myra Crawford, Thomas Miller, J. Michael Hardin, Carlo DiClemente

ABSTRACT: The objectives of the Smoking Cessation or Reduction In Pregnancy Trial (SCRIPT) were: (1) To determine the extent to which recommended AHRQ health education methods could be provided routinely to pregnant Medicaid smokers by public health maternity staff, (2) to document behavioral impact among a representative sample of patients, and (3) to estimate the cost-benefit of dissemination. Over a four year period, regular maternity care staff screened 5,451 patients at 8 prenatal care sites; 40% were smokers and 60% agreed to participate. After randomization at their first visit to either the Experimental (E) or Control (C) group, and elimination of 333 patients ineligible for follow-up, 956 received standardized risk information and were advised to quit. E Group patients (n = 479) also received AHRQ recommended health education methods, including “A Pregnant Woman’s Guide to Quit Smoking”, a companion “Commit To Quit” Video and brief patient-centered counseling. Baseline, end of pregnancy, and post-partum self-reports and saliva cotinine analyses confirmed smoking status: cessation and significant reduction (SR). SR was defined as a >50% reduced saliva cotinine value between the first visit and third trimester visit. A significantly higher percentage of patients quit in the E group(13%) versus the C group(8%). In the E group 22% were confirmed as significant reducers versus 11% of the C group. An annual savings of $80+ million was estimated from nationwide dissemination of these methods and the cost to benefit ratio was $1.00 to $12.50. AHRQ assessment and intervention methods can be routinely provided by regular prenatal care staff to pregnant smokers. These methods significantly increase cessation and significant reduction rates. Potential cost savings and cost-benefit were documented.

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PA6-8

CHANGES IN SMOKING STATUS AFFECT THE LUNG FUNCTION OF WOMEN MORE THAN OF MEN: THE LUNG HEALTH STUDY

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The Lung Health Study was a randomized 5-year 10-center clinical trial testing whether intervention with an inhaled bronchodilator and a smoking cessation program would result in slowing of age-related decline in pulmonary function. Participants were smokers, aged 35-60, with mild lung function impairment. We compared the relationship of smoking history during the study with changes in lung function between men and women. A total of 3,348 men and 1,998 women in the study had a follow-up visit including spirometric evaluation at Year 5. This paper reports an analysis by gender of changes in lung function for three smoking history categories: sustained quitters, intermittent quitters, and continuing smokers. Among participants who quit smoking in the first year, mean FEV1 % of predicted increased more in women (2.9%) than in men (1.2%) (p < .001). In women who quit, improvement in FEV1 in the first year was strongly related to baseline cigarettes smoked per day. Across the 5-year follow-up period, among sustained quitters, women gained more in FEV1 % predicted than did men; among continuing smokers, the mean loss in FEV1 % predicted was greater in women than in men (p < .001). Among women at risk for COPD, smoking cessation has an even clearer advantage than it does for men.

Supported by contract N01-HR-48002 from the Division of Lung Diseases of the National Heart, Lung, and Blood Institute, Atovent and placebo inhalers were supplied by Boeringer Ingelheim Pharmaceuticals Inc., Ridgefield, Conn Nicorette supplied by Marion Merrell Dow Inc., Kansas City, MO.

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**POI 01**

**EVOLUTIONARY RELATIONSHIP OF NACHR SUBUNITS AND IDENTIFICATION OF ESSENTIAL AMINO ACID FOR COMPLEMENTARY COMPONENT OF ACETYLCHOLINE BINDING SITE**

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A significant number of subunits for nACHRs has been identified in human and other species. However, the evolutionary relationship and biological functions for most of these subunits are largely unknown. Herein, we analyzed the evolutionary relationship for 123 subunit sequences using various alignment and phylogeny algorithms and found that these subunits could be classified into 6 groups. Group I consists of vertebrate alpha9 and alpha10 subunits, and group II diverged after group I to generate vertebrate alpha7, alpha8, and insect and nematode nACHR subunits. The third split generated clusters III/IV and V/VI. Groups III and IV are composed of all remaining invertebrate subunits, while groups V and VI are composed of vertebrate subunits only. Furthermore, our results indicate that groups I and II diverged before the separation of vertebrate from invertebrate. Following this divergence, other alpha and non-alpha subunits were generated within each lineage independently, suggesting a convergence in the evolution of nACHR subunits. Additionally, it was proposed previously that adjacent subunits within the nACHR can form acetylcholine binding site, with one subunit being the principle (P) and the other being the complimentary (C) components. Based on whether each subunit has P, C, both, or neither components, they are defined as P-, C-, PC-, or S-subunits. Multiple sequence alignments showed that asparagine at position 4 (N4) in loop E is conserved in PC and C subunits, but not in P and S subunits, suggesting that the N4 represents an essential amino acid for the complementary component of acetylcholine binding site of nACHRs.

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**POI 02**

**INVOLVEMENT OF NICOTINIC RECEPTORS IN NICOTINE-INDUCED TOXICITY IN PRIMARY CULTURE OF CEREBELLAR GRANULE CELLS**

Mashael Al-Namaeh, Robert E. Taylor, Yousef Tizabi, Dept. of Pharmacology, College of Medicine, Howard University, Washington DC 20059

Exposure to high doses of nicotine can result in central and peripheral excitation followed by depression. This can result in tremor, convulsion and respiratory failure. To gain a better understanding of nicotine-induced toxicity in the central nervous system, we used a primary cell culture paradigm to study the effects of nicotine and its antagonist mecamylamine. Cerebellar granule cells were isolated from the brains of 20 day old Sprague-Dawley fetuses. Cells were dissociated and cultured in MEM buffer according to an established procedure. Exposure of cells to nicotine (0.01- 1.0 mM) for 3 days resulted in a dose-dependent toxicity as evidenced by lactate dehydrogenase assay. The toxicity was evident at nicotine concentrations above 0.2 mM. Exposure of cells to mecamylamine (MEC, 0.05 - 0.2 mM) for 3 days did not have any effect on cell viability. However, pretreatment of cells with MEC (0.05, 0.1 and 0.2 mM) attenuated nicotine-induced toxicity. The effects of MEC were similar across the tested doses, implying lack of a dose-response relationship for the doses of mecamylamine used in this study. Mecamylamine is a non-competitive antagonist that may block the high-affinity nicotinic receptors at low concentrations, but may block all nicotinic receptor subtypes at relatively higher concentrations. These results suggest that cytotoxic effects of relatively high doses of nicotine are at least partially mediated by nicotinic receptors. Further studies are underway to delineate the exact nature of the nicotinic receptor subtype that may be involved in nicotine-induced toxicity.

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**POI 03**

**CHRONIC NICOTINE TREATMENT DECREASES CYP2A6/CYP2B6-LIKE PROTEIN EXPRESSION AND NICOTINE METABOLISM IN AFRICAN GREEN MONKEYS**

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Nicotine metabolism is decreased in smokers versus non-smokers. We found that plasma nicotine AUCs were decreased by 50% (p<0.05) in smokers (n=17) versus non-smokers (n=7; 4 mg oral nicotine). The mechanism(s) responsible for this decreased activity have not yet been determined. Nicotine is primarily inactivated to cotinine by hepatic CYP2A6 (nicotine C-oxidation, NCO). To evaluate the effects of chronic nicotine on hepatic CYP2A6/CYP2B6, and NCO, an African Green Monkey (AGM) model was developed. Inhibition studies determined that approximately 80% of in vitro hepatic NCO can be attributed to a CYP2A6-like enzyme (CYP2A6agm). Male AGM (n=6 per group) were treated with nicotine (s.c., 0.3 mg/kg, bid), phenobarbital (oral 20 mg/kg), and/or saline (s.c., bid) for 3 weeks. Immunoblotting demonstrated a 60% decrease (p<0.05) in hepatic CYP2A6agm expression in nicotine-treated animals. CYP2B6agm expression was also decreased. In contrast, phenobarbital-treated animals demonstrated an increase in CYP2B6agm, but not CYP2A6agm. In vitro NCO was decreased by 40% in the nicotine-treated group (p<0.05), mediated primarily by a decrease in CYP2A6agm, as demonstrated with selective CYP antibodies. NCO was increased by 60% in the phenobarbital-treated group (p<0.05), mediated primarily by an increase in CYP2B6agm. Studies of mechanisms of regulation are currently underway. Nicotine may decrease its own metabolism in primates by decreasing the expression of nicotine-metabolizing CYP2A6.

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POI 04  EFFECTS OF CHRONIC NICOTINE ON BRAIN MONOAMINES IN MICE
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Nicotine has been proposed to act as an antidepressant in smokers and in non-smoking depressed patients. Nicotine has also been shown to have antidepressant effects in rodents in the forced swim and learned helplessness models of depression. In the present study, we determined whether nicotine has similar neurochemical effects on monoamine systems to the tricyclic antidepressant amitriptyline. C57BL/6J mice were administered either 200 μg/mL nicotine in 2% saccharin, 200μg/ml amitriptyline in 2% saccharin, or 2% saccharin as a control chronically for 30 days. High performance liquid chromatography (HPLC) was used to measure dopamine (DA) and serotonin (5-HT) levels as well as their metabolites dihydroxy-O-phenylethylacetic acid (DOPAC) and 5-hydroxyindoleacetic acid (5-HIAA) in several brain areas including cortex and striatum. Dopamine and serotonin turnover were compared in mice drinking saccharin, chronic nicotine, or chronic amitriptyline to determine whether the effect of nicotine on monoamine turnover is similar to that of the known antidepressant amitriptyline. Initial results suggest that unlike acute treatment, chronic oral nicotine does not affect cortical or striatal DA or 5-HT turnover in mice. Initial results also suggest that chronic oral amitriptyline does not affect cortical DA or 5-HT turnover in mice.

The study was done while the first author was at Yale University School of Medicine with funding by Yale Transdisciplinary Tobacco Research Center Summer Fellowship.

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POI 05  CHRONIC NICOTINE EXPOSURE, SERUM LEPTIN, AND BODY WEIGHT IN FEMALE MICE
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There is an inverse relationship between nicotine and body weight, particularly among females (e.g., Grunberg, 1982; Perkins, 1993). Leptin, a hormone associated with body weight regulation, may contribute to the nicotine-body weight phenomenon. However, the few investigations of leptin and nicotine exposure have reported contradictory results. The current pilot experiment evaluated leptin responses to chronic oral nicotine administration in adult C57BL/6J female mice.

Eighteen mice were exposed to 0 (n=9), 50 (n=7), or 200 (n=2) μg/mL (-)-nicotine free base in a 2% saccharin solution 24 hr/day for 28 days. On the last day, animals were sacrificed and serum was assayed for leptin and cotinine using ELISA. Body weight also was measured. Serum cotinine levels confirmed nicotine exposure in a dose-dependent manner (p<0.05). The high- and low-nicotine groups were collapsed for the following comparisons to the no-nicotine group due to sample size constraints. Consistent with previous reports, nicotine-exposed animals gained significantly less weight than did no-nicotine animals during days 1-9 of nicotine exposure (p<0.05), but not at the end of the experiment (days 25-28). The difference in leptin levels between nicotine and no-nicotine mice only approached significance (p=0.07); power analysis confirmed that the sample size was too small to detect significance. Specifically, leptin levels were marginally higher in nicotine-exposed mice. This preliminary finding suggests that leptin plays a role in the nicotine-body weight relationship in female mice. Further examination of leptin responses to acute nicotine exposure is needed to delineate leptin's role in the nicotine-body weight relationship.

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POI 06  CYP2D6 AND ADHERENCE TO TREATMENT WITH BUPROPION SR FOR SMOKING CESSATION
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The effectiveness of bupropion SR for smoking cessation will be impacted by adherence to treatment. Adverse reactions, which could be influenced by the metabolism of bupropion, can affect adherence. We sought to examine this issue in 458 smokers (168 men, 290 women) who provided buccal cell samples as part of a randomized field trial. Samples were genotyped for polymorphisms of CYP2D6, a gene responsible for the metabolism of a number of drugs. At three-month follow-up, individuals reported whether they discontinued the medication because of side effects. Over all subjects, 26.9% reported discontinuing bupropion due to side effects, with a higher percentage of individuals homozygous for the CYP2D6*2 variant being marginally more likely to have stopped taking bupropion (39.2%) than individuals who were homozygous for the wild-type variant (25.6%), or heterozygous for the two variants (24.0%; p<.10). In women, a greater percentage of those who were homozygous for the *2 variant (47.1%) reported discontinuing the medication than wild-type homozygotes (26.7%) and heterozygotes (24.0%; p<.04). The association between CYP2D6 genotype and likelihood of discontinuing bupropion was not significant in men. These results suggest that variation in adherence to bupropion SR may be related to genotype in CYP2D6 in women but not in men and may partly explain why women are less successful in achieving abstinence with the medication.

Research supported by National Cancer Institute grant CA71358. Bupropion SR provided by Group Health Cooperative Pharmacy.

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POI 07  CYP2A6 INHIBITION INCREASES PLASMA NICOTINE CONCENTRATIONS DURING NICOTINE PATCH AND GUM USE
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Nicotine replacement therapy (NRT) is commonly employed to help smokers quit smoking. This therapy, however, typically replaces only 50% of the nicotine concentrations achieved while smoking. Incomplete replacement may contribute to NRT limited success. We determined whether inhibition by methoxsalen of CYP2A6, the primary enzyme responsible for nicotine’s metabolism, could increase the systemic concentration of NRT (21 mg/day nicotine patch or 4 mg nicotine gum). The study was a randomized, double-blind crossover comparison of nicotine and cotinine concentrations with and without methoxsalen treatment in 12 dependent smokers (DSM-IV, Fagerström > 3) using the patch, and 11 using the gum. Subjects in the patch study received patch for four days while taking 10 mg methoxsalen or placebo t.i.d. On Day 5, the final patch was removed. Nicotine kinetics were determined on Days 4 and 5. On Day 4 of patch, mean nicotine concentrations were increased by 24% during methoxsalen compared to placebo (p < 0.05). Cotinine concentrations were unchanged. Subjects in the gum study received 10 mg methoxsalen or placebo t.i.d. for three days. On these days, they chewed one piece of nicotine gum for 30 minutes every hour x 5 and nicotine levels were determined. In the gum study, mean nicotine concentrations were increased by 52% on Day 3 of methoxsalen compared to placebo (p < 0.05). These findings suggest that CYP2A6 inhibition should increase the efficacy of NRT by providing greater nicotine replacement than with use of NRTs alone.

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POI 08  IN VITRO IDENTIFICATION OF NICOTINE ANALOGS AS CYP2A6 INHIBITORS AND SUBSTRATES
Edward M. Sellers, M.D., Ph.D.*1,2, Adaku Ibeke*1, Billy R Martin, Ph.D.3, William Glassco, Ph.D.4, M. Imad Damaj, Ph.D.3 and Rachel F. Tyndale, Ph.D.1,4, 1University of Toronto, 2Sunnybrook and Women’s College Health Sciences Centre, 3Virginia Commonwealth University and 4Centre for Addiction and Mental Health

In humans, approximately 80% of nicotine is metabolized to the inactive metabolite cotinine by the hepatic enzyme CYP2A6. Four nicotine analogs (isonicotine, norisonicotine, metanonicotine and nornicotine) were screened for inhibitory effects (at 20 and 200 µM) on nicotine metabolism (30 µM) to cotinine using expressed CYP2A6. In human liver microsomes, the IC50 of the nornicotine was 0.34 ± 0.13 and 4.75 ± 0.25 respectively. Similarly, in rat liver microsomes, isonicotine and norisonicotine showed no significant inhibition of nicotine metabolism, while nornicotine showed 100% inhibition at 20 µM. The Ki obtained for isonicotinic acid was 3.5 ± 0.5. Nornicotine appears to be a more effective substrate than nicotine for CYP2A6; an additional unidentified metabolite peak from nornicotinic acid appears approximately 5.6-5.8 minutes after incubation with CYP2A6 or human and rat microsomes. Isonicotinic acid is more immediately converted to cotinine in the in vitro system.

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POI 09  CYP2A6 ALLELE FREQUENCIES AMONG AFRICAN AMERICANS
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CYP2A6 is the major enzyme in the inactivation of nicotine. Previous studies demonstrated that tobacco-dependent individuals with inactive CYP2A6 variants have decreased nicotine metabolism, smoke fewer cigarettes and have increased quitting success (Rao et al., 2000; Gu et al., 2000). This indicates that CYP2A6 inactive and possibly decreased activity alleles may be "protective" against smoking and that variation in these allele frequencies may contribute to ethnic differences in smoking behaviour, risk of tobacco dependence and ability to quit.

The African American (AA) population is of great interest since genetic information on CYP2A6 is lacking in this group. This is despite the fact that smoking behaviours and nicotine/cotinine metabolism, both possibly influenced by CYP2A6 variation, differ in AA compared to other ethnic groups.

We examined the frequencies of established CYP2A6 inactive alleles (*2, *4, *5) and recently identified variants (decreased activity tested in vitro, *6, *7, *8, *9) in an AA population (Kansas City) and other ethnic groups. The "protective" allele frequencies (*2, *4, *5, *6, *7, *8, *9) combined (mean +/- 95% CI) were significantly lower (p < 0.05) in AA (9.5% +/- 5%) compared with Caucasians (23.0% +/- 3%), Chinese (30.7% +/- 9%) and Japanese (68.1% +/- 13). This suggests that CYP2A6 genetic variation may contribute to an increased risk of tobacco dependence and a decreased quitting success in AA compared to other ethnic groups.

Supported in part by NIDA grant DA06889 and by Nicogen Inc.

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POI 10  NEUROENDOCRINE RESPONSE TO DOPAMINERGIC AGENTS IN ADOLESCENTS WITH ADHD, AND NICOTINE DEPENDENCE
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OBJECTIVE: Growing body of literature indicates that the dopaminergic systems are involved in the pathophysiology of attention deficit hyperactivity disorder (ADHD) and nicotine dependence. However, there is a lack of research examining the dopaminergic systems in adolescents with ADHD, and nicotine dependence. We present preliminary results from an ongoing study examining the dopaminergic systems in adolescents with ADHD, and nicotine dependence.

METHODS: Ten participants (15-20 yr.) with ADHD, nicotine dependence or controls were recruited. Neuroendocrine and behavioral response to the dopaminergic agents- methylphenidate (10 mg) and pramipexole (0.25 mg) were examined. Measures of these responses were spontaneous eye-blink rate, plasma prolactin (PRL), and growth hormone (GH). Additionally, participants completed a visual analog mood scale (VAMS).

RESULTS: No significant adverse events were reported after both methylphenidate and pramipexole administration. As expected with dopamine agonists, both methylphenidate and pramipexole administration resulted in increase in GH levels and decrease in PRL levels. Data on eye-blinks and VAMS will be presented.

CONCLUSION: Preliminary results indicate that adolescents tolerated the dopaminergic challenge well with no significant adverse events. Neurobiological studies of this kind can provide important information about the pathophysiology of ADHD and nicotine dependence in adolescents.

This study was conducted while the first author was at the Medical University of South Carolina. Supported in part by NIDA Grant DA0357-01 and the General Clinical Research Center USPHS Grant # M01RR01070.

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POI 11  TOBACCO CONSUMPTION IN SMOKERS AND POLYMORPHISMS IN DOPAMINE METABOLIC ENZYMES; FAILURE TO REPLICATE AN ASSOCIATION IN A FOLLOW-UP STUDY
E.C. Johnston*, T.G. Clarke, S.E. Griffiths, M. Murphy, R. Walton

Understanding the molecular basis of tobacco addiction may enable development of effective cessation strategies. Central dopaminergic pathways are implicated in nicotine dependence and allelic variants in genes involved in dopamine metabolism may influence smoking habits. Our pilot study suggested that variations in dopamine-beta-hydroxylase (DBH) and monoamine oxidase (MAO) predict levels of tobacco consumption. The exploratory study (n=225) was based on a random sample of less than 15% of the available cohort. This follow-up study tests the hypothesis in a larger sample. Participants (n=1524) not included in the original study were genotyped at DBH-1368 and MAO-A-1460 using sequence specific PCR. Serum cotinine concentrations were measured in a random sample of 338 (22%) participants to assess reliability of reported tobacco consumption.

There were no differences in the baseline demographic characteristics of the exploratory sample (median age 49, 56% female) and the confirmatory group (median age 50, 60% female). Mean daily cigarette consumption in the confirmatory group was 17.1 (SD 9.9) compared to 16.7 (SD 8.8) in the exploratory sample. In the confirmatory cohort, unadjusted differences in mean daily cigarette consumption for participants within each genotype group were analysed. Cigarette consumption was unrelated to genotype; mean differences (95% CI) in cigarette consumption were -0.7 (-1.9, 0.5) for DBH-1368 (wild type GG vs. GA/AA) and -0.6 (-0.4, 1.6) for MAO-A-1460 (TG/TT vs. wild type CC). Multiple linear regression was used to adjust for potential confounders (baseline age, age at smoking initiation, gender, body mass index, weekly alcohol consumption, marital status, ethnicity and socio-economic class), and confirmed no differences between genotypes. The strongest confounder was baseline age, with older age implying lower cigarette consumption. Variation in DBH and MAO had no significant effect on daily tobacco consumption in this follow up study.

CORRESPONDING AUTHOR: Elaine C Johnston.
BACKGROUND: Cigarette smoking and nicotine withdrawal affect dopamine concentrations in various brain regions by mechanisms that are poorly understood. One possible mechanism involves the metabolism of dopamine by monoamine oxidases (MAO) A and B, since MAO activity is inhibited by tobacco smoke. We measured the plasma concentrations of the dopamine metabolite, homovanillic acid (HVA), in smoking and non-smoking recovering alcoholics and healthy controls to determine whether smoking affected these levels. We also measured platelet MAO-B activity levels and examined the correlations between plasma HVA concentrations and MAO-B activity.

METHODS: Plasma HVA concentrations were assayed using gas chromatography in 109 smoking (N = 73) and non-smoking (N = 36) men and women. Recovering alcoholic subjects (55%) had been abstinent from alcohol on average for greater than 4 months.

RESULTS: Smokers (9.6 ± 3.6) had 21% lower plasma HVA concentrations compared with non-smokers (12.2 ± 5.6) (p < .03). Neither gender nor subjects' history of alcoholism affected these results. Platelet MAO-B activity levels were not significantly correlated with plasma HVA concentrations (r = 0.07; p = ns).

CONCLUSIONS: Smokers had significantly reduced plasma dopamine metabolite concentrations compared with non-smokers. These results extend previous work from our group finding 46% lower cerebrospinal fluid HVA concentrations among smokers. Smoking-related changes in dopamine turnover may underlie aspects of tobacco dependence, and medications that target these disturbances appear to be effective aids to smoking cessation. Whether the smoking-related changes in HVA concentrations reflect alterations in dopamine synthesis, release, reuptake, or metabolism remains to be determined. However, platelet MAO-B activity and plasma HVA levels were not correlated in the present sample.

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MATERNAL NICOTINE EXPOSURE IN MICE ALTERS HEALTH OUTCOMES AND LATER NICOTINE PREFERENCE IN ADOLESCENT OFFSPRING

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RATIONALE: Maternal cigarette smoking is a risk factor for adolescent smoking, but it is difficult to separate the biological and social causes of smoking behavior in humans. Therefore, the present experiment was designed to examine the effects of maternal nicotine exposure on nicotine preference by adolescent offspring.

METHODS: Nicotine (50 or 200 mg freebase/ml) or no nicotine was given in drinking water with 2% saccharin to pregnant C57BL/6J mice from day 9 of pregnancy until offspring were weaned on postnatal day 21 (PN21). Two weeks later, nicotine preference by periadolescent offspring was tested in the home cage, continuously, for 7 days using a two-bottle choice paradigm during the periadolescent window (PN35-42).

RESULTS: Serum cotinine levels collected at the end of the experiment confirmed nicotine consumption by mothers and offspring. Maternal nicotine consumption resulted in premature death of offspring and significantly diminished body weights in periadolescent survivors (p < 0.05). Males exposed to low doses of maternal nicotine preferred nicotine during adolescence whereas female and control mice did not (p < 0.05).

CONCLUSIONS: Chronic maternal nicotine exposure affects the health of offspring and increases risk of nicotine addiction in male offspring.

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A META-ANALYSIS OF THE HERITABILITY OF SMOKING INITIATION AND TOBACCO USE IN ADOLESCENTS AND ADULTS.

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Many twin studies of smoking-related behavior have reported that genetic factors play a significant role in the determination of smoking initiation and tobacco use. However, heritability estimates from the literature display considerable variability, most likely due to differences in model structure, age, sample size, origin of cohorts, and measurement for smoking-related behavior. To address this variability, we reevaluated the results of existing studies via meta-analysis, a commonly used literature analysis method. Our results indicate that the heritability estimate weighted by estimated variance for smoking initiation is 46.8% (± 2.94; SE) with a 95% confidence interval spanning from 41.0 to 52.6% (Nstudies = 20). A similar analysis was also conducted of tobacco use and revealed that the heritability estimate weighted by estimated variance for this phenotype is 53.3% (± 4.98; SE) with a 95% confidence interval spanning from 43.6 to 63.1% (Nstudies = 19). Heritability estimates based on other weighting methods did not differ significantly from that weighted by estimated variance for either phenotype. Given that the datasets used in our analyses were derived from multiple cohorts representing a wide range of differences in age, sex, cohort, and population size, we believe that these estimates are likely to reflect the true value of the degree of genetic contribution to total phenotypic variation in regards to smoking initiation and tobacco use (Supported by DA-12844).

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HETEROGENEITY IN PHENOTYPES BASED ON SMOKING STATUS IN THE GREAT LAKES SMOKER SIBLING REGISTRY

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We analyzed data collected from same-sex siblings enrolled in the Great Lakes Smoker Sibling Registry, which was created to enable identification of genetic differences likely to be involved in smoking behavior. Participants were 24 sibling pairs discordant for ever-smoking (19 female, 5 male; 92% White; mean [SD] age 37.4 [8.5]). In 46% of pairs, the ever-smoker was the older sibling. Among the smokers, 79% were current smokers; among the never-smokers, 83% had experimented with smoking. Eversmokers had 13.6 (1.5) years of education, compared with 15.0 (1.8) for their never-smoking siblings (p = .000). Eversmokers reported significantly more pleasurable experiences, dizziness, and “buzz” upon initial exposure to smoking than did their never-smoker siblings. Ever-smoking siblings scored 9.5 (3.2) on novelty-seeking, compared with 6.9 (3.7) for never-smokers (p = .016). They also consumed significantly more caffeine (p = .016) and alcohol (p = .031), scored significantly higher on an index of alcohol dependence (p = .005), and rated the extent to which they experienced a “buzz” upon initial exposure to alcohol (p = .028). Depression and anxiety were consistently though not significantly higher in the ever-smoking siblings, compared with the never-smokers. These findings are consistent with differences previously identified in unrelated groups of ever-smokers and never-smokers. Because same-sex siblings typically share a large set of common environments when growing up, the significant differences between siblings discordant for smoking reported here are likely to be due to genetic differences or (with the exception of responses to early exposure, which occurred in adolescence) to differences in their adult environments. Funded by CA81645.

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EVIDENCE FOR A GENETIC MODE OF TRANSMISSION IN NUCLEAR FAMILIES WITH A HIGH PREVALENCE OF EVER SMOKING


Few studies of smoking in families have described the pattern of transmission (genetic or otherwise) from parents to children. Family smoking histories of all first-degree biological relatives were collected from 468 index cases (participants in “SMOFAM”, a longitudinal study of psychosocial and behavioral predictors of substance use now in its 15th year of follow-up). The smoking-related phenotype was ever smoking (defined as having smoked 100 or more cigarettes in lifetime); reported by index cases for all first-degree relatives). Complex segregation analyses were conducted using SAGE to test whether ever smoking aggregates in families and, if so, to test whether there is evidence for a pattern of genetic transmission. The maximum likelihood ratio test identified the most parsimonious model. Although evidence for familial aggregation was obtained, evidence for genetic transmission was inconclusive. Utilizing data from 128 families with three or more smokers, the Mendelian transmission model was not rejected (chi-square(3) = 3.27, p > 0.05), and the environmental transmission model was rejected (chi-square(3) = 8.06, p < 0.05), suggesting the presence of a segregating genetic substrate in these families. These results suggest that while strict genetic transmission of ever smoking is not evident across all families, evidence consistent with Mendelian transmission is present in families with a high prevalence of ever smoking.

Study supported by grants 7PT2001 and 7PT2002 from the University of California Tobacco-Related Diseases Research Program.

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POI 20  PERSISTENCE OF CIGARETTE SMOKING: FAMILIAL LIABILITY AND THE ROLE OF NICOTINE DEPENDENCE

Eric O. Johnson*, Gary A. Chase, and Naomi Breslau

AIMS: With acceptance of the health risks of cigarette smoking in the United States, it has been suggested that high genetic vulnerability may explain smoking persistence. Indeed, heritability estimates for smoking persistence range from 27% to 70%. However, studies have not addressed how this liability to smoking persistence may interact with other characteristics of individuals. We examined alternative ways that familial liability to persistence, nicotine dependence and smoking persistence may be related.

METHODS: In an epidemiologic sample of young adults 26 to 35 years old (N=979), nicotine dependence and familial density of smoking persistence were assessed. A subset of 389 daily smokers was informative for logistic regression analyses.

RESULTS: Absent nicotine dependence, daily smokers with medium and high familial density of persistence were at increased risk of smoking persistence (OR = 4.2 and 7.0, respectively). However, familial density of persistence was not associated with smoking persistence among daily smokers with nicotine dependence. Level of education also appeared to limit the influence of familial liability, although nicotine dependence also modified this effect.

CONCLUSIONS: Familial liability to persistence of smoking is moderately associated with smoking persistence; however, this association is not simple. Nicotine dependence seems to play a modifying role in smoking persistence, which overrides the effects of familial liability as well as level of education.

CORRESPONDING AUTHOR: Eric O. Johnson.

POI 21  SMOKERS WITH MULTIPLE FIRST-DEGREE RELATIVES WHO SMOKED DISPLAY HEIGHTENED LEVELS OF STRESS-INDUCED CIGARETTE CRAVING

Joel Erblich, Ph.D.*, Mount Sinai School of Medicine; Raymond Niaura, Ph.D., Miriam Hospital; Bonnie Spring, Ph.D., University of Illinois, Chicago; Yael Boyarsky and Dana Bovbjerg, Ph.D., Mount Sinai School of Medicine

Individuals whose first-degree relatives smoked are significantly more likely to be persistent smokers themselves. The mechanisms underlying this relationship are unknown. Considerable research has demonstrated that smokers display heightened levels of cigarette craving after being exposed to stress situations, and, according to some studies, the duration of these craving responses may be predictive of later cessation failure. Based on this research, we experimentally tested the hypothesis that smokers with two or more first-degree relatives who smoked ("FH+") would exhibit stronger craving reactions following stressful stimuli than smokers without such family histories ("FH-."). We recruited 78 smokers (mean age=40.8 years, 58% female, 42% completed some college, 46% income>$20K, 59% African American) to an experimental study in which they were exposed to a neutral situation (changing assignment to Unigene cluster Mm.40744, was found to align to genomic DNA which has allowed identification of sequences encoding the entire coding region of the gene and assigned intron/exon boundaries. These results of gene identification serve to indicate the power of centralized data bases that result from the sequencing of whole genomes in combination with functional results obtained in the laboratory on drug-regulated gene expression.

CORRESPONDING AUTHOR: David J. Vandenbergh.
POI 24
INVESTIGATION OF 1-HYDOXYPYRENE AS A MARKER FOR CIGARETTE SMOKE EXPOSURE IN MALES AND FEMALES.

M.A. Sarkar*, G. Gudi, M. Franzon

Annually 175,000 cancer deaths in the US can be attributed to tobacco use. While this exposure can be avoided, many people remain addicted. Smoking cessation programs and reduction of tobacco intake may be useful in reducing the carcinogenic risk. To monitor their progress through cessation programs a non-invasive biomarker can prove useful in assessing exposure to the carcinogenic metabolites. The objective of this study was to investigate urinary 1-hydroxypyrene glucuronide (1-OHGP) as a non-invasive biomarker for exposure to cigarette smoke. Urine was collected from smokers (> 20 cigarettes/day) and nonsmokers (5 females and 6 males, each group) at 7 a.m. (overnight), 9a.m., 11a.m., 1p.m., 3p.m., 5p.m., 7p.m. and 9p.m. Levels of 1-OHGP were measured by immunofluorimetry chromatography, solid phase extraction and HPLC with synchronous fluorescence spectroscopy. Urinary 1-OHGP levels were significantly higher among smokers (mean log 1-OHGP = 1.72 ± 0.93) than in non-smokers (mean log 1-OHGP = 0.80 ± 0.92) (P<0.05). Log 1-OHGP level was about 2.7-fold higher in male smokers (2.02 ± 0.78) compared to male nonsmokers (0.77 ± 0.90) and 1.6-fold higher in female smokers (1.33 ± 0.97) compared to female nonsmokers (0.84 ± 0.97). There was no statistically significant gender effect in 1-OHGP levels. However, lower urinary 1-OHGP excretion in female smokers the reasons for which need to be further explored. A positive linear relationship was observed between urinary 1-OHGP levels and number of cigarettes smoked (r2=0.42, P<0.0012). Urine samples obtained between 9 am and 1pm had the most significant difference between the two groups A single sample obtained between 9 a.m. and 1 p.m. may be best to discern between smokers and nonsmokers, avoiding the need to collect several samples over a prolonged period.

CORRESPONDING AUTHOR: M.A. Sarkar.

POI 25
PILOT STUDY TO ASSESS RESPONSE TO A MAIL-BASED BIOLOGIC DATA COLLECTION KIT

Andrew Hyland, Joseph Bauer, Hamed Rezaishiraz, Karen Head, John Cowell, Gerald Bepler, Michael Cummings

The primary objective of this study is to assess the response rate to a mail-based mouthwash rinse data collection kit used to obtain DNA samples from a population of subjects who are geographically dispersed. The secondary objective is to assess the volume and quality of genetic material obtained from the biologic data collection effort. A sample of 300 current and former smokers were randomly selected from a large group of current and former smokers who reside in 20 US communities and who completed detailed tobacco use telephone interviews in 1988, 1993, and 2001. Subjects were mailed an invitation to participate in the study, directions on how to provide a mouthwash rinse sample to be used for genetic analyses potentially involving in nicotine dependence, and were randomized within community into three incentive arms: 1) $10 check included with the kit; 2) $2 check included with the kit; 3) no incentive. Subjects were asked to massage their cheeks, swish a mouthful of commercially available mouthwash for 30 seconds, and then expectorate the fluid in a 50 ml polypropylene tube. Mouthwash samples were returned through postage paid regular mail to the laboratory to assess response rates by incentive arm and to assess measures of DNA volume and quality. This methodological work is still in progress; however, results will be presented on the overall response rate to the mouthwash rinse data collection effort, the effect of incentives on response rate; the characteristics of responders, the cost per sample collected, as well as some preliminary laboratory analysis including total DNA volume and polymerase chain reaction success rates with obtained samples.

CORRESPONDING AUTHOR: Andrew Hyland.

POI 26
RISK TAKING AND SMOKING TENDENCY AMONG AFRICAN-AMERICAN CHILDREN: MODERATING INFLUENCE OF PEER PRESSURE

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The percentage of youth who report smoking has increased at an alarming rate (80% increase among African American youth; CDC, 1999). One factor that has been shown to be associated with increased smoking practices is risk-taking/rebelliousness (Collins, et al., 1987). Another factor associated with smoking initiations is susceptibility to peer pressure (Botvin, Epstein, Schinke, & Diaz, 1994). This investigation examined the moderating influence of susceptibility to peer pressure on the association between risk taking and the tendency to smoke among a predominately African-American population.

Participants included 88 students (mean age = 12 years). A majority of the children (90%) were African-American (n = 79), 8% were Caucasian (n = 7), and 2% were either Hispanic or Asian. Participants completed a 130-item health questionnaire assessing various areas, including smoking behavior or propensity, general risk-taking, and susceptibility to peer pressure to smoke.

After controlling for gender and socio-economic status on a hierarchical multiple regression analysis, both risk taking and susceptibility to peer pressure contributed to significant variance in smoking tendency [F (4, 81) = 3.91, p < .01]. On the final step of the regression model, the interaction between risk taking and susceptibility accounted for a significant 5% of incremental variance in smoking tendency (R2 changed = .05, p < .05).

Results support a moderating influence of susceptibility to peer pressure on the relationship between risk taking and smoking tendency. Findings support use of programs designed to teach peer negotiation and refusal efficacy even among youngsters who believe themselves to be risk-takers as a means of preventing smoking behaviors among African-American children.

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POI 27
CHILDHOOD ADHD IS ASSOCIATED WITH LOWER SMOKING ABSTINENCE RATES IN ADULTHOOD

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Cross-sectional and prospective studies indicate a link between attention-deficit hyperactivity disorder (ADHD) and tobacco use, with earlier onset of regular smoking, increased rates of use, and decreased cessation rates among adults diagnosed with ADHD in childhood. Treatment studies have not reported differences in cessation rates by ADHD status. Identification of subgroups with particular difficulty in quitting smoking is important for tailoring interventions. This study examined abstinence rates among 348 adult smokers (35% female, 75% Caucasian) participating in two randomized controlled treatment studies. Treatments included nicotine replacement, mood stabilizers (bupropion, nortriptyline), and psychological interventions. Childhood ADHD was assessed retrospectively by the diagnostic interview schedule. Adult inattentive symptoms were self-reported on the Brown ADHD Checklist. Forty-two individuals (12%) met criteria for child ADHD. Post-intervention (12wk) quit rate with missing coded as relapsed was 33% for ADHD participants and 42% for nonADHD participants (X2=7.8, p= .377). In a survival analysis, child ADHD status was predictive (p=0.001) of time to relapse controlling for gender, age of first smoking, and number of cigarettes at baseline. By week 52, all 42 ADHD participants had relapsed, while 18% of nonADHD participants reported continued abstinence. Findings were parallel for analyses restricted to subjects with complete data. Adult inattention as measured by the Brown scale was correlated with multiple measures of depressive symptoms (r=0.50–0.54), but not predictive of abstinence. Current findings indicate individuals with ADHD in childhood have particular difficulty at maintaining long-term abstinence. While adult inattention was related to poor mood, there was no influence on abstinence.

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NICOTINE DEPENDENCE AMONG ADOLESCENTS WITH PSYCHIATRIC DISORDERS: EVALUATING SYMPTOM EXPRESSION AS A FUNCTION OF DEPENDENCE SEVER

Strong, D.R., Brown, R.A., Ramsey, S.E. and Myers, M.G

 Debate continues as to the adequacy of existing operationalizations of nicotine dependence particularly among adolescents. The measurement of symptoms specific to nicotine dependence is complicated by the fact that nicotine dependence often occurs with other DSM-IV disorders. Using methods based on item response theory, we examined a structured interview assessment of DSM-IV Nicotine Dependence and the Modified Fagerstrom Tolerance Questionnaire (mFTQ; Prokhorov et al., 2000) symptoms to explore the expression of particular symptoms as a function of level of nicotine dependence in a sample of 191 adolescents with psychiatric disorders.

Despite our attempts to capture a broad range of smokers, 64% of teens were daily smokers, and 68% met DSM-IV criteria for nicotine dependence. Both the DSM-IV symptoms and the mFTQ demonstrated the ability to discriminate among adolescents across levels of dependence, and both showed significant correlations with smoking rate, craving, and withdrawal symptoms. The mFTQ was less sensitive to individual variation in DSM-IV symptom counts, suggesting the physiological components were not strongly related to the cognitive and behavioral components of the DSM-IV nicotine dependence syndrome. However, the mFTQ consistently showed strong relationships to the immediate consequences of nicotine deprivation (urge, craving) supporting the conceptualization of the mFTQ as measuring nicotine exposure. Given the number of scoring alternatives in using modifications of the FTQ, we assessed the discriminative utility of each of the seven mFTQ item-response options. These analyses provide us with some preliminary understanding of the severity of particular symptoms and the order in which symptoms are likely to be expressed across levels of nicotine dependence.

DEVELOPMENT AND VALIDATION OF AN ADOLESCENT SMOKING CONSEQUENCES QUESTIONNAIRE

Johanna M. Lewis Esquerre, Ph.D.*, Brown University; James R. Rodrigue, Ph.D., University of Florida

Several researchers have investigated the role of outcome expectancies in the initiation and maintenance of smoking behavior. Some scholars, using an empirically validated adult smoking expectancy questionnaire, reported that smokers identify a greater number of positive smoking expectancies and fewer negative smoking expectancies compared to non-smokers and ex-smokers. The purpose of this study was to develop a similar smoking expectancy questionnaire for adolescents. Using the Smoking Consequences Questionnaire developed by Brandon and Baker (1991) as a model, the Adolescent Smoking Consequences Questionnaire (ASCQ) was created and administered to 437 middle and high school students. The ASCQ, and demographic and tobacco surveys, were administered to smoking and non-smoking adolescents in a group format during classroom periods. To assess test-retest reliability, the ASCQ was re-administered four weeks later. Overall, the results represent initial evidence for the validity and reliability of the ASCQ. Factor analyses yielded five factors that included Negative Reinforcement/Negative Affect Reduction, Peer Pressure/Positive Social Consequences, Appetite-Weight Control, Negative Respiratory Consequences, and General Negative Consequences. As expected, regular smokers identified a greater number of positive smoking expectancies and fewer negative smoking expectancies compared to non-smokers and occasional smokers. Peer smoking and peer pressure/positive social expectancies also were better predictors of current smoking than parental smoking and a variety of sociodemographic variables. Future research should continue to assess the validity and reliability of the ASCQ, and use the ASCQ to investigate the role of smoking expectancies in adolescent smoking behavior.

This non-funded study was conducted while the first author was at the University of Florida.

CONSTRUCTING A SHORT FORM OF THE SMOKING CONSEQUENCES QUESTIONNAIRE WITH ADOLESCENTS AND YOUNG ADULTS

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Cigarette-smoking related expectancies have received limited research attention, however recent studies have provided evidence for their relationship with smoking behavior. The Smoking Consequences Questionnaire (SCQ) is the most commonly used measure in such studies. The goal of the present study was to construct a short form of the SCQ and to examine the validity of this short form among both young adults and adolescents. A brief, validated measure of smoking expectancies can facilitate research, easing both the administration and analyses of smoking expectancies in larger models. Analyses were conducted on 2 independent samples of substance abusing youth including 107 young adults and 125 adolescents. Confirmatory factor analyses on the young adult sample yielded a 21-item short form representing the four original SCQ factors. This structure was replicated on the adolescent sample and factorial invariance was demonstrated across the samples. Results provide initial evidence for reliability and validity of a short SCQ (S-SCQ) and suggest its appropriateness for use with young adults and adolescents.

This research was supported by grants from the National Institute on Alcohol Abuse and Alcoholism and the California Tobacco Related Disease Research Program.

TEEN RESPONSES ON THE FAGERSTRÖM TEST FOR NICOTINE DEPENDENCE (FTND): A FACTOR ANALYSIS

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The Fagerström Test for Nicotine Dependence (FTND) is a 6-item self-report questionnaire used to assess tobacco addiction. Researchers have hypothesized that teenage smokers and adult smokers may systematically differ in their response patterns on the FTND. We performed a factor analysis of FTND responses from 463 teens requesting treatment for tobacco addiction and compared the factor structure with previously published findings from adult smokers. Teenage smokers' mean age was 15.5 (S.D. 1.3, range 13 to 17) years; 65.2% were female; 64.8% were Caucasian, 31.8% African-American, and 3% Other. We found that the FTND factor structure (both from pro-and verimax rotations) from the teenage population consisted of one factor accounting for 33.8% of the variance and was loaded on by items "hate to give up which cigarette," "smoke more in the morning," and "how soon on waking." The second factor, accounting for 15.9% of the variance, had an eigen value of 0.96 and was loaded on by items "difficulty refraining," "smoke if ill," "cigarettes per day." Our findings suggest that the factor structure of the FTND is similar for teen smokers requesting treatment and older smokers; these findings support that teenage smokers experience the same dimensions of tobacco addiction as adults. Further psychometric study of instruments assessing tobacco addiction is needed to elucidate possible differences between teens and adults.

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POI 32

THE GLOVER-NILSSON SMOKING BEHAVIORAL QUESTIONNAIRE (G-NSBQ)

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It is well documented that smoking creates physical dependence; moreover the Fagerström Tolerance Questionnaire (FTQ) and its revised Fagerström Test for Nicotine Dependence (FTND) have been used extensively to estimate the level of physical dependence of both smokers and more recently smokeless tobacco users. However, there is little consistency in the ability to measure behavioral aspects of the smoking addiction. Examples of behavioral patterns are the rituals associated with smoking, the sense of security created by smoking and/or the relationship developed between a smoker and his/her cigarettes.

Purpose was to develop a direct, easily administered, pencil and paper questionnaire to determine the degree to which behavior plays a role in smoking dependence.

Eighteen questions, each with 5 stem responses were developed in 1993 and tested on 2,032 valid subjects in several countries. The objective was to select questions that best solicit behavioral information. The principal methods used to select questions were components analysis, cluster analysis, stepwise multiple linear regression, cross tables, Mantel-Hanzaszel chi square test, and a gamma test.

Without diminishing the data obtained, 7 questions were removed from the questionnaire creating a more concise instrument of 11 questions.

The final questionnaire provides valuable data regarding the degree to which behavior plays a role in dependence. Proposed uses of this instrument would be to better match smokers with appropriate pharmacological and behavioral therapy by administering both the FTQ or FTND (physical dependence) and the GNSBQ (behavioral dependence). The questionnaire, its development, the data collection process, the regression model used to reduce the number of questions, the analyses, and the resulting 11-question questionnaire will be presented.

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POI 34

SHORT-TERM DISTRIBUTION OF NICOTINE IN THE RAT

Bradley G. Brewer and Peter P. Rowell*

Nicotine, with a pKa of 7.9, is about 24% nonionized at physiological pH, and therefore is able to cross cell membranes with relative ease. In many models of nicotine dependence, most notably the bolus theory, it is assumed that the time it takes nicotine to pass through lung tissue to the blood stream is negligible. However, recent studies by Rose and coworkers (Drug Alcohol Depend., 1999) have indicated that the lung may serve as a depot for nicotine such that the acute arterial levels achieved are more than ten-times lower than expected from the bolus theory of nicotine absorption. In this study the short-term distribution characteristics of nicotine in the rat were investigated. A ventilated open-chest rat model was utilized. [3H]-Nicotine was injected into the right ventricle and whole blood was sampled from the left ventricle. These results were compared with [14C]-dextran, a compound which remains only in the plasma compartment. It was found that [3H]-nicotine takes longer to pass through the lung tissue than [14C]-dextran and has different kinetic characteristics. The distribution of nicotine in the lung, heart, and brain was determined at 5, 10, 20, 30 and 40 sec following administration. It was found that nicotine remains in the lung between 20-30 seconds and there is a similar delay between administration of [3H]-nicotine and its appearance in brain tissue. These results indicate that nicotine is retained within lung tissue and the transfer of nicotine to the arterial blood is slower than might be expected.

Supported by grants from the National Institute of Drug Abuse and the Kentucky Tobacco and Health Research Institute.

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POI 33

THE WISCONSIN DEPENDENCE MOTIVES QUESTIONNAIRE: A NEW MEASURE OF TOBACCO DEPENDENCE

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Existing measures of tobacco dependence (e.g., the Fagerström Test for Nicotine Dependence [FTND]) have been criticized on both theoretical and psychometric grounds. For example, they have shown inconsistent relations with diverse dependence criteria, and they do not sample theoretically distinct dimensions of dependence. The Wisconsin Dependence Motives Questionnaire (WDMQ) was developed to assess tobacco dependence using a multiple motives model. The WDMQ is intended to yield a global tobacco dependence score while also ranking smokers on multiple theoretical constructs thought to give rise to dependence. The questionnaire content was derived with reference to influential theories of drug addiction. Individuals with a range of tobacco use patterns and socio-demographic characteristics were surveyed in the development of the WDMQ (n = 778). The scale development process resulted in a dependence measure with 13 distinct motives for tobacco use (e.g., cognitive enhancement, negative reinforcement, tolerance), each with high internal consistency (alphas of 0.87 and greater). In addition, these subscales and the total WDMQ demonstrate concurrent validity when compared to criteria of smoking heaviness and DSM-IV measures of dependence. The WDMQ has the potential to reveal heterogeneity among tobacco users, track developmental change across the course of dependence, and reveal relations between particular dependence motives and benchmarks such as relapse and withdrawal severity.

This study was conducted at the University of Wisconsin. Supported by National Cancer Institute Grant # P50-CA84724-03.

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POI 35

THE PHARMACOKINETIC CHARACTERISTICS OF NPA LOZENGE


Nicotine Polacrilex (NPA) lozenge is a pressed tablet designed to deliver nicotine to the buccal cavity. The pharmacokinetic characteristics of 2 and 4 mg NPA lozenges were evaluated in the following four studies conducted in adult smokers: (1) a single-dose, four-way crossover study (in replicate design) to compare 4 mg NPA lozenge and 4 mg NPA gum; (2) a single-dose, two-way crossover study to compare 2 mg NPA lozenge and 2 mg NPA gum; (3) a multiple-dose, four-way crossover study to compare NPA lozenge administered every 90 minutes and NPA gum administered every 60 minutes at 2 and 4 mg dose levels; and (4) a single-dose, three-way crossover study to compare the pharmacokinetic profile of 4 mg NPA lozenge when a) used as directed, b) chewed and immediately swallowed and c) chewed, retained in the mouth for 5 minutes, and then swallowed. The single dose studies demonstrated 8-10% higher Cmax and 25-27% higher AUC(0-inf) from NPA lozenges compared to those from NPA gums at both 2 and 4 mg dose levels. The multiple dose study utilized different dosing intervals to compensate for the higher absorption from single dose and resulted in 30% lower AUC(0-1) from lozenges compared to those from gums at both 2 and 4 mg dose levels. In the fourth study, NPA lozenges administered differently from the label-specified instructions for use resulted in reduced absorption. These pharmacokinetic characteristics should allow the NPA lozenge to become an effective and safe therapy for smoking cessation.

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POI 36
SAFETY PROFILE OF THE NEW NICOTINE POLACRILEX LOZENGE

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A new nicotine polacrilex lozenge has been developed as an effective smoking cessation aid in two strengths. Each lozenge delivers approximately 25% more nicotine than the comparable strength gum. The dose selection is based on dependence as measured by ‘time to first cigarette’ instead of cpd with those who smoke within 30 minutes after waking, are assigned to the 4 mg. The combination of slightly higher per piece nicotine delivery by the lozenge and the increase in the proportion of smokers assigned to the 4 mg strength led us to examine product safety. 917 subjects were randomized to 2 mg (459 active; 458 placebo) and 901 subjects were randomized to 4 mg (450 active; 451 placebo). The average lozenge/day at 2 weeks (SD) for the 2 mg: active=6.9(3.6), placebo=7.1(3.8); 4 mg: active=8.3(3.6), placebo=8.3(4.1). Subjects receiving active product had more drug related adverse events than placebo subjects (2 mg: 46% active, 36% placebo; 4 mg: 52% active, 33% placebo). In the 2 mg dose group, more subjects discontinued the study on the active arm as compared to the placebo, the reverse was true in the 4 mg dose group. Serious adverse events occurred in less than 3% of the subjects in either dosages; only one was possibly related. The most common related adverse events that occurred more frequently in the active lozenge were: headache, heartburn, hiccup, nausea, and coughing. Most of these were moderate in severity. Even with higher nicotine delivery, the new 2 and 4 mg nicotine polacrilex lozenge demonstrated an appropriate level of safety when used for smoking cessation.

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POI 37
MENTHOL CIGARETTE SMOKING INHIBITS NICOTINE METABOLISM

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African-Americans (AA) have higher rates of lung cancer than whites (W). It is hypothesized that mentholated cigarette smoking by AA could contribute to lung cancer by facilitating more intensive smoking and/or enhancing pulmonary absorption of tobacco smoke toxins. To explore these hypotheses, we studied 14 subjects, 7 AA/7 W, in a 3 week study during which they smoked regular cigarettes for 1 week, then mentholated cigarettes or regular cigarettes during weeks 2 and 3, in a crossover design.

On a research ward during weeks 2 and 3, smokers smoked 20 cigarettes/day with circadian blood sampling and received an iv infusion of deuterium-labeled nicotine and cotinine. Similar blood levels of nicotine and carboxyhemoglobin were seen in mentholated cigarette and regular cigarette conditions. During mentholated cigarette smoking, the total clearance of nicotine was significantly slower than with regular cigarette smoking (1289 vs 1431 ml/min, p<0.02), but cotinine metabolism was unaffected. Our findings do not support the hypothesis that mentholated cigarettes result in more intensive smoking or greater intake of nicotine or other tobacco smoke toxins, but we do find that mentholation of cigarettes inhibits nicotine metabolism. The possibility that mentholated cigarettes could result in inhibition of metabolic detoxification of carcinogens derived from cigarette smoke needs to be considered as a possible mechanism for an association between mentholated cigarettes and lung cancer.

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POI 38
MENTHOL CIGARETTE USE IN ADOLESCENTS: TRAJECTORY AND ENJOYMENT OF SMOKING

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Although menthol content in cigarettes has been linked to health outcome, little research has examined how smoking menthol affects the trajectory and the perceived enjoyment of smoking (ES) among adolescent smokers. We hypothesized different hedonic value of cigarettes in adolescent menthol versus non-menthol smokers. In addition we hypothesized a more rapid progression to daily smoking in menthol smokers. Fifty-one adolescents [78.4% girls, 78.4% Caucasians, mean age=15.0±1.36, mean FTND scores=6.8±1.28] requesting smoking cessation treatment completed one baseline topography session in which they smoked their usual brand of cigarette. Topographical (number of puffs, puff interval, interpuff interval, puff volume, puff velocity) and physiological (blood pressure [BP], heart rate [HR], carbon monoxide [CO]) measures were obtained. Participants also completed a visual analog questionnaire assessing “Enjoyment of Smoking”. Most Caucasian smokers (77.1%) and all African Americans smoked menthol cigarettes. Chi-square and Student’s t-tests were used to measure between group differences. Menthol cigarettes had significantly higher nicotine (p<0.001) and tar content (p<0.001) than regular cigarettes. There was no difference in smoking trajectory between menthol and non-menthol smokers. However, among teens who had been smoking for 4 years or more (N=22), menthol smokers had greater ES than non-menthol smokers (p=0.054). Menthol smokers also reported fewer past quit attempts than non-menthol smokers (p=0.008). These relationships dictate the need for further research on the effects of menthol flavoring on the hedonic value of smoking as well as cessation attempts in young smokers.

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POI 39
ADOLESCENT SMOKERS AND THE TRANSTHEORETICAL MODEL: A MIXED METHOD ANALYSIS

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The Transtheoretical Model (TTM) has been applied extensively to adult smokers. Instruments have been adapted for use in adolescent smokers (e.g., Decisional Balance and Processes of Change), however they have not been adequately studied in this population. Purpose: To explore the patterns of change in these measures over time in relation to smoking behavior and quit attempts. Methods: Forty high school smokers were followed monthly for one year. Repeated measures of Stage of Change, Decisional Balance, and Processes of Change and serial in-depth interviews regarding smoking behavior and beliefs and were collected. Plots of each individual’s scores over the year were compared with the qualitative data. Results: Stage of Change plots revealed forward and retrograde movement, discontinuous stage movement (Precontemplation to Action) but no consistent pattern of steady progression to quit attempts. Acute drops in Decisional Balance (DB) scores were not associated with quit attempts and could herald increased consumption. Teens considered some DB items (stinks, teeth yellow) “nuisance” factors lacking sufficient emotional saliency to prompt a quit attempt. Processes of Change scores increased as predicted in more active stages and matched some of the described cessation strategies used by participants. Conclusion: The TTM does not seem to describe the natural history of teen smoking cessation. Intentions to quit fluctuate rapidly over time unrelated to actual attempts. DB may not adequately capture relevant cons of smoking for teens and other non-attitudinal factors are important in predicting cessation. Tailoring interventions to stages of change may not be helpful in teens.

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POI 40 VALIDITY OF THE CONCEPT OF “STAGE OF CHANGE” IN CURRENT AND FORMER SMOKERS

Etter, J.F.

BACKGROUND: The concept of “stage of change” is widely used by researchers and clinicians in the field of smoking cessation. Our aim was to assess the validity of three staging questionnaires and of the concept of stage of change itself.

METHODS: Survey on Internet in 1025 ever smokers, retest after 7 days in 318 people (31%), follow-up after 32 days in 451 people (44%).

RESULTS: 83-93% of participants were classified in the same stage by all pairs of questionnaires, and 15% changed stage between baseline and retest. Including quit attempts in the “Preparation” stage had a large impact on stage distributions, since 18-24% of smokers who had decided to quit in the next 30 days were downgraded to the “Contemplation” stage because they had not made a quit attempt in the previous year. The “Action” stage included 5-7% of occasional smokers. Quit attempts during the past 30 days and 7 days were better predictors of smoking cessation than quit attempts during the past 12 months.

CONCLUSIONS: These results reflect theoretical and methodological problems with the measurement of stage of change. Four different variables (current behavior, quit attempts, intention to change, time since quitting) are included in the concept of stage of change. None of these variables is measured comprehensively, they are combined in a somewhat haphazard manner, and intention and time are continuous variables categorized by arbitrary cutpoints. Measuring each of these four variables independently may be preferable to using an incomplete mix of these elements.

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POI 41 A COMPARISON OF THE CONTEMPLATION LADDER AND THE STAGES OF CHANGE IN A COLLEGE STUDENT SAMPLE

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Several researchers recently have expressed reservations about the validity of the stage of change construct, and some have suggested that a continuous measure of motivation to quit smoking, such as the contemplation ladder, might be more valid. Previous research using a work site sample (Herzog et al., 2000) revealed that patterns of motivational readiness to quit varied considerably depending on whether the stages or the contemplation ladder was employed. The current study replicates this finding in a college student sample (n = 144). The results indicated that the stages of change yielded a distribution skewed in the direction of low motivation to quit, whereas the contemplation ladder yielded a distribution skewed in the direction of high motivation to quit (p < .001). Subsidiary analyses indicate that the contemplation ladder and the stages of change were both associated with other cessation-related variables. These results, together with previous data, demonstrate that different measures of motivation to quit can lead to different conclusions about motivational readiness to quit in a given sample of smokers. Researchers and clinicians should consider this issue when selecting an instrument to measure motivation to quit.

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POI 42 INDIVIDUAL DIFFERENCES IN WITHIN-DAY PATTERNS OF CIGARETTE SMOKING AND URGES TO SMOKE

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In the current study, individual differences in within-day smoking and urge patterns were examined using a daily process approach. A sample of 51 (n = 30 female; n = 30 nicotine-dependent) community-residing adult smokers recorded number of cigarettes smoked and urges to smoke 4 times daily for 14 days. Multilevel Poisson regression models predicting smoking rate from 3 time-of-day (TOD) contrasts (non-work vs. work hours, morning work vs. afternoon work hours, morning vs. evening non-work hours), gender, and nicotine dependence status revealed significant interactions between person-level predictors (gender, nicotine dependence) and TOD. Women's smoking rates during non-work hours were markedly higher than during non-work hours, higher during afternoon work hours than morning work hours, and higher during evening non-work hours than morning non-work hours, while rates for men were stable across the day. The 2-way interaction between gender and the morning vs. evening non-work hours contrast was qualified by a significant gender by dependence by TOD interaction, the general pattern (higher smoking evening rates for women, stable rates for men) maintained. Nicotine dependence but not gender interacted with TOD to predict urges. Dependent smokers recorded more urges during work hours relative to non-work hours and more urges during morning non-work hours than evening non-work hours, while non-dependent smokers showed stable rates of urges across the day. The smoking rate findings could reflect group differences in work environments, as male participants were more likely than females to have jobs where workplace smoking restrictions were absent. The urge findings reflect the greater likelihood of dependent smokers reporting desire to smoke during times when smoking is prohibited.

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POI 43 “SNUFF-STARTERS” AND “CIGARETTE-STARTERS”: TWO DIFFERENT TOBACCO CAREERS?

K. Ingvar Rosendahl*, B.Sc., M. Rosaria Galanti, MD, Ph.D., Anders Ahlborn, Ph.D., Hans Gilljam, MD, Ph.D.

Cross-sectional surveys among Swedish male adolescents indicate that cigarette smoking and the use of oral snuff are closely associated. In order to gain knowledge on the development of these behaviors we analyzed the progression of tobacco use in a prospective cohort of 1482 Swedish boys between age 11 and 14 (The BROMS Cohort Study).

Among subjects who at age 11 reported ever use of oral snuff only (n=35) 71.0% reported they at least tried smoking by the age of 14. The rate of “snuff initiation” escalated rapidly between the age of 13 and 14 years. The proportion taking up smoking during the first year following snuff initiation declined with increasing age at first use, from 41% among those who were 11 or younger to 16% among 12 to 13 years old.

Of the 176 “snuff-starters” up to the age of 13, only 7% were current user of tobacco at age 14. Among current users, less than 1/3 were smoking cigarettes. Of the 512 boys who initiated tobacco use with cigarette smoking (“cigarette-starters”), 24% reported current use of tobacco at age 14, and 67% of the current users were smokers.

A minority of male adolescents initiates tobacco use with oral snuff. The earlier the initiation the higher the probability of a subsequent close experimentation with cigarettes. “Snuff-starters”, however, show slower rates of progression in tobacco use than “cigarette-starters “, and the two groups probably differ in other social and behavioral characteristics.

This study was entirely funded by the Stockholm Center of Public Health, Stockholm County Council.

**POI 44**  
**TOLERANCE FOR DISCOMFORT AMONG SMOKERS**


Unsuccessful attempts to quit smoking may be at least in part due to fears of one's ability to tolerate the anticipated discomfort when quitting smoking. The present study evaluated the psychometric properties of a questionnaire designed to examine how well smokers tolerate emotional and physical discomfort associated with nicotine withdrawal. The 38 items of the Tolerance for Discomfort questionnaire—Smoking version (TFD-S) have a 5-point Likert-type response format. Ninety-eight adult cigarette smokers recruited from newspaper ads, a smoking cessation group, and its wait list completed the TFD-S and measures of ability to tolerate emotional discomfort, smoking history, intentions to quit smoking, depression symptoms, and demographics. Principal components analysis of the TFD-S with varimax rotation retained 30 items comprising three components accounting for 47% of total item variance: (1) tolerance for physical discomfort and urges; (2) cognitive coping with discomfort; and (3) pain management. Intercorrelations among the scales ranged from .02 to .33, suggesting a modest amount of shared variance. Reliabilities for the scales (coefficient alpha) ranged from .78 to .90. Validity of the measure was supported by correlations with demographic variables, smoking history, tolerance for emotional discomfort, and depressive symptoms. Results of this study enhance our knowledge of smokers' ability to tolerate discomfort associated with smoking cessation.

This study was conducted at the Providence VAMC and supported by two VA Career Scientist Awards, a VA Merit Review grant, and grant # 1 R01 AA11318 from NIAAA.

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**POI 45**  
**FEEDBACK AND MONETARY INFLUENCES ON SMOKING BEHAVIOR**

T. Scott Marzilli, Ph.D.*, University of West Florida, John B. Shea, Ph.D., Indiana State University, and Maria E. Weber, B.S., University of West Florida

The study examined the influence of performance feedback and monetary rewards on smoking behavior, with an emphasis on how self-administration of nicotine would shift when the decision to smoke interfered with monetary earnings. Subjects (N=6) completed one of two experimental sequences of five testing sessions in an outpatient protocol. The five testing sessions consisted of two consecutive sample days and three consecutive choice days. On sample days, subjects were given either four nicotinised or four denicotinised cigarettes that were smoked every 30 minutes. After the smoking of each cigarette, subjects were told whether their preceding psychomotor task performance was “better” or “worse” than average. The nicotinised and denicotinised cigarettes were labeled A or B under double-blind conditions. Each time subjects received “better” than average feedback they earned $10 and each time they received “worse” than average feedback they earned $2. On choice days, subjects were given a choice of which cigarette they wanted to smoke with the feedback and monetary rewards consistent with the sample days. Feedback was not actually linked to psychomotor task performance, but instead was preprogrammed. Feedback significantly influenced the choice to self-administer nicotine. Subjects reliably chose the cigarette that was associated with the “better” than average feedback and increased monetary rewards 83% of the time. Interestingly, this choice was irrespective of the nicotine content of the cigarette. Thus, the choice to self-administer nicotine was significantly reduced when it was associated with a loss in monetary earnings. This choice persevered to the no-feedback condition, thereby providing evidence that smoking motivation may be shaped by contingency based rewards.

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**POI 46**  
**EFFECTS OF REPEATED SMOKING OF ECLIPSE CIGARETTES**

Wallace B. Pickworth, Jennifer L. Maisen, Eun M. Lee, Eric T. Moolchan

In April 2000, R J R Reynolds introduced a new smoking device, Eclipse®, that the company claimed delivered lower levels of smoke than conventional cigarettes. Eclipse® uses a carbon fuel-element to vaporize substances in the rod that are inhaled by the user. In this report, the effects of Eclipse® on smoking topography, substance delivery factors, physiologic subjective and biochemical markers of smoking were compared to conventional cigarettes. Ten adult smokers (8 men) smoked ad lib on four occasions: Eclipse® twice, through the mouthpiece of the topography unit and handheld; own brand twice, through the mouthpiece of the topography unit and handheld. Measures were collected before and up to 1 hr after smoking. Sessions were separated by at least 24 hr. There were no apparent differences between smoking through the topography mouthpiece and conventional (hand-held)smoking. Compared to their own brand of cigarette, the Eclipse® took longer to smoke (366 vs 292 sec) and needed more puffs (14.8 vs 10.8) and caused a larger increase in exhaled CO (7.3 vs. 4.2 ppm). Puff volume (90.7 vs. 63.0 ml) and puff velocity (81.6 vs 58.2 ml/sec) were greater after the Eclipse® than the usual brand; interpuff interval and puff duration were similar. Cardiovascular effects were similar after Eclipse® and the usual brand. Subjects rated the Eclipse® as less satisfying (3.1 vs 5.5) and tasteful (2.6 vs. 4.9) and the subjects liked the Eclipse® less (2.4 vs. 5.2) than their usual brand. The results of this study indicate that acute exposure to the Eclipse® device exposes the user to significant quantities of CO and possibly other harmful components of tobacco smoke. The results further validate the use of topography as a quantitative index of smoke exposure.

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**POI 47**  
**ACUTE EFFECTS OF ADVANCE®, A POTENTIAL REDUCED EXPOSURE PRODUCT FOR SMOKERS**

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The tobacco industry is developing products with potentially lower levels of lethal tobacco constituents, relative to cigarettes. Several of these potential reduced exposure products (PREPs) are available (e.g., Star Scientific’s Advance®, purportedly low in tobacco-specific nitrosonamines, or TSNs), though few studies describe their effects. Research demonstrates that some PREPs’ acute effects can differ from cigarettes in ways that may influence smokers’ health. This study examined Advance®’s acute effects. Twenty smokers of light or ultra-light cigarettes (15 or more cigarettes/day) completed three, Latin-square ordered, 2.5-hour sessions. In each session, participants completed an 8-puff smoking bout every 30 minutes for a total of four bouts. In one session subjects smoked their own brand, in another the Advance®, and in a third they sham smoked (i.e., puffed on an unlit cigarette) to control for smoking-associated actions. Subject-rated measures of tobacco/nicotine withdrawal, expired carbon monoxide (CO), and heart rate (HR) were assessed periodically. Blood was sampled at the beginning and end of each session. Preliminary analyses reveal that, unlike some PREPs, Advance® produces similar withdrawal suppression, HR increase, and CO boost compared to normally marketed cigarettes. Relative to the other conditions, sham smoking produced lower CO and HR with higher levels of subjective withdrawal. Plasma nicotine levels, not yet available, will be presented. Studies with longer exposure periods may be necessary to determine if carcinogen delivery (i.e., TSNs) is decreased. These results highlight the importance of evaluating the potential health effects of PREPs and underscore the need for an objective and comprehensive testing strategy.

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POI 48  U RINARY 1-HYDROXYPYRENE AS A BIOMARKER OF PAH INTAKE AMONG SMOKERS OF CIGARETTES WITH AND WITHOUT BLOCKED FILTER VENTS

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Most U.S. cigarettes utilize filter tip ventilation to reduce exposure of smoke yields of nicotine, CO, and “tar”, by air dilution. Some smokers negate this effect by blocking vents with their lips or fingers. To understand how this may affect the smokers’ cancer risk, we compared the delivered dosages of select components in mainstream smoke generated by machine-smoking of the most popular vented brand, simulating the average human smoking patterns, both with the vents fully open and fully closed. The smoke yields of TPM, nicotine, and carcinogenic benzo[a]pyrene increased by 13.4, 12.3, and 21.0%, respectively, when the vents were obstructed during smoking. We also compared excretion of 1-hydroxypyrene (1-OHP) in urine of 37 smokers who smoke either non-vented or vented cigarettes but blocked the vents during smoking (Group A) with that of 30 smokers of ventilated cigarette who do not cover the holes (Group B). Levels of 1-OHP were significantly higher in Group A compared with Group B, both on an overall basis (626 ± 714 vs. 285 ± 181 ng/g creatinine; p = 0.008) as well as on a per cigarette basis (47.8 ± 63.8 vs. 25.6 ± 23 ng/g creatinine per cigarette; p = 0.06). Smokers who block vents or who smoke ventless cigarettes increase their exposure to PAH, as evidenced both by increased smoke delivery and by increased excretion of 1-OHP.

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POI 49  CIGARETTE SMokers Do NOT COMPENSATE WHEN SMOKING NICOTINE-FREE Cigarettes

Jed E. Rose, Ph.D., and Frederique M. Behm

Cigarettes with selective reductions in nicotine delivery have been considered as potential tools to prevent or treat nicotine dependence, and as a harm-reduction approach by virtue of reduced nitrosamine delivery. One unanswered question is the extent to which individuals might smoke these products more intensively than high-nicotine products. To investigate the role of cigarette tar and nicotine delivery in compensatory smoking, conventional ventilated-filter low-tar, low-nicotine cigarettes (14 mg tar, 13 mg CO, 0.02 mg nicotine) were compared with high-tar, nicotine-free cigarettes manufactured from a genetically modified tobacco. Sixteen cigarette smokers participated in two 8 h sessions during which they smoked each type of cigarette ad lib, with order of presentation counterbalanced. Expired air carbon monoxide, plasma nicotine and smoking topography measures were collected. Subjects showed significant compensatory increases in smoking when using the conventional ventilated-filter low-tar cigarettes. Puff volume was 60% greater than with the nicotine-free cigarettes (p<0.001), and subjects achieved an expired air CO level 74% as high as with the nicotine-free cigarettes. Smoking the nicotine-free cigarettes produced similar CO levels to those measured at baseline with subjects’ habitual brands of cigarettes. Plasma nicotine levels were also significantly higher with the conventional low tar and nicotine cigarettes (11 ng/ml vs. 1 mg/ml, p<.001). These results suggest that delivery of substantial amounts of smoke with selective reductions in nicotine yield deters compensatory smoking behavior.

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POI 50  Effects of Nicotine on Dizocilpine (MK-801)-induced Sensory Gating Impairments in Female Rats.

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It has been suggested that the high incidence of smoking in schizophrenic patients may be an attempt at self-medication with nicotine in this population. The sensory gating impairment associated with this disorder may be modeled in animals by administration of the NMDA receptor antagonist, dizocilpine. The acoustic startle reflex (ASR) and prepulse inhibition (PPI), indices of sensory gating, have been shown to be impaired following dizocilpine administration in male rats. The purpose of this study was to determine whether dizocilpine has similar effects in female rats. Moreover, it was of interest to determine whether dizocilpine effects in female rats may be antagonized by pretreatment with nicotine. Administration of dizocilpine (0.15 mg/kg, ip) to adult female Sprague-Dawley rats resulted in an increase in ASR and a decrease in PPI suggesting sensory gating impairment in these rats. Pretreatment with an acute dose of nicotine (0.1 - 0.5 mg/Kg ip) did not affect dizocilpine-induced impairments in either ASR or PPI. However, chronic administration of nicotine (0.2 mg/kg once daily) for 7 or 14 days, significantly attenuated dizocilpine-induced increases in ASR. The effects of dizocilpine on PPI were not affected by nicotine pretreatment. Neither acute nor chronic nicotine treatment had any significant effect on ASR or PPI. These results suggest that some components of sensory gating impairments induced by dizocilpine administration in female rats may be attenuated by chronic administration of nicotine. This effect of nicotine may contribute to its therapeutic potential in female schizophrenic patients.

Supported by Mordecai Wyatt Johnson Program at Howard University.

CORRESPONDING AUTHOR: Yousef Tizabi, Ph.D.

POI 51  ASSESSMENT OF MEMORY AND ATTENTION FOLLOWING ACUTE NICOTINE ADMINISTRATION TO SCHIZOPHRENIC PATIENTS

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Nicotine has been shown to enhance some aspects of memory and attention in normal subjects and in some patient populations such as Alzheimer’s and Parkinson’s disease. Memory and attentional problems have been consistently observed in schizophrenic (SZ) patients; and nicotine-induced improvements in these patients on eye tracking and sensory gating suggest that they might accrue cognitive benefits from nicotine administration. In this study long-term memory was assessed using yes/no recognition of visuospatial designs. Working memory was assessed in a delayed match-to-sample paradigm using unfamiliar faces. The Continuous Performance Task (CPT) was chosen as a measure of sustained attention. Smoking and non-smoking SZ patients and normal volunteers (NV) were tested at baseline (i.e., 2 hr nicotine abstinence) and after nicotine administration (1 mg delivered via nasal spray) in a randomized counterbalanced order. In all tasks, NVs performed better overall than SZ patients. Significant improvement following nicotine was obtained only on the long-term memory task and only for the subset of SZ patients who were smokers. In fact, nicotine administration normalized performance for SZ smokers. This memory improvement reflected a reduction in false alarm rates in the nicotine condition; hit rates were unaffected by nicotine. In contrast, nicotine did not improve working memory or visual attention for either subject group. These results suggest that nicotine enhances long-term memory retrieval in SZ smokers, whereas similar performance enhancements will not necessarily be observed for working memory and attention.

Supported by NARSAD, NIH and Novartis Pharmaceuticals.

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POI 52  EFFECTS OF ACUTE TRYPTOPHAN DEPLETION ON NEGATIVE SYMPTOMS AND SMOKING TOPOGRAPHY IN NICOTINE DEPENDENT SCHIZOPHRENICS AND NONPSYCHIATRIC CONTROLS

Brian Hitsman, Ph.D.*, Brown Medical School & The Miriam Hospital; Bonnie Spring, Ph.D., Dennis E. McChargue, Ph.D., and Regina Pintoire, Ph.D., University of Illinois at Chicago

We hypothesized that acute tryptophan depletion (ATD), which transiently reduces brain serotonin, would decrease negative symptoms and after smoking topography in patients with schizophrenia. Nicotine dependent schizophrenics (n = 11) and nonpsychiatric controls (n = 8) were examined after ingesting comparable drinks that do and do not deplete plasma tryptophan. Tryptophan-depleting and placebo mixtures were administered double-blind and in counterbalanced order. Test sessions were separated by a 1-week interval. Psychopathologic symptoms (Positive and Negative Syndrome Scale, Modified Hamilton Depression Scale) and smoking topography (time to first puff, puffs per cigarette, puff duration, interpuff interval, and cigarette duration) were measured before ingestion and 5 hours after each mixture, corresponding to the time of maximal depletion. Analyses were conducted using a 2 (schizophrenic/control) x 2 (ATD/placebo) x 2 (baseline/5-hours) MANOVA. Contrary to expectations, ATD decreased cigarette duration in schizophrenics [group x condition x time; Wilk’s Lambda = .80, p = .07] and increased puff duration in schizophrenics and controls [condition x time; Wilk’s Lambda = .53, p = .002]. ATD was not associated with changes in negative symptoms or depression for either schizophrenics or controls. Independent of psychiatric comorbidity, ATD was associated with topographic changes suggesting increased desire to smoke. Compromising brain serotonin via ATD appears to intensify smoking topography in nicotine dependent individuals directly, rather than indirectly via changes in psychopathologic symptoms.

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POI 53  SMOKING CUE-REACTIVITY IN SCHIZOPHRENICS AND CONTROLS: EFFECTS OF MECAMYLAMINE

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While rates of smoking in schizophrenia are higher than in the general population, reasons for this difference are not known. Self-medication of cognitive deficits associated with schizophrenia, genetic and environmental factors and abnormalities in brain reward systems could explain higher rates of smoking in this disorder. To investigate whether brain reward pathways may be dysregulated in schizophrenic smokers (abnormalities in incentive motivational states), we are studying smoking cue-reactivity (CR), and pre-treatment with the nicotinic receptor antagonist mecamylamine (MEC), on CR in schizophrenic (SCZ) versus control (CON) smokers. Nicotine-dependent SCZ and CON smokers are studied in the CR procedure during a two-day test procedure: 1) after baseline smoking; 2) after 45 minutes of smoking abstinence; 3) after overnight smoking abstinence. Subjects are pre-treated with MEC (0.0, 5.0 and 10.0 mg/dL) for three days, during three separate test weeks at least one week, in a counterbalanced, double-blind manner. Urge to smoke (UTS) is assessed in response to smoking, neutral, happy and sad cues presented for 30 second periods on a computer screen, and subjects rate their responses on a visual analogue scale (VAS). Smoking CR is determined by subtracting UTS VAS score obtained before presentation of smoking cues from that obtained after presentation of smoking cues. Preliminary results with SCZ (n=3) and CON (n=5) smokers suggest that smoking CR is most robust during the early smoking deprivation period. MEC dose-dependently blocks smoking CR in both groups. A detailed quantitative comparison of smoking CR and the effects of MEC in both groups will be presented.

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POI 54  NICOTINE WITHDRAWAL SYMPTOMS AND SMOKING URGES IN SMOKERS WITH SCHIZOPHRENIA

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Little is known about biological and behavioral factors that may influence smoking in schizophrenics. Using contingent monetary reinforcement, we examined the effects of smoking reductions on nicotine withdrawal symptoms and smoking urges in smokers with schizophrenia. Fifteen outpatients participated in each of 3 conditions: (a) monetary reinforcement for smoking reductions (CO levels < 12 ppm) combined with placebo patch (C+PLA); (b) monetary reinforcement for smoking reductions with 21-mg nicotine patch (C+NIC); and (c) non-contingent reinforcement with placebo patch (NC). Conditions lasted 5 days and were separated by 1-week washout periods. CO levels were measured 3 times daily in the patients’ homes; nicotine withdrawal symptoms (MNWS) and smoking urges were measured once daily. Results indicated that contingent monetary reinforcement reduced CO levels (NC: 27.5 +/- 1.3; C+PLA: 20.8 +/- 1.6) and increased total nicotine withdrawal scores (NC: 0.9 +/- 0.2; C+PLA: 1.2 +/- 0.2). Duration of smoking reduction was correlated with smoking urges and several nicotine withdrawal subscale scores. This dose of transdermal nicotine did not increase the efficacy of contingent monetary reinforcement or reduce nicotine withdrawal symptoms. However, duration of smoking reduction was less strongly associated with nicotine withdrawal subscale scores in the C+NIC condition. These findings indicate that reductions in smoking are associated with increases in nicotine withdrawal symptoms in smokers with schizophrenia and that 21 mg transdermal nicotine may be insufficient to reduce these symptoms.

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POI 55  SEX DIFFERENCES IN THE SUBJECTIVE AND REINFORCING EFFECTS OF CIGARETTE NICOTINE DOSE

Kenneth A. Perkins, Ph.D., Lynette Jacobs, M.A., Elizabeth Pelayo, B.S., Mark Sanders, M.A., and Anthony R. Caggiula, Ph.D.

We have shown that the subjective and reinforcing effects of non-nicotine cigarette stimuli (i.e. “cues”) are greater in women than men. By contrast, some research with novel nicotine delivery methods suggests that nicotine itself may be less reinforcing in women than men. However, sex differences in the reinforcing effects of nicotine dose via cigarette smoking have received little attention. In this study, we examined the subjective and reinforcing effects of smoking as a function of 2 cigarette nicotine “dose” levels (“moderate”—preferred brand, versus “low”—Carlton ultra-light, 0.1 mg yield). Male and female smokers (n=30) participated in three sessions, the first two involving independent assessment (only one brand available), and the third involving concurrent assessment (both brands available), of hedonic ratings (e.g. “liking”) and reinforcement for the two cigarette brands. Reinforcement was determined by responses on a progressive ratio computer task to earn single puffs on the designated cigarette. Subjects were blind to the brand of each cigarette, and subjects abstained overnight prior to each session. Hedonic ratings and smoke-reinforced responding differed between the low versus moderate nicotine cigarette dose, as expected, especially in men. The dose effect on smoke reinforcement was significantly smaller in women than men (significant sex by dose interaction) under the independent, but not concurrent, assessment condition. These results indicate that, under some conditions, cigarette nicotine dose is a less important influence of subjective hedonic ratings and reinforcement from smoking in women than in men.

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POI 56  EFFECTS OF NICOTINE AND MECAMYLAMINE ON CHOICE ACCURACY IN AN OPERANT VISUAL SIGNAL DETECTION TASK IN RATS

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Central nicotinic systems have been shown to play an important role in cognitive function. In humans, the most pronounced cognitive action is to improve attention, but in rats memory improvement is most easily seen. The current study used an operant visual signal detection task designed to determine the possible effects of nicotine and mecamylamine on attention in rats. Adult female rats (N=35) were trained to perform the signal detection task as a measure of attention. After establishment of a stable baseline with about 75% accuracy, the rats were injected (SC) with saline or a dose of nicotine tartrate (0.0125, 0.025, 0.05, 0.1, 0.2, and 0.4 mg/kg) or mecamylamine (1, 2 and 4 mg/kg). The lower nicotine dose range (0.0125-0.05 mg/kg) caused a significant dose-related improvement in correct rejections, but no change in hit responses. The higher nicotine dose range (0.1-0.4 mg/kg) did not affect the percentage of correct rejections but affected the percentage of hits in a complex manner. Early in the session, the higher doses of nicotine reduced the percent of hits, whereas during the later part of the session nicotine increased the percentage of hits. Mecamylamine caused a significant reduction in the percentage of hits. These results support the involvement of nicotinic systems in attention in rats as has been shown in humans. This animal model of nicotine-induced attentional improvement may offer a valuable forum to study the neuronal mechanisms underlying nicotinic effects on attention and a means to evaluate novel nicotinic agonists to counteract attentional dysfunction.

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POI 57  EFFECTS OF NICOTINE PREEXPOSURE ON THE SUBSEQUENT CONDITIONED AND UNCONDITIONED LOCOMOTOR EFFECTS OF NICOTINE IN RATS

Matthew I. Palmatier, Cedric Woogleed, Josh VanBoening, and Rick A. Bevins

We examined the effects of nicotine preexposure (0.421 mg/kg base) on unconditioned and conditioned locomotor activity induced by the same nicotine dose. Rats received daily subcutaneous (SC) injections of nicotine for 0, 3, 9, or 27 days. Following preexposure, rats in each condition were assigned to one of two groups (Paired or Unpaired). Paired rats received nicotine SC immediately before placement into activity chambers for 30 min; Unpaired rats received saline. This protocol was repeated once daily for 8 days. A drug-free test occurred 24 h after the last conditioning trial. Acute nicotine depressed activity in non-preexposed controls; hyperactivity replaced suppression on subsequent trials. Nicotine preexposure (3, 9, and 27 days) attenuated the acute suppressant effects and enhanced the subsequent stimulant effects of nicotine. Except for the 27-day condition, all Paired groups were hyperactive relative to controls on the drug-free test indicating acquisition of an environment-nicotine association. Non-specific effects on activity during the test obscured observation of conditioning after 27-days of preexposure. Follow-up experiments examined conditioned/unconditioned activity after preexposure and conditioning with either 0.175 or 0.105 mg/kg nicotine. Importantly, these doses do not support conditioning under our protocol. Preexposure to 0.175 mg/kg nicotine altered the acute and chronic locomotor effects of nicotine in a manner similar to 0.421 mg/kg (described previously). Further, on the drug-free test, these rats were more active than controls, indicating that preexposure enhanced acquisition of an association between the environment and this sub-threshold nicotine dose. The locomotor effects of 0.105 mg/kg nicotine were unaffected by preexposure to this dose.

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POI 58  NICOTINE’S ANXIOLYTIC EFFECTS DIFFER IN ADOLESCENT AND ADULT RATS

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Ninety percent of adult smokers start smoking in adolescence. Whether adolescents smoke for the same reasons as adults has not been thoroughly examined. Effects of nicotine to reduce anxiety have been debated in empirical and conceptual literature. Age differences may help to explain conflicting findings. True experiments of nicotine's effects in adolescence cannot be performed in humans. Therefore, the present experiment examined nicotine’s anxiolytic effects in rats. The elevated plus maze (EPM) was used to examine age differences in nicotine’s anxiolytic effects in a 2 (adolescent/adult) X 3 (saline, 0.5 mg/kg, or 1.0 mg/kg nicotine) factorial design. Subjects were 60 Sprague-Dawley males, half adolescent (30 days old) and half adult (65 days old).

Animals were placed on the EPM 10 minutes following injections. Total time spent in open arms and number of open arm entries was recorded over a 5-minute period. Among adolescent rats, nicotine increased amount of time spent in the open arms, suggesting that nicotine was anxiolytic. In contrast, nicotine decreased amount of time adult animals spent in open arms, suggesting that nicotine was anxiogenic.

These results suggest that there are age differences in effects of nicotine on anxiety. If these findings extend to humans, then adolescents may initiate and maintain smoking for reasons different from adults. In particular, in the adolescent, nicotine may help to relieve anxiety, thereby increasing the vulnerability to nicotine use during this age period.

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POI 59  TOBACCO CRAVING AND WITHDRAWAL IN ADOLESCENTS SEEKING TREATMENT FOR NICOTINE DEPENDENCE

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We collected self-reported craving and withdrawal data from adolescents enrolled in an outpatient nicotine dependence treatment program. Participants (n = 63) were (mean ± SD) 15.4 ± 4.1 years old, smoked their first cigarette at age 11.4±1.9, began smoking daily at age 12.5±1.4, currently smoked 17.6±6.6 cigarettes per day, scored 6.8±1.3 on the Fagerström Test for Nicotine Dependence (FTND), and had tried to quit smoking 3.3±2.9 times. Tobacco craving was assessed with the 10-item version of the Questionnaire on Smoking Urges (QSU-Brief), and tobacco withdrawal was assessed with the Minnesota Nicotine Withdrawal Scale (MNWS). Because the trial is ongoing, we report here only pre-quit QSU-Brief and MNWS data. Mean ± SD scores on Factor 1, Factor 2, and the General scale of the QSU-Brief were 4.6±1.9, 3.3±1.7, and 4.0±1.6, respectively. Mean ± SD scores on the craving item of the MNWS and of the remaining six items were 2.7±1.2 and 1.2±1.0, respectively. Neither QSU-Brief nor MNWS data differed significantly as a function of gender or ethnicity. QSU-Brief scores were positively correlated with number of cigarettes smoked per day and number of quit attempts and negatively correlated with age of onset of daily smoking. Mean score on the craving item of the MNWS corresponded to "moderate" on the rating scale, and QSU-Brief scores were comparable to those reported by adult smokers not seeking treatment, suggesting that craving may be a similar obstacle to successful tobacco abstinence in adolescent and adult smokers.

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### POI 60 IMPULSIVITY AND MAINTENANCE OF ABSTINENCE FROM SMOKING

Neal Doran*, Bonnie Spring, Ph.D., Dennis McChargue, Ph.D., Michele Pegadja, Ph.D., Malia Richmond, M.A., and Jessica Werth, M.A., University of Illinois-Chicago

Trait-impulsivity is an established risk factor for substance use initiation, progression to regular use and possibly dependence. Nicotine use onset risk, specifically, increases in proportion to trait-impulsivity. Some evidence suggests that impulsive persons find nicotine disproportionately rewarding, but little research has examined whether impulsivity influences the ability to attain and maintain tobacco abstinence. We tested the hypothesis that women who exhibit greater trait-impulsivity would relapse more quickly following a period of nicotine abstinence. Participants were euthymic, regular smokers (n = 45; 51% female) with 2+ prior episodes of major depression who participated in a paid smoking cessation analogue study. Participants' impulsivity scores (M = 66.23, SD = 9.72), measured via the Barratt Impulsiveness Scale, were comparable to normative data for nonpatients (Patton, Stanford, & Barratt, 1995), (M = 64.39, SD = 8.91). Three alternative treatment conditions required participating in a paid one-day skill training workshop, remaining bioverified abstinent for the next 48 hours and weekly follow-up for one month. Regression analyses controlling for treatment condition and baseline nicotine dependence indicated that greater impulsivity predicted fewer days smoke-free following the workshop [R2 change = .117, F (1, 37) = 5.047, & e.355, p = .031]. Results indicate that, among smokers who have a significant history of major depression, greater impulsivity predicts briefer maintenance of smoking abstinence. It remains unclear whether results will generalize to self-quitters or to smokers who lack depressive histories.

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### POI 61 MENSTRUAL CYCLE EFFECTS ON SMOKING RELAPSE

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Studies have shown that smoking withdrawal symptomatology is increased in the late luteal (LL) versus the follicular (F) phase of the menstrual cycle. However, there is little research conducted looking at relapse rates throughout the menstrual cycle. This study examines smoking relapse rates when quit dates are fixed during the menstrual cycle.

Nine female smokers completed this 26-week pilot study. Their mean age was 36.4 years (SD±3.2). They smoked a mean of 18.6 (SD±3.4) cigarettes/day and had mean Fagerstrom scores of 3.8(SD±1.7). Average cycle length was 27 days (SD±1.9).

Cycle phase was determined using ovulation testing kits and monthly calendars. Participants were given transdermal nicotine and randomized to quit smoking in either the F (N=5) or the LL (N=4) phase of their menstrual cycle. Participants completed daily forms for 8 weeks post quit to measure withdrawal and menstrual cycle symptomatology. Smoking relapse was defined as two ways: 1) first slip, and 2) 7 consecutive slips without 24 hours between slips. For the second definition, the day of relapse was retrospectively defined as the first day of the 7 consecutive slips.

As expected, withdrawal symptomatology was higher in the LL phase compared to the F phase. Using both definitions of relapse, 1/5 relapsed when quitting in the F phase and 3/4 relapsed when quitting in the LL phase (p=.3887). Survival analysis comparing the LL quit group to the F quit group was completed using the Cox proportional hazard model. Based on the definition of first slip the hazard ratio was 4.260. Based on the definition of 7 consecutive slips the hazard ratio was 4.117.

Although our numbers are small it appears there is a trend that women are more likely to relapse when quitting in the LL phase versus the F phase of their menstrual cycle.

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### POI 62 ANHEDONIA PREDICTS SMOKING RELAPSE AMONG DEPRESSION-PRONE SMOKERS

Jessica Werth Cook, M.A.*, Bonnie Spring, Ph.D., Dennis McChargue, Ph.D., Michele Pegadja, Ph.D., Malia Richmond, M.S., Neal Doran, University of Illinois at Chicago

It is unclear whether and how a history of depression undermines smoking cessation. We examined whether anhedonic personality traits that impede the ability to experience pleasure increase a depression-prone smoker’s difficulty remaining smoke-free. In a paid treatment analogue study, 45 euthymic regular smokers (51% female) with 2+ prior episodes of depression, were randomized to 3 treatments involving a daylong smoking cessation workshop. Abstinence was bioverified for the next 48 hours and weekly for 1 month. Anhedonia scores (M=119.47, SD=11.51), measured at entry via the Fawcett Clark Pleasure Scale, were comparable to normative data for depressed individuals. After controlling for treatment group, cigarettes smoked daily, Hamilton Depression score, gender, and age, Cox regression analysis showed that the odds of relapsing during the month after the workshop decreased by 9% for every 1-point reduction in the 144-point anhedonia scale (O.R.=.91, 95% C.I. [.84-.99, Wald = 4.52, p<.05]). Anhedonic deficits in the ability to experience pleasure appear to have a substantial negative influence on the probability that smokers with a history of recurrent depression will be able to maintain short-term abstinence. Results indicate that depression-prone smokers with greater anhedonic personality features are more at heightened risk of early return to smoking. Increased knowledge of the causes and remediality of anhedonia is needed to guide the development of targeted cessation treatment for smokers with a history of depression.

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### POI 63 COGNITIVE AMELIORATION OF URGE AND WITHDRAWAL SYMPTOMS IN SMOKING CESSATION

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Theory suggests that smoking urges and nicotine withdrawal symptoms drive relapse, and thus should be more commonly experienced by relapsers than by abisters. In addition, cognitive-behavioral theory predicts that successful quitters should be able to respond to urge-withdrawal symptoms with palliative cognitive controls. In order to examine these hypotheses, Ecological Momentary Assessment data were analyzed. These data were collected in a study in which participants carried hand-held tape recorders and electronic diaries that prompted them randomly for information up to eight times on average per day. At each prompt, participants were asked in an open-ended fashion to describe and audiotape their quit smoking experiences. Tape-recorded data were transcribed and scored using a system that coded each thought unit. Chi square analyses indicated, contrary to hypothesis, that abisters discussed urges and withdrawal symptoms at significantly more random prompts than did lapseers. However, at those prompts in which an urge-withdrawal symptom was mentioned, lapseers were more likely than lapseers to mention self-efficacy and positive affect. Thus, although abisters reported urges and withdrawal more frequently, their symptoms may have been ameliorated by concurrent focus on self-efficacy and positive affect. Results are consistent with cognitive-behavioral therapy’s aim to help individuals identify problems and respond with rational thoughts that improve mood.

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POI 64 EFFECTS OF THE NICOTINE PATCH, ALONE AND IN COMBINATION WITH THE NICOTINE INHALER, ON COTININE CONCENTRATIONS AND CRAVING FOR CIGARETTES

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The goal of this study was to determine the increase in blood cotinine concentrations and relief of craving for cigarettes associated with adding the Nicotrol nicotine inhaler to a Nicotrol nicotine patch regimen. Twenty highly dependent smokers (FTND > 6) participated in a 4-week, within-subjects, open-label study. After the first, baseline smoking week, subjects quit smoking and were treated for one week with the nicotine patch alone, one week with the nicotine patch plus the inhaler, and a final week with the nicotine patch alone. Blood samples were taken at the end of each week. Preliminary analyses reveal significant differences between study conditions in cotinine concentrations and craving for cigarettes. The mean cotinine concentration in the patch plus inhaler condition was 197.5 (s.e.=21.4) as compared to 137.2 (15.9) in the first patch alone condition. Craving for cigarettes was lower in the patch plus inhaler condition than in the first patch alone condition, with means of 2.0 (20) and 2.9 (.17), respectively. Sixty-three percent of subjects rated the inhaler as a useful adjunct to patch therapy. Our findings indicate that the addition of the nicotine inhaler to a nicotine patch regimen produces substantial increases in cotinine concentrations and decreases craving for cigarettes. Our results also suggest that in highly dependent smokers this treatment regimen is likely to have relatively high patient acceptability.

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POI 66 NICOTINE WITHDRAWAL: EFFECTS ON NOVELTY REWARD AND ENVIRONMENTAL FAMILIARIZATION

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The present experiments assessed the effects of nicotine withdrawal in two preparations. In a novelty conditioning task, withdrawal was induced by removal of an osmotic pump delivering nicotine at 9 mg/kg/day for 7 days. Place conditioning was assessed 1 to 4 days after pump removal. In this 1-day procedure, rats were repeatedly confined to each compartment of a place conditioning chamber. One compartment was paired with novel objects; the other was not. After the final confinement, rats were allowed free-access to both end compartments (no objects). Controls spent more time in the novelty-paired compartment. Place conditioning was blocked on withdrawal days 1-3; evidence for novelty reward returned on withdrawal day 4.

Withdrawal may have impaired environmental familiarization rather than reward related processes. To test this possibility we took advantage of rats’ tendency to interact more with an object in a familiar than a novel environment. Rats were implanted with nicotine-filled or empty pumps. Half of the rats in each condition were exposed to a novel environment on the 6th day after implantation. Before exposure, withdrawal was precipitated in the nicotine condition by a mecamylamine injection (i.e., withdrawal during environmental familiarization). On the following day, all rats were placed in the environment and time spent interacting with an introduced object was measured. Regardless of condition, rats that were previously exposed to the environment interacted more with the object than rats not exposed to the environment. Thus, withdrawal did not affect environmental familiarization suggesting that the blockade of novelty reward was due to withdrawal preventing the rewarding effects of novel stimulation to enter into a conditioned association.

Support: NIDA (DA06092, DA11893).

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POI 65 EFFECTS OF NICOTINE ON ATTENTION AND AFFECT: MODULATION BY TASK, PERSONALITY, AND DRD2 ALLELES

David G. Gilbert, Jonathan Hammersley, Adam Izetelny, Robert Radtke, Jodi Huggenvik, Tiffanie Markus, Stacey Small, Victoria Stout, Norka Rabinovich, and Amy Skerly

The effects of nicotine patch vs. placebo patch on attention and distractibility were assessed with a battery of tasks. Smokers (n = 64) participated in 4 experimental sessions (2 nicotine & 2 placebo). Nicotine produced highly significant beneficial main effects on all tasks (emotional Stroop, rapid visual information processing with emotional and numeric distractors, executive cued spatial attention, emotionally primed spatial attention). Nicotine attenuated negative affect during most tasks, but not during the task that required direct attention to negative pictures. Carriers of an A1 allele of the DRD2 dopamine receptor benefited less from the negative-affect-reducing effects of nicotine than did non-carriers. Nicotine produced larger performance-enhancing effects when cues and distractors were consistent with task-relevant performance. In the Lateralized Numeric Distractors Task there was a significant interaction: Nicotine x Distractor Visual Field (left vs. right) x Distractor Type (task congruent vs. incongruent). Performance benefits of nicotine on several tasks were systematically related to smoking-related personality variables.

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POI 67 PSYCHOPHYSIOLOGICAL EFFECTS OF NICOTINE ABSTINENCE AND COGNITIVE CHALLENGES IN HABITUAL SMOKERS

We tested the hypothesis that psychophysiological responses to behavioral challenges are enhanced by short-term abstinence (18 hours) from smoking. Blood pressure, salivary cortisol levels, and withdrawal symptoms were measured after a period of smoking abstinence or ad libitum smoking, during rest and in response to acute cognitive challenges. Thirty habitual smokers (15 women and 15 men) participated in two laboratory sessions conducted on two separate days (Abstinence and ad libitum smoking). Cotinine and nicotine concentrations in saliva and expired carbon monoxide were measured in both conditions. Abstinence produced significant withdrawal symptoms in all participants (p < 0.01) with women reporting greater desire to smoke than men (p < 0.05). Participants showed greater systolic blood pressure responses to the behavioral challenges in the abstinence condition than the control condition (p < 0.01). They also showed worse cognitive performance on the challenges in the abstinence than in the ad libitum condition (p < 0.001). Men had greater salivary cortisol levels than women (p < 0.05), and both men and women showed the expected decline across time (p < 0.0001), but showed no difference between the abstinence and ad libitum smoking conditions in the laboratory or during ambulatory measurements (p > 0.2). These results replicate our earlier findings, and they indicate that abstinence alters mood, performance, and blood pressure responses to acute cognitive challenges but not adrenocortical responses. It is possible that these changes mediate stress-related vulnerability to smoking relapse.

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THE EFFECT OF CIGARETTE DEPRIVATION ON CUE-REACTIVITY IN SMOKERS

Steffani R. Bailey, B.A.*, Katherine A. Cern, B.A., Stephen T. Tiffany, Ph.D., Purdue University

Cessation of smoking can be manipulated by depriving smokers of cigarettes or allowing them to smoke cigarettes while exposed to smoke-free conditions. This study investigated the effects of cigarette deprivation on cue-reactivity and craving in smokers. Participants (N=117) were divided into a deprivation group and a control group. The deprivation group was offered a single cigarette while being exposed to cues associated with smoking, while the control group was offered a neutral task. Results indicated that deprivation increased cue-reactivity and craving, supporting the hypothesis that deprivation enhances cue-reactivity in smokers. This study provides evidence for the role of cigarette deprivation in cue-reactivity and craving, which may have implications for smoking cessation interventions.
and that these changes may be related to elevations in proinflammatory cytokines. That symptoms of sickness behavior occur in subjects during smoking withdrawal, tinewhen freely smoking and after 24-hrabstinence from smoking. Results suggest that nicotine withdrawal in cigarette smokers causes an elevation in the cytokine interleukin-1, interleukin-6, and tumor necrosis factor alpha. Cytokine levels, mood, hunger, body discomfort, temperature, and fatigue were assessed in nonsmokers and in subjects addicted to nicotine cessation.

Supported by the Penn State Life Sciences Consortium.

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SICKNESS BEHAVIOR AND CYTOKINE RESPONSES IN SUBJECTS DURING WITHDRAWAL FROM NICOTINE

Cigarette smoking is the single most preventable cause of death and illness in the United States. It is not uncommon for an individual addicted to nicotine to fail multiple attempts to quit smoking. One primary reason for these failed attempts is the unpleasant physical and mental symptoms that accompany nicotine withdrawal. A previously unexamined hypothesis to explain these symptoms is that nicotine cessation results in the development of what is known in immunology as “sickness behavior”. Sickness behavior is a term used to describe a wide constellation of psychological and physical symptoms resulting from activation of the immune system and the production of pro-inflammatory immune peptides known as cytokines. Pro-inflammatory cytokines also are involved in the stress response, contributing to anxiety and mood depression; symptoms also common during nicotine cessation. Examples of sickness behaviors include fatigue, anorexia, malaise, anxiety, and depression. Physical symptoms include low-grade fever, myalgia, and elevation in acute phase proteins. In a study of 20 smokers and 20 non-smokers, we tested the hypothesis that nicotine withdrawal in cigarette smokers causes an elevation in the production of the proinflammatory cytokines interleukin-1, interleukin-6, and tumor necrosis factor alpha. Cytokine levels, mood, hunger, body discomfort, temperature, and fatigue were assessed in non-smoking subjects and in subjects addicted to nicotine when freely smoking and after 24-hr abstinence from smoking. Results suggest that symptoms of sickness behavior occur in subjects during smoking withdrawal, and that these changes may be related to elevations in proinflammatory cytokines.

This work was supported by The Pennsylvania State University Life Sciences Consortium.

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CORTISOL AND CRAVING: EVIDENCE FOR A LINK BETWEEN GLUCOCORTICOIDS AND REINFORCEMENT FROM SMOKING?

Preclinical research suggests a pathway between glucocorticoids (end-product of the hypothalamic pituitary adrenocortical stress axis), mesolimbic dopamine activity, and reinforcement/self-administration of various drugs of abuse. However, we know of no research examining this pathway with nicotine or in humans. As an initial investigation of associations between glucocorticoids and reinforcement from smoking, we examined the influence of cortisol boost following smoking on craving for the next cigarette in two independent studies. In Study 1, 20 smokers (50% female, ages 21-65) smoked 3 high-nicotine cigarettes 30 minutes apart after overnight abstinence. Plasma cortisol and urge to smoke (craving) were assessed at baseline, and following each cigarette. We found large negative associations between change in cortisol and change in craving following each cigarette (r=-.33, p<.05). In study 2, 30 smokers (47% female, ages 18-50), participated in two experimental sessions after overnight abstinence. In one session, participants smoked 2 high nicotine cigarettes; in the other, they smoked 2 control cigarettes. Cortisol and self-reported craving were measured before and after the two cigarettes during each session. Again, we found a significant, inverse association between cortisol levels following 2 high nicotine cigarettes and craving (r = -0.48, p < .01), but no significant relationships between cortisol and craving following the control cigarettes. Results provide preliminary evidence for a link between glucocorticoids and reinforcement from smoking in humans. Future work might examine links between glucocorticoids, mesolimbic DA pathways, and reinforcement from smoking/smoking uptake.

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**PO1 76**

**EFFECT OF CUE-REACTIVITY ON TOBACCO CRAVING AND MEMORY**

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Tiffany’s model of drug urges states that drug use becomes controlled by automated schemata through repetition and that craving occurs when drug use schemata are blocked. The blocking of these automatic processes involves the activation of different nonautomatic processes that draw on the cognitive resources available for other tasks. We tested the hypothesis that heightened tobacco craving would impair a test of short-term memory. Nonabstinent smokers (n = 48) participated in four imagery trials in a single session. Participants listened to scripts containing either descriptions of craving for cigarettes or no craving content and were instructed to imagine themselves in the scene. Imagery scripts (craving and no-craving) were presented either before presentation of a list of 12 categorically-related words (encoding trials) or before free recall (retrieval trials). During list presentation, 6 of the 12 words were repeated, and subjects were instructed to identify repeated words. Number of correctly identified repeated words was taken as a measure of working memory, and number of correctly recalled words reflected declarative memory. Results indicated that cravings scripts increased self-reported tobacco craving and that imagery scripts, disrupted recall in the retrieval trials compared to no-craving scripts. For encoding trials, recall was slightly better with craving scripts relative to no-craving scripts. Our findings thus support Tiffany’s hypothesis that imagery-induced craving interferes with subsequent cognitive processing.

Supported by NIDA Intramural Research Program.

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**PO1 77**

**A PLACEBO CONTROL STUDY OF NICOTINE WITHDRAWAL IN CIGARETTE SMOKERS**

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Cigarette-abstinent smokers often describe an aversive withdrawal syndrome associated with the abstinence period. This syndrome is attributed to an underlying level of nicotine dependence, though most studies examining it have not used a placebo control design (i.e., a denicotinized cigarette control condition). A lack of a placebo design means that symptoms associated with not smoking (i.e., tobacco withdrawal) may be mislabeled as nicotine withdrawal. The few studies using a placebo control suggest that denicotinized cigarettes suppress withdrawal symptoms for up to 24 hr; the duration of this placebo-induced withdrawal suppression has not been addressed systematically. The goals of this study were to evaluate the symptoms of nicotine withdrawal under placebo-control conditions and to determine the duration of placebo-induced withdrawal suppression.

Thirty smokers (15 men), who report daily intake of 15 cigarettes/day or more for the past 2 years, participated in this three condition, within-subject, outpatient, placebo control study. Five-day conditions (denicotinized cigarette, nicotinized cigarette, no smoking) lasted Monday-Friday, were Latin-square ordered, and were separated by a minimum 72-hr washout period. Compliance with each condition was monitored with a combination of daily expired-air CO, daily counts of cigarette butts, and thrice-weekly urine cotinine assessment; subjects were paid for their participation contingent upon compliance. Preliminary analyses reveal that, on some measures (e.g., increased eating; desire for sweets; craving), placebo-induced withdrawal suppression was observed for several days while on others (impatient; difficulty concentrating) it was not observed at all. These results suggest differences between tobacco and nicotine withdrawal symptomatology.

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**PO1 78**

**THE IMPACT OF ANTICIPATED CIGARETTE AVAILABILITY ON SMOKERS’ REACTIONS TO SMOKING STIMULI**

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The cue-reactivity procedure assesses the craving and autonomic responses of addicts presented with drug-related cues in the laboratory setting. Previous research from our laboratory has shown that when smokers are given the opportunity to smoke within the cue-reactivity session, cigarette availability has a robust impact on several reactivity measures. This study evaluated whether smokers’ reactions to cigarettes that were available to smoke within session (local availability) would be influenced by manipulating post-session availability (distal availability). One hundred smokers were randomly assigned to continue their usual smoking patterns or to abstain from tobacco or nicotine for the ensuing 24 hours. Subjects were then exposed to 48 trials of either a lit cigarette or a glass of water while informed of the probability (0%, 50%, or 100%) that they would be able to consume the cue on each trial. Subjects returned 24 hours later in order to assess their smoking behavior between sessions and tobacco withdrawal. Smokers reported stronger craving when viewing a lit cigarette than a glass of water, and their craving increased as the probability of being able to take a puff from the cigarette increased. Subjects in the No Smoking condition showed an overall reduction in craving levels, but this reduction was of the same magnitude across the availability and cue manipulation within the session. This shows that local availability affects cue reactions to cigarettes, whereas distal availability affects general craving levels but does not influence local availability.

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PO2 01  EFFECTS OF REFERRAL SOURCE AND COMPENSATION FOR SCREENING ON ADOLESCENT RETENTION IN SMOKING CESSION RESEARCH

Daniel N. Jones, B.S.*, Miqun L. Robinson, M.D., Ph.D., and Eric T. Moolchan, M.D., TTATRC, NIDA/IRP

Adolescent smoking cessation research has suffered limitations in the areas of recruitment and retention. Peer influence and financial compensation have been identified as factors that might affect the enrollment and outcome of adolescent research. Data were obtained from an accruing adolescent smoking cessation study. Eighty participants (21 Males, 59 Females; ages 13-17) were considered for analysis. We hypothesized that 1) retention (defined by number of treatment visits attended) would vary according to referral type, and 2) an increase in financial compensation would affect retention. Types of referral included: television (n=6), radio (n=32), newspaper (n=7), and peer/word of mouth (n=20), guardian (n=9), doctor (n=1), school (n=4), and outreach programs (n=1). Results from one-way ANOVA analyses supported the hypothesis that retention varies with type of referral (F=3.965 p<.01). Post hoc measures revealed significantly lower retention rates for participants referred by television or peers. One-Way ANOVA results also supported the hypothesis that retention decreased after increase in compensation (F=3.321 p<.05). Post hoc test results indicate an association between increase in compensation for screening procedures and lower retention rates among participants. Further analyses with a larger data set will be conducted for conclusions leading to enhanced teen recruitment and retention.

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PO2 02  EFFECT OF EXTERNALIZING PSYCHIATRIC DISORDERS ON RETENTION, SMOKING RATES AND CO LEVELS IN AN ADOLESCENT SMOKING CESSATION TRIAL

A. Thiri Aung, M.D.*, David H. Epstein, Ph.D., Nandita Thatte, B.S., Monique Ernst, M.D., Ph.D., and Eric T. Moolchan, M.D., TTATRC, NIDA/IRP

Externalizing psychiatric disorders in teens constitute a risk factor for smoking. Due to the possibility of self-medication as a contributing factor to smoking in this age group, we hypothesized that teen smokers with Attention Deficit Hyperactivity Disorder (ADHD), Conduct Disorder (CD) or Oppositional Defiant Disorder (ODD) (n=38) would have shorter retention (days in treatment) and higher tobacco consumption than those without psychiatric disorders (n=33). Seventy-two teen smokers (mean age 14.9±1.42, mean FTND 7.1±1.34) enrolled in a 12-week-long randomized double-blind placebo-controlled smoking cessation trial combining nicotine patch and gum with cognitive-behavioral therapy. Smoking rates and expired air carbon monoxide (CO) were measured at each visit. The Diagnostic Interview for Child and Adolescent-DSM IV was used to diagnose psychiatric disorders prior to commencing treatment. Retention (mean days in treatment 42.17±32.17) and smoking rates among teen smokers with ADHD, CD, and ODD did not significantly differ from those without psychiatric disorders. Throughout much of treatment, mean CO levels were higher for smokers with ADHD, CD, and ODD; in a repeated-measures regression (SAS PROC MIXED), there was no main effect of group [F(1,69) = 0.56, p=.46], but there was a trend toward a group by day interaction [F(11,326) = 1.61, p<.10]. Further research should determine the relative contribution of various modalities (e.g., psychotherapy, pharmacotherapy) to enhancing retention in cessation of youth with psychiatric disorders.

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PO2 03  PREDICTORS OF SMOKING INITIATION AMONG COLLEGE-BOUND HIGH SCHOOL STUDENTS

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Smoking rates among college students is increasing, yet little is known about the development of their smoking. This longitudinal analysis focuses on a national sample of high school students who reported never experimenting with cigarettes and were college students four years later (n=1,249). SUDAAN statistical analysis procedures were used to weight and adjust for sampling design and non-response. Approximately 14% of the college-bound, high school non-smokers had initiated smoking within four years. Students who were more likely to initiate smoking were those without psychiatric disorders. Through much of treatment, mean CO levels did not significantly differ from those without psychiatric disorders. Throughout much of treatment, mean CO levels were higher for smokers with ADHD, CD, and ODD; in a repeated-measures regression (SAS PROC MIXED), there was no main effect of group [F(1,69) = 0.56, p=.46], but there was a trend toward a group by day interaction [F(11,326) = 1.61, p<.10]. Further research should determine the relative contribution of various modalities (e.g., psychotherapy, pharmacotherapy) to enhancing retention in cessation of youth with psychiatric disorders.

Support by NIDA intramural funds.

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PO2 04  SMOKING TRAJECTORY AND BEHAVIORAL PROBLEMS OF YOUNG SMOKERS SEEKING TREATMENT
Migun L. Robinson, M.D., Ph.D.*, Monique Ernst, M.D., Ph.D., and Eric T. Moolchan, M.D., TTATRC, NIDA/IRP

Early use of tobacco has been associated with externalizing and internalizing behavioral problems. We hypothesized that early onset of tobacco use and early daily use predict behavioral patterns in adolescent smokers seeking treatment. Sixty-eight adolescent smokers enrolled in a smoking cessation program (18 male, 50 Caucasian, 18 African American). We obtained smoking histories from both phone and on-site screening forms. Participants enrolled were (mean±SD) 15.3±1.4 years old, smoked their first cigarette at age 11.3±1.9, began smoking daily at age 12.4±1.4, had an interval between age of onset and age of daily smoking 1.2±1.3 years. Current (past 6 months) psychopathology was assessed using the Child Behavior Checklist which provides 8 factor scores (Withdrawn, Somatic Complaints, Anxious/Depressed, Social, Thought, and Attention Problems, Delinquent and Aggressive Behavior), 2 second-order factors (Internalizing and Externalizing), and a total problem score. The Withdrawn Problem score was significantly correlated with later age of onset of smoking (p=0.04) and, at a trend level, with a longer interval between age of onset and age of daily smoking (p=0.06). We compared CBCL scores between smoking groups: early onset (<12 y; n=33) and late onset (>12 y; n=35), and early daily (<13 y; n=33) and late daily (>13 y; n=35). The late onset group had significantly higher scores in Withdrawn (p<0.001) and Somatic Complaints (p=0.05), and marginally higher internalizing score (p=0.065). Late daily smokers tended to score higher on the Withdrawn (p=0.08) and Social Problems factors (p=0.07). These findings suggest that internalizing behavioral patterns (i.e. Withdrawn) protect adolescents from early onset of smoking in adolescent smokers seeking treatment.

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PO2 05  OFFICE RECRUITMENT OF CLINICIANS FOR TEEN SMOKING INTERVENTION STUDY
Scott McIntosh, Ph.D.*, Jean Spada, B.A., Deborah J. Osip-Klein, Ph.D., Jonathan D. Klein, M.D., Ronald Kraus, M.S., Jennifer Kelly, B.S., and Rebecca Cornelison, University of Rochester

Relatively few health services studies are conducted in community physician offices (Levinson, et al., 1998). Past studies, typically with adult health providers have found success with a variety of strategies, including sample frame creation, support from physician groups and opinion leaders, introductory letters, telephone recruitment, and face-to-face meetings. Focus groups for a current study with Family Physicians and Pediatricians has lead to a minimization of materials and identification of effective procedures for both recruitment and interventions. This presentation describes a recruitment method that was successful in randomizing a target sample of physician offices for a study of clinician cessation interventions and self-help adjunctive treatments with teen smokers in both urban and rural settings. The larger study’s aims included the randomization of over 100 practices, followed by office-based training and ongoing support services and evaluation. The recruitment model described here builds on and is consistent with the methods described in the few studies in this area, and may be generalizable to other settings. Of the 103 practices who were presented with the live recruitment presentation, 101 of them were successfully randomized, and 100 of them continued to remain engaged in the study for at least 6 months.

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PO2 06  SMOKING CESSATION AMONG AFRICAN AMERICANS: WHAT WE KNOW AND WHAT WE DON’T
Linda L. Pederson, Ph.D.*, Office on Smoking and Health, CDC; Jasjit Afluwalia, M.D., M.P.H., Kari Jo Harris, Ph.D., Department of Preventive Medicine, University of Kansas School of Medicine

African American Smokers Smoker fewer cigarettes per day, over 70% smoke menthol cigarettes, are more likely to report trying to quit, are less likely to be successful, are less likely to be advised to quit by a clinician and are less likely to know about smoking cessation services.

The purpose of this review is to provide a critical summary of research on smoking cessation among African Americans. Articles published from 1985 to 2001 divided into two categories: evaluations of cessation interventions and examinations of self-quit behavior. Studies were tabulated using year, study design/ sample size, variables/ results and comments. For the intervention studies, the setting provided the method for organizing the studies and included church-based programs, community based interventions and clinic programs. While there are some promising interventions carried out in churches, the studies did not demonstrate unequivocal effectiveness. For clinical studies, the Nicotine patch appears to be effective and interventions for pregnant smokers are also useful. With regard to self-quitting, the sociodemographic variables that were related to cessation were similar to those that have been found in the general population. There was very little information available on other categories of variables such as Psychosocial. Smoking history, Reasons for Quitting, Methods for Quitting and Other Lifestyle Behaviors. Directions for future research and programs will be discussed, including more research on the natural history of quitting, on the social norms for smoking among African American groups and on the conceptual dimension of race in the context of this research.

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PO2 07  FEASIBILITY, ACCEPTABILITY, AND EARLY OUTCOME INDICATORS IN A SMOKING CESSATION PROGRAM TARGETING URBAN AFRICAN-AMERICAN FEMALE SMOKERS
Andrea King, Ph.D.*, Roslynn Riley, B.S., Michelle Hoffman, B.S., and Lisa Johnsen, Ph.D.

Few studies have specifically targeted smoking cessation in African-American female smokers, a subgroup regarded as having considerable variability in smoking topography and treatment adherence. This study examined the feasibility, acceptability, and initial outcome in a smoking cessation program targeting urban low- and mid-income African-American females (age range 24-64 yrs; education range 11-19 yrs). Although many programs are largely behavioral, this 6-session intervention, delivered by Master’s level clinicians, integrated cognitive, behavioral, and addiction/ 12-step techniques (© King & Riley, 2001). The program also emphasized education on nicotine replacement and provided free samples. Baseline data on the first 22 participants indicate average cigarettes smoked daily=16.0 (range 5-25), FTND score= 5.6 (range 2-9), and 95% smoked mentholated cigarettes. Results showed that acceptability of the program was generally high, as 82% completed the 8-week intervention and 78% complied with the nicotine patch. Early outcome data (1 mo. post quit-date) showed significant overall declines in cigarettes/day (from M=16.0 to .5), CO levels (from 14.9 to 3.5 ppm), and cigarette craving (B-QSU: from 25.8 to 16.2; Fc≥ 3.03 ps<.01). Quit rates at 1- and 3-months were 67% and 44%, respectively. Finally, participants’ ratings of therapist competence was high (72% rated extremely effective), regardless of therapist ethnicity or gender. Components of treatment rated the most helpful were stress reduction and cognitive techniques. In conclusion, this demonstration project indicates good treatment retention, compliance with nicotine replacement, and early smoking cessation in African-American female smokers. Although participants were self-motivated to enroll in a smoking cessation program, the results suggest that providing comprehensive treatment and patch samples may enhance outcome compared to previous results in less intensive programs.

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SMOKING-RELATED FACTORS ASSOCIATED WITH THE ABILITY TO QUIT SMOKING IN EARLY PREGNANCY

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Half or more women smokers continue to smoke during pregnancy. Despite substantial evidence that nicotine replacement therapy (NRT) is effective for smoking cessation, health providers are reluctant to prescribe NRT in pregnancy in part because there are no criteria to determine for which women the benefit for quitting outweighs the risk. This secondary analysis describes factors associated with continued smoking in pregnancy to identify pregnant smokers who might benefit from NRT. Baseline data from a randomized, intervention trial to promote smoking cessation in pregnancy was analyzed. We examined early-pregnancy reported smoking variables (cigarettes per day, number of minutes to first cigarette of the day, duration of longest prior quit attempt, number of prior quit attempts, prior medication use to quit smoking, spouse’s smoking status) to determine whether each alone or in combination discriminated between pregnant women who quit smoking at the beginning of pregnancy or continued smoking. Continued smoking was defined as smoking on most days or every day since knowing about the pregnancy. The women had a mean age of 24.0 years and 78% were White. Regression tree analyses, using a cross-validation procedure, suggested three groups with distinctly different probabilities of quitting: 1) CPD < 6.5 (n=156, 79% quit); 2) 6.5 < CPD < 14.5 or (CPD > 14.5 and PPD > 165 days) (n=245, 56% quit); 3) CPD > 14.5 and PPD < 165 days (n=216, 35% quit). A logistic regression model, used to test the difference among these 3 groups on quit status, resulted in a c-index of 0.68 (chisquare=73.0, 2 df, p<0.001).

These findings suggest that pregnant women who smoke more than 6.5 cigarettes per day are less likely to quit smoking on their own, and may be candidates for NRT. Further research needs to establish the safety of using NRT in this population.

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SMOKING AMONG PREGNANT WOMEN: QUALITATIVE AND QUANTITATIVE FINDINGS

Myra Muramoto, M.D., M.P.H. *, Mimi Nichter, Ph.D.; Mark Nichter, Ph.D., M.P.H.; Laura Tesler, M.A.; Shelly Adrian, M.A.; Maribel Tobar, M.S., University of Arizona

Up to 40% of pregnant women who smoke, quit during pregnancy, but approximately one-third of these women relapse before delivery. Postpartum relapse rates approximate 50%, 70%, and 90% at 1, 6, and 12 months, respectively. Stress, depression, and lack of social support are commonly cited factors influencing relapse. To date, little is known about how pregnant women who smoke experience these factors, and how they impact smoking behavior during pregnancy and postpartum.

Data presented are from a longitudinal, ethnographic study of smoking behavior during pregnancy, among 57 low-income, Caucasian and Hispanic pregnant women. Smoking biographies are documented each month though in-depth interviews, from first trimester through six months postpartum, with concurrent collection of quantitative measures of depression, stress, and social networks.

Preliminary, interim results from pre-partum interviews depict five general smoking trajectories, women who: 1) quit early in pregnancy and stayed quit (25%); 2) quit later (4%); 3) reduced smoking (−30%); 4) continued to smoke at pre-pregnancy levels (−17%); and, 5) increased smoking (−17%). Case studies will highlight the important emerging biographical themes including: 1) women’s small social networks with little support for quitting; 2) male partners as important but exceedingly unstable influences, where supportive relationships may rapidly become stressful or negative; 3) nearly absent discourse about smoking from healthcare providers, leading women to believe that providers are unwilling to assist with quitting, and moreover, providers implicitly accept or even support their continued smoking.

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PREDICTORS OF CIGARETTE SMOKING DURING PREGNANCY

B. Leonhardt, M. Tuten, and D. Svikis

Cigarette smoking during pregnancy can result in a variety of adverse consequences including low birthweight. Research suggests nondisclosure rates of tobacco use during pregnancy are increasing, indicating the necessity for appropriate screening measures to identify women at risk for perinatal smoking in order to provide adequate intervention. The purpose of the present study was to develop a model of demographic and substance use variables to predict prenatal smoking status at first prenatal visit. Participants (N=227) were pregnant women from an urban obstetrical clinic who were predominantly Caucasian (61%), single (71%), in their mid-20s, and had less than a high school education (11.1 years). As part of routine OB care, all women were screened at the time of their first prenatal visit to assess pregnancy and pre-pregnancy health behaviors. Logistic regression was used to estimate the probability of being a perinatal smoker. Based on univariate analyses, six predictor variables were entered into the model (race, number of years of education, employment status, daily prenatal caffeine use, at-risk for problem alcohol use, and ever use of marijuana). The overall predictive model was statistically significant (p < .001). All predictors except for employment status were significantly related to the likelihood of being a perinatal smoker. Less educated, Caucasian women who drank caffeinated coffee during the current pregnancy, who had ever tried marijuana, and who were at-risk for problem alcohol use, were more likely to report perinatal smoking. The overall model successfully classified 79.1 percent of the entire sample. Results from the present study suggest screening for past and present non-nicotine substance use may provide necessary information for identifying women who may be at risk for continued smoking during pregnancy.

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SMOKING DURING PREGNANCY: THE ROLE OF NEGATIVE AFFECT AND SOCIAL SUPPORT

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Smoking during pregnancy has been identified as a health risk factor for both women and their infants. Approximately one third of women are regular cigarette smokers when they become pregnant. Of these, an estimated 40% quit smoking during their pregnancy. Pregnancy provides a unique opportunity, at a critical time, for smoking cessation. Two risk factors for smoking that have been identified are negative affect (ranging from transient negative mood to clinical depression) and social support. However, little is known about how these factors impact smoking during pregnancy.

This study examined 160 pregnant women (87 smokers and 73 recent quitters) in order to determine the role of negative affect and social support in smoking cessation during pregnancy. Partner support, general social support, and negative affect all differentiated smokers from recent quitters during pregnancy. However, differences remained significant only for partner support (measured as the ratio of positive to negative support) after controlling for covariates (socioeconomic status, pre-pregnancy smoking rate, confidence, and partner smoking status). Demographic and smoking-related variables, including pre-pregnancy smoking rate, confidence, partner smoking status, and SES, were all strongly correlated with pregnancy smoking status. More attention to smoking-related factors may allow for the development of effective and cost-efficient smoking cessation and relapse prevention programs for pregnant women.

This study was conducted while the first author was at Binghamton University, SUNY, funded by a Lung Health Dissertation Grant from the American Lung Association.

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**PO2 12** PREDICTORS OF PARTICIPANT COMPLIANCE IN A SMOKING CESSATION TRIAL FOR WOMEN

Laurence A. Molinelli*, Zandra N. Quiles, Robert F. Leeman, Ari Haukkala, Donna Medaglia, Beth L. Nordstrom, L. Howard Hartley, Arthur J. Garvey, Taru Kinnunen, Harvard School of Dental Medicine, Brigham and Women’s Hospital, Boston, MA

Frequently, smoking cessation studies report relatively low abstinence rates at long-term follow-up points. Compliance with cessation treatment protocol, especially early on, may be a key factor in long-term abstinence rates. This may be important in trials that require a greater time commitment or place a heavier burden on participants. The goal of the present ongoing NIDA-funded study (DA 12503) is to test the effectiveness of an aerobic exercise intervention as an adjunct to nicotine gum therapy for sedentary female smokers, requiring up to 26 visits in a 19-week period. Additionally, those assigned to the exercise group are required to engage in home exercise. The purpose of the present analysis is to examine what factors influence participant adherence to the study protocol during the first 30 days post-quit.

Worse program attendance and lower adherence to home exercise were associated with higher nicotine dependence, BMI, guilt, reported stress, and withdrawal-like symptoms (e.g., anxiety, irritability, depressed mood and restlessness) prior to the quit date. Higher baseline age and negative affect predicted better compliance. Neither the amount smoked prequit nor during cessation treatment influenced program attendance. Nicotine gum use was positively associated with the amount smoked prequit, nicotine dependence, and baseline BMI.

The present analysis suggests that for female smokers, psychological and weight-related factors play a greater role in protocol adherence than physical addiction as indicated by amount smoked. Addressing these factors may prove useful in increasing smoking cessation rates among women.

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**PO2 13** MINNESOTA MULTIPHASIC PERSONALITY INVENTORY (MMPI) PESSIMISM SCALE PREDICTS TOBACCO ABSTINENCE FOLLOWING TREATMENT FOR NICOTINE DEPENDENCE

Steven Ames, Ph.D.*, Kristin Vickers, Ph.D., Christi Patton, Ph.D., Kenneth Oford, M.S., Paul Decker, M.S., Darrell Schroeder, M.S., Delfino Vargas-Chanes, Ph.D, Robert Colligan, Ph.D., Max Trencery, Ph.D., and Richard Hurt, M.D., Mayo Clinic

Prior research has suggested that trait anxiety, pessimism, neuroticism, and depression play a greater role in smoking behavior than physical addiction as indicated by amount smoked. Addressing these factors may prove useful in increasing smoking cessation rates among women.

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**PO2 14** CAN MMPI-2 PROFILES OF INCARCERATED MALE SMOKERS PREDICT WHO QUILTS DURING A SMOKING BAN?


This study investigated MMPI-2 profiles and smoking status of 272 incarcerated males forced to quit smoking due to a smoking ban. Average age was 33 years; median prison sentence was 16 years; and 75.3% were Caucasian. 64.2% of the inmates identified themselves as smokers, 19.8% as ex-smokers, and 16% as non-smokers. The majority of smokers (63.7%) reported smoking between 11-30 cigarettes per day; 12.9% smoked more; and 49.3% had tried to quit in the previous year. Most smokers (82.9%) began smoking by age 15 and 26.3% had never made an attempt to quit.

MMPI-2 was given upon initial incarceration. Demographic information and smoking history were collected one week before the smoking ban, while smoking status was collected four days after the smoking ban. No differences were found among smokers, ex-smokers, and non-smokers on the 10 clinical scales, but MAC-R approached significance (p = .08), with current smokers scoring higher. Smokers who began smoking at 15 or younger scored significantly higher on the MAC-R (F (1, 151) = 4.68, p <.05), but lower on Hostility (F (1, 86) = 4.64, p <.05), than smokers who began at 16 or older. Logistic regression testing the 10 clinical scales and MAC-R correctly classified 82.6% of smokers who reported quitting. Smokers who continued to smoke had significantly higher scale scores on Social Isolation and MAC-R, while inmates who reported abstaining had higher scores on Paranoid. Implications for this study will be discussed.

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**PO2 15** A QUIT-SMOKING PROGRAMME IN PRISON

Peter Nottle, NSW Department of Corrective Services, and Renee Bittoun*, Smoking Research Unit, Psychological Medicine, University of Sydney and.

Twenty-two male inmates of a medium security correctional centre voluntarily attended a quit smoking programme conducted as part of a “Well Men’s Health Clinic” within the prison. Aged between 21 and 44, all showed high tobacco dependence scores and high expired CO at baseline. For safety reasons they were all commenced on 21mg nicotine transdermal patch, and were encouraged to apply multiple patches when urges to smoke were not quelled. At 8 weeks 27% were continuously abstinent confirmed by expired CO. Prisoners released or transferred were not included as successfully abstinent. The success of this programme has seen an unprecedented waiting list of prisoners eager to participate in a quit smoking programme.

Supported by NSW Department of Health and NSW Department of Corrective Services.

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PO2 16 CAN IN VIVO REHEARSAL OF MOOD MANAGEMENT HELP DEPRESSION-PRONE SMOKERS QUIT?  
Bonnie Spring, Ph.D.*, Michele Pergadia, Ph.D., Malia Richmond, M.A., Dennis McChargue, Ph.D., Neal Doran, University of Illinois—Chicago & Hines VA Hospital

Ambiguity about whether mood management training bolsters smoking cessation may arise because training conditions generalize poorly to the pervasive dysphoria of early abstinence. We tested whether rehearsing skills during incremental dysphoria exposure (psychological +/- biological) enhances coping skill mastery and prolongs abstinence. Euthymic smokers (n=45; 51% female; age m=39.7, SD=12.8; cigarettes/day m=20.7, SD=11.9) with 2+ prior major depressive episodes volunteered for a paid treatment analogue study and were randomized to: Control (CT), Mood Management Only (MM), Mood Management + Tryptophan Depletion (TD). Requirements were to attend a day-long, therapist-facilitated workshop, remain bioverifed abstinence for 48 hours, and be assessed for skill use and abstinence for 1 month. Workshops trained and rehearsed cessation skills and either (CT) self-hypnosis or (MM & TD) mood management skills (distraction, meditation, reframing). MM and TD rehearsed skills during exposure to psychologically induced negative mood that co-occurred with (TD) or without (MM) biologically induced dysphoria evoked by double-blind tryptophan depletion that transiently depletes brain serotonin. One month later, 20% of TD, 43.8% of CT, and 78.6% of MM had relapsed to smoking. Cox regression survival analysis controlling for Fagerstrom showed that MM, compared to either TD or CT, increased relapse risk by 4.9 (95% CI, 1.3-19.2)(G2=5.98, p <.05) and decreased cessation skill use (F(2,39)=6.4, p<.01) but did not differ affect mood. Mood management training alone undermined abstinence maintenance compared with biologically valid mood management rehearsal or non-stressful supportive treatment. Supported by HL59348 and an American Heart Association grant.

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PO2 17 EVALUATION OF INTERVENTION COMPONENTS OF A MULTI-FACETED SMOKING CESSATION PROGRAM


A 6-week smoking cessation program was designed to address the cognitive, behavioral, and physiological aspects of quitting smoking in an urban population. Fourteen of 15 (93%) smokers who completed the program assessed the helpfulness of individual components of the intervention.

Participants responded to advertisements, of whom 71% were female, aged 19 to 77 years (mean=52), with 71% having only a high school degree. Participants attended a mean of 5 sessions, with 57% attending all six. At the final session of the program the following intervention components were rated as very-to-extremely helpful in their goal towards quitting: (A) sharing with and hearing from other group members (93%), (B) learning about substitute behaviors, including distraction and delay techniques (78%), (C) the use of a smoking behavior log (72%), (D) self-talk (71%), (E) information provided by MD concerning nicotine replacement (71%), (F) using positive affirmations (65%), (G) self-hypnosis (65%), (H) hearing from a cancer survivor (64%), and (I) weekly homework assignments which addressed topics covered in each session (58%). Overall, the smoking cessation program was rated as very-to-extremely: informative (100%) and helpful (92%). The benefits of this intervention are further supported by the relatively high proportion of successful quitters (29%) given the sample size. Further, there was a reported reduction in the average number of cigarettes smoked per day (mean = 24 vs 11), and mean increase in motivation (6 vs 8) and confidence to quit (4 vs 8) on scales from 1 to 10. This program evaluation illuminated intervention components that may motivate quitting for the development/ refinement of other smoking cessation programs. 

This research received no outside grant funding.

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PO2 18 PREDICTORS OF 3-MONTH CONTINUOUS ABSTINENCE FROM CIGARETTE SMOKING AMONG CHINESE SMOKERS TREATED IN A SMOKING CESSATION HEALTH CENTRE


The purposes of this study are to describe the characteristics of attendees to a smoking cessation health centre (SCHC) in Hong Kong, and to determine factors associated with successful quitting among them. Smokers (n=768) who received smoking cessation services from the SCHC between August 21, 2000 and April 30, 2001 are included. All attendees to the SCHC received clinic services (counselling and/or nicotine replacement therapy) provided by trained counsellors. Of the 768 clients, 77% were male with a mean age of 39 (range 12 to 86); 72% smoked more than 10 cigarettes daily. The mean Fagerster score was 5 among the clients. The 3-month continuous quit rate was 27% among the clients. To identify the factors associated with successful quitting; the association between successful quitting and different variables of interest (19 variables) was examined. In the bi-variate analysis six variables were found to be associated with successful quitting. A multivariate analysis, which included all these significant variables in the model, revealed all of them as predictor variables for successful quitting. The strongest predictor for successful quitting (odds ratio greater than 2.0) were: perceive quitting as more important, started smoking regularly at the age of 14 or above, moderately dependent on nicotine, age 41-50 year and age 51 or above. The predictors of successful quitting identified in this study compare favourably with other international studies and suggest that promotion of smoking cessation services should take these predictor variables into consideration in the service planning to tailor interventions.

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PO2 19 A META-ANALYSIS OF CLINICAL STUDIES CONFIRMS THE EFFECTIVENESS OF BUPROPION SR (Zyban™) IN SMOKING CESSATION

Jarvis M.J., University College, London; Powell S., Marsh H., GlaxoSmithKline (GSK) UK, Middlesex; Aristides M., Brown A., M-TAG UK Ltd, London

A number of randomised trials have examined bupropion SR combined with behavioural support as a treatment for smoking cessation. Objective: Meta-analyses were performed to provide a pooled estimate of treatment effect for bupropion SR 300 mg/day versus placebo in motivated-to-quit smokers. Methods: Major databases, trial registers and GSK internal systems identified 8 studies (5 studies with 12-month data available) for inclusion (eligibility criteria: randomised, double-blind, placebo-controlled trials). Endpoints investigated were: continuous abstinence through weeks 4-7 of treatment; 12-month continuous and point prevalence abstinence. Quantitative pooling of data (based on the intention-to-treat populations in original trial reports) was conducted using Cochrane Collaboration software, Metaview v.4.1. Fixed- and random-effects models were used where appropriate based on the extent of heterogeneity. Results: Zyban was associated with a significant increase in continuous abstinence from smoking for weeks 4-7 of the treatment period (Peto odds ratio (OR) = 2.71 [95% CI: 1.88, 4.07]; relative risk (RR) = 2.04 [95% CI: 1.60, 2.61]; absolute risk difference (ARD) = 19% [95% CI: 15%, 23%]; number needed to treat (NNT) = 5) and for 12-month continuous abstinence (OR = 2.10 [95% CI: 1.62, 2.73]; RR = 2.05 [95% CI: 1.57, 2.66]; ARD = 8% [95% CI: 5%, 11%]; NNT=12). Results for 12-month point prevalence abstinence were similar. Conclusion: The body of evidence from well conducted clinical trials confirms that Zyban significantly increases the likelihood of achieving smoking abstinence through to 12 months by at least two-fold compared with placebo.

Funded by GlaxoSmithKline UK Ltd.

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PO2 20  
**BUPROPION SR FOR SMOKING CESSATION: PREDICTORS OF SUCCESSFUL OUTCOME**

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Information concerning predictors of success following treatment with bupropion SR for smoking cessation is limited. The present study sought to examine predictors of success in 1,524 smokers who received either 150 mg or 300 mg bupropion in combination with either telephone or proactive counseling or a tailored mail-based approach and then were assessed at 3 and 12 months post cessation. Participants were recruited from a large health system, screened for contraindications, randomized to one of four combinations of treatment, and assessed on a comprehensive set of relevant smoking characteristics prior to treatment. Smoking outcome at 3 and at 12 months was defined as point-prevalence of any smoking within the 7 days prior to follow-up contact. An intent-to-treat approach was utilized where all subjects with missing data were considered to be smoking. Analyses were conducted in two stages. First the association between each characteristic and treatment outcome was examined separately. Then, forward stepwise logistic regression analyses with terms for bupropion dose, behavioral treatment, dose*behavior interaction, and baseline characteristics were used to develop outcome prediction models at each follow-up point. Older age, male gender, less tobacco dependence, more previous quit attempts, prior experience with NRT, less current or previous depression, and higher motivation to quit were consistently associated with higher rates of point prevalent abstinence.

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PO2 21  
**IMPACT OF ZYNTABAC ON MORBIDITY, MORTALITY AND HEALTH CARE COSTS DUE TO SMOKING IN SPAIN**

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Smoking causes significant morbidity, mortality and health care expenditure in Spain. Using a discrete deterministic, population-based model, we estimated the burden over 20 years and calculated the cases of morbidity and death averted and the health care savings with ZYNTABAC (bupropion HCl), the first non-nicotine pharmacotherapy for nicotine dependence.

Given the current smoking prevalence of 35% (men) and 21% (women) and assuming smokers quit unassisted an estimated 74% of current Spanish smokers aged 16 years and over will be affected by one of six key smoking-attributable morbidities (chronic obstructive pulmonary disease, asthma exacerbation, stroke, heart disease, lung cancer and low birth weight) over 20 years.

A one-off investment in ZYNTABAC (efficacy of 30.3%, cost 153 Euro), reduces smoking-attributable morbidity and mortality by 123,381 cases of morbidity and 47,650 deaths compared with willpower (1% efficacy). ZYNTABAC is dominant compared with willpower i.e. it is more effective and less costly (discounting at 4.3%). The total cost of ZYNTABAC for the 37% of smokers motivated to quit is 630 million Euro with the reduction in direct health care costs amounting to 2 billion Euro over 20 years.

Continuous quit rates were generally maintained at one year follow-up.

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**PO2 24**

**EFFECTIVENESS OF THE NICOTINE PATCH IN SPIT TOBACCO CESSION WITH ADOLESCENTS**

R. Craig Stotts, Paula K. Roberson, Ehab Hanna, Susan Jones

BACKGROUND: Approximately one-third of adolescent males in rural and southern areas of the country use spit tobacco (ST). No previous cessation programs targeted for this group have resulted in one-year cessation rates higher than 12%. Most adolescent ST users want to quit but no effective programs are available to them. METHODS: A randomized, placebo-controlled clinical trial was conducted with spit tobacco users who were ages 14-19, used ST at least one year, and were interested in quitting. One group received usual care counseling, while two other groups received a special behavioral intervention couple with either active or placebo nicotine patches. Subjects were recruited from high schools throughout the state of Arkansas; 100 were enrolled in each arm for a total of 300. The experimental intervention included 6 weeks of one hour classes held at each high school followed by stage-based telephone counseling every 3 months. Numerous incentives were used to enhance recruitment and minimize attrition. RESULTS: At one year followup, the data clearly show that the behavioral intervention was effective but the nicotine patch did not enhance quit rates. This study found that adolescents can be effectively recruited into tobacco cessation clinical trials with the appropriate approaches and incentives. They can also be retained in long term studies if certain tracking and incentive systems are employed.

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**PO2 25**

**SUCCESSFUL TREATMENT WITH NICOTINE LOZENGE OF SMOKERS WHO FAILED PRIOR USE OF OTHER PHARMACOLOGICAL TREATMENTS**

Saul Shiffman, Ph.D., Pinney Associates and University of Pittsburgh; Carolyn M. Dresler, M.D., GlaxoSmithKline Consumer Healthcare

Nicotine replacement therapies (NRT) have demonstrated efficacy for smoking cessation, as have other pharmacological treatments. However, many smokers have tried these treatments but failed to quit smoking. It is not clear whether these smokers should be considered nonresponders and discouraged from using pharmacotherapy or, whether they should try using new pharmacological aids. In the context of a clinical trial of a new nicotine lozenge, we assessed whether the efficacy of the lozenge (vs. placebo) varied according to past treatment failure. 1818 smokers were randomized to active lozenge (2 or 4 mg) or placebo. 63% had previously tried a pharmacological treatment, mostly NRT (61%), particularly nicotine patch (47%) and gum (37%). Using logistic regression, we related 28-day continuous abstinence at 6 weeks to lozenge treatment (active vs. placebo) and prior treatment. The analysis showed that the active lozenge had a significantly stronger effect among smokers with past pharmacotherapy (OR=1.34, p<0.005). This was because smokers with past failure did significantly worse than others when treated with placebo (21% vs. 33%, OR=1.84, p<0.001). However, treatment with active lozenge completely eliminated this disadvantage, affording those with past failure the same chance of success as those without this history (47% vs. 48%, OR=1.02, p>0.50). The effect was accounted for primarily by prior patch use. Smokers who have previously failed to quit with pharmacological therapy should be encouraged to attempt quitting again with the nicotine lozenge or other NRT.

This study was supported by GlaxoSmithKline Consumer Healthcare (GSK). Saul Shiffman is a consultant to GSK and Carolyn M. Dresler is employed by GSK.

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**PO2 26**

**INTERACTIVE VOICE RESPONSE TECHNOLOGY FOR SMOKING CESSATION RELAPSE PREVENTION**

Anna M. McDaniel, D.N.S., R.N.*; Anna M. McDaniel, D.N.S.; Indiana University; and G.H. Rosener, R.Ph., TeleHealth Systems

The purpose of this pilot study was to assess the feasibility, acceptability and preliminary impact of an interactive voice response (IVR) system for preventing relapse in individuals who had completed a smoking cessation program affiliated with an inner-city public hospital. A non-probability sample of 24 participants in a smoking cessation educational program was recruited for this study. A computerized tele- phone system called participants to monitor progress and provide brief educational/ motivational messages about quitting smoking for six weeks. The system used a pre- recorded question set to collect data from patients via a telephone keypad. An algo- rithm controlled the sequencing of the data collection and provided feedback based on patient input. Follow-up data about satisfaction and usability of the system were obtained by telephone interview at the end of the trial period. Of 32 eligible patients, 24 agreed to participate in the feasibility study (75% recruitment rate). Overall, 73% (140/192) of calls placed by the IVR system were completed. Over 75% of partici- pants agreed that the use of the computerized calling system to help people quit smoking was a “good idea”. Fifteen participants (68%) found the system “somewhat” or “very” helpful. Satisfaction with the system was high: mean satisfaction score of 32.5 out of a possible 40. Fourteen participants (58%) reported smoking abstinence at follow-up. There was a significant positive association between the number of calls received by the IVR and smoking abstinence. Preliminary results suggest that IVR technology is a useful and acceptable method for relapse prevention with the potential for significant impact at a relatively low cost.

Supported by the Indiana University School of Informatics.

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**PO2 27**

**TELEPHONE QUITLINE FOR SMOKERS: EVIDENCE FOR ITS EFFECTIVENESS IN REAL-WORLD APPLICATION**

Shu-Hong Zhu, Ph.D., University of California, San Diego

In recent years, telephone quitlines for smoking cessation have proliferated. Twenty states in the U.S. now have statewide quitlines and American Legacy Foundation is setting up a national quitline. While AHRC guidelines recommend quitlines based on review of clinical trials, their effectiveness in real-world application is untested. There was concern as to whether the clinical trial results could be replicated in a service setting, where practically no smoker is screened for eligibility as would be done in a research setting, and where demands for volume of service may impinge on the qual- ity of counseling. Attempts to evaluate the effectiveness of the telephone intervention for these statewide quitline services, however, encountered a problem that confronts most evaluators of social programs: It was not feasible to have a randomized control group in the service setting, because callers expect to receive counseling based on request. This study developed an innovative design that allowed a random assign- ment of a subset of smokers into a control group without disregarding their desire to receive counseling. This randomization methodology was implemented successfully in the California Smokers’ Helpline and 3,282 smokers participated in the randomized trial. The 12-month prolonged abstinence rates indicated that telephone counseling doubled the quit rates, compared to a self-help group, replicating the earlier clinical trial result in a real-world service setting.

Supported by California Department of Health Services Contract # 92-15416.

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PO2 28

COMPUTER ASSISTED SMOKING CESSATION FOR LATINO AND NON-LATINO SMOKERS: USABILITY TESTING

Beth Bock*, Ph.D., Fred Bock, BS., and Raymond Niaura, Ph.D., Brown University Medical School and BTTF, Inc.

Limited time, training and reimbursement for prevention services present significant barriers to physicians wishing to offer intervention for smoking cessation. We report on the development of a computer software system designed to provide intervention support to physicians and their patients. Usability testing and patient satisfaction results functioned as an integral part of system development. Latino (LA=198) and white Non-Latino (NL=417) smokers (mean=22 cigarettes/day) at three primary care clinics were enrolled as part of a larger study of smoking cessation [68% female, mean age=39 years, SD=11.5, mean years education=11.5, SD=2.1, 79% US born]. Over 70% of subjects chose to use the computer system and participated in usability testing. The software system installed on laptop computers provided assessments of smoking history, attitudes toward quitting, nicotine dependence and mood. No differences between LA (69%) and NL (78%) were observed in usability testing participation. Over half (58%) had never used a computer before, although 53% had access to a computer at home, school, work or public libraries. While 78% of all participants felt audio features were unnecessary, LA subjects (11.9%) were more likely than NL subjects (2.7%) to find the audio interesting and helpful (χ2=5.3, p<0.05). Most subjects rated the system as [very easy] (93%) to use, NL subjects rated the system as easier to use than LA subjects (p<0.05). Usability testing and resulting design features such as audio and written instructions, materials written at 6th grade level, color coding and time delay of on-screen presentations contributed to system usability and participated perceived ease of use.

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PO2 29

A RANDOMISED TRIAL OF A PROGRAM OF COMPUTER-GENERATED PERSONALIZED ADVICE FOCUSING ON RELAPSE PREVENTION

Ron Borland, Deon Hunt and James Balmford

Personalized computer generated advice is an effective method of facilitating smoking cessation. Most of the existing programs focus on encouraging cessation and do not appear to be well designed for preventing relapse. This paper reports on 12 month follow-up outcomes from a randomised trial of a newly developed interactive personalized program with a strong emphasis on relapse prevention. The program was delivered to callers to a quitline smoking cessation who agreed to be contacted for research. The intervention consisted of a series of telephone assessments each resulting in a tailored letter providing advice based on their current situation and change from the previous assessment. Assessments were scheduled in a stage-sensitive way with assessments closer together when close to quitting and further apart as abstinence progressed or if the person lost interest (due to relapse or failure to progress). Participants where 1060 smokers or recent ex-smokers, with approximately half offered the program of computer-generated letters and the others merely agreeing to four assessments (baseline, 3, 6, & 12 months). Results show significant benefit at 12 months using sustained abstinence for at least 6 months as the main outcome measure. (n=742, 30.2% vs 16.9%, χ2=0001). (When all missing cases were treated as smokers, the difference remained significant, p<0.0001). The program appeared to both help recent quitters to stay quit and to increase the quit success of those smoking at baseline. We are currently working on a version of the program that is deliverable over the internet with email prompts at appropriate times for reassessments.

Funded by NHMRC project grant.

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PO2 30

SMOKING CESSATION ON THE WEB: INITIAL EVALUATION OF QUITNET.COM

Beth Bock, Ph.D., Amanda Graham, Ph.D., Christian Carter, Nathan Cobb, M.D., Brown University Medical School and Beth Israel Deaconess Medical Center

QuitNet (www.quitnet.com) is a website designed to provide smoking cessation services following the Surgeon General’s guidelines. This study presents an initial evaluation of QuitNet with respect to cessation outcomes, user satisfaction and site use. Of surveys were emailed to 33,610 registered users, 25.9% were not received due to expired email addresses. Of the remaining surveys 19.9% (n=6,954) were returned completed. Only age differed significantly between those with invalid email addresses (mean=37 years, SD=12.3) compared to non-responders (mean age 38.3, SD=12.0) and survey respondents (mean=41.8, SD=11.9; p<0.0001).

Survey respondents were registered with the site for an average of 24 months (92.8% were non-Hispanic white; education=14years, 63.6% female). 48.3% were currently smoking (mean cigarettes/day=25.6, SD=11.9). Most current smokers (55%) reported reduced smoking since first registration with QuitNet. Among those who quit smoking, time quit ranged from <3 months (24%) to >1 year (32%). Change in smoking status was significantly associated ratings of site helpfulness (p<0.001).

Frequency of site use was predictive of smoking status (t=0.12, p<0.001) in a dose-response relationship. More respondents who used the site daily (25%) were quit than weekly (52%) or monthly (42%) users. Number of system logins (F=81.7, p<0.001) and number of bulletin board posts (F=38.5, p<0.001) were positively associated with quit status. A logistic regression showed significant predictors of smoking cessation included: intensity of logins (number/time), total number of bulletin board postings and duration of membership (p<0.05). Those who quit smoking successfully had more frequent logins, been registered longer and made more bulletin board posts. The Web may provide an effective alternative venue for smoking cessation treatment.

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PO2 31

COMPARISONS OF SPANISH LANGUAGE AND ENGLISH LANGUAGE PARTICIPANTS OF AN INTERNET SELF-ADMINISTERED SMOKING CESSATION STUDY

Jacqueline L. Stoddard, Ph.D.,* Ricardo F. Muñoz, Ph.D., Kevin L. Delucchi, Ph.D., and Eliseo Pérez-Stable, M.D.

There is growing evidence that the Internet is a feasible method for delivering and evaluating smoking cessation interventions among English speaking participants, but little is known about the feasibility of this technology among Spanish speaking smokers. In this study, we compared two groups of smokers who participated in a self-administered Internet smoking cessation study: 1519 English language and 788 Spanish language subjects enrolled in equivalent versions of the same study, one in English, one in Spanish.

Both groups were similar in their use and evaluations of the site as well as smoking history (i.e., age at 1st cigarette, age 1st smoked regularly). However, the samples differed somewhat in demographics and smoking behavior. The Spanish language sample tended to be younger, more educated, more frequently employed, and had a higher proportion of male participants than the English sample. The Spanish sample also had the higher rate of individuals who met criteria for current major depression, who were exposed to smoking from others, and the lowest rate of individuals motivated to quit smoking, and who had used cessation aids to quit smoking. At six-month follow-up, serious quit attempts and 7-day abstinence rates were about 5% lower in the Spanish group.

It is feasible to disseminate Internet-administered assistance for smoking cessation to both Spanish language and English language smokers. Demographic characteristics of the Spanish sample are similar to those of the early, English language, web users. Differences in abstinence rates between these two groups may be due to demographic factors rather than differing acceptance of the medium as form of help for smoking cessation. As more Spanish language individuals begin using the web, differences between English and Spanish language smokers may narrow further, and smoking quit rates among Spanish language participants of Internet-administered cessation programs may increase.

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**PO2 32**

**ATTITUDES TOWARDS GIVING SMOKING CESSATION ADVICE AMONG NURSING STAFF AT A LONG-TERM RESIDENTIAL CARE FACILITY**

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This study provides a first assessment of long-term care staffs' prevalence of and attitudes towards giving smoking cessation advice, and predictors of advice giving. A survey of 115 nurses found that 54.8% of the licensed nurses and 34.6% of the nursing assistants reported ever advising long-term residents to quit smoking. Multivariate analyses indicated that advising was associated with the belief that quitting would improve health, greater awareness of unsafe smoking, and supporting on-site cessation programs. Predictors of not advising were being in favor of locating smoking residents in the same building and believing that cessation advice is the responsibility of physicians.

Descriptive analyses revealed that nursing staff somewhat agreed that smoking among residents and secondhand smoke is harmful, but there are benefits to quitting, smoking is a resident's right and pleasurable activity, and that some residents are not capable of making decisions regarding their smoking and health. Nursing staff moderately endorsed items reflecting safety concerns and 36% thought the facility's smoking policy should be changed. The strongest barriers to giving advice were lack of institutional support and perceived residents' disinterest in quitting.

The nursing home setting may be missing opportunities for intervention. Providing a health care environment that promotes the treatment of nicotine addiction can help nursing homes achieve their goals of maintenance and improvement of health care for their residents.

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**PO2 33**

**EDUCATION OF CANADIAN PHARMACISTS FOR THEIR ROLE IN SMOKING CESSATION**

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Nicotine Replacement Therapy (NRT) was previously available in Canada only on prescription, but regulatory changes allowed provinces to permit the sale of nicotine gum and transdermal patches without prescription in pharmacies. This change put pharmacists on the front line of contact with patients using NRT to quit smoking and set the stage for study of education of Canadian pharmacists in advising patients about smoking cessation.

Representatives of each of the nine faculties of pharmacy in Canada were surveyed regarding their views on the role of pharmacists in smoking cessation; the role of pharmacy faculties in tobacco-related education, current curriculum content, and barriers to and facilitators of curriculum change.

The educators agree that pharmacists have a very important role in identifying smokers and helping them quit, including advising about NRT. The perceived ideal teaching role of pharmacy faculties reflects these priorities. Existing curriculum hours are mostly devoted to nicotine pharmacology and effects, and to NRT effectiveness and use. Topics specific to smoking cessation counselling were most likely introduced into the curriculum since the regulatory change. Education of Canadian pharmacists in smoking cessation has responded to changes in pharmacist roles, but some smoking-related topics still receive minimal coverage.

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**PO2 34**

**AFTER THE ST INTERVENTION: WHAT HAPPENS TO USERS WHO DON'T QUIT?**

Judy A. Andrews, Ph.D.**, Maureen Barkley, Herbert H. Severson, Ph.D., and Edward Lichtenstein, Ph.D., Oregon Research Institute

As part of the evaluation of the effectiveness of two self-help ST interventions, 1,069 ST users were randomized to receive either a self-help manual only (Manual) or a self-help manual, companion video, and phone call support (Assisted Self-Help). Enrollees completed baseline, 6-, 12-, and 18-month follow-up assessments. We used Latent Growth Curve Modeling (LGM), specifically a piecewise growth function, to model the decrease in total nicotine exposure among those who did not quit tobacco during the follow-up period. Visual inspection of the means shows a sharp decrease in nicotine exposure from baseline to 6 months (10.64 to 7.30), followed by relatively little change from the 6- to 18-month follow-up period (7.30, 7.30, 7.54). Repeated measures ANOVA showed a significant decrease in nicotine exposure from baseline to 6-months post-intervention (F1, 259) = 132.81, p < .001. For the last three time points, a linear growth function, with a positive non-significant slope (12) fit the data well X2 (1, n = 261) = .43, p = .51. This analysis suggests that ST users who did not quit their ST use decreased their nicotine exposure soon after the intervention and maintained this decrease throughout the follow-up period. Initial analyses of predictors of outcome over time showed that decrease and maintenance of lower nicotine exposure did not vary as a function of the intervention. Our findings are important to interventions focusing on harm reduction as an outcome.

This study was supported by NCI Grant #CA 60586.

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**PO2 35**

**BRIEF BEHAVIORAL COUNSELING AND CONTINGENCY MANAGEMENT IN TREATMENT-SEEKING SMOKERS: PRELIMINARY FINDINGS**

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Contingency management techniques have been successfully used to reduce carbon monoxide levels in non-treatment-seeking smokers (Stitzer, 1986; Roll, et al., 1996). However, few studies have evaluated the efficacy of these techniques in initiating and maintaining abstinence from smoking in treatment seeking individuals. This present study reports on preliminary findings in a trial combining brief counseling and contingency management. This trial was part of a larger study investigating nicotine abstinence effects, in which subjects received no pharmacotherapy. For the first week following quit date, subjects met with research assistants 3 times daily to confirm abstinence, with one of these appointments also including a 20-minute behavioral counseling session. Self-reported cigarette abstinence was confirmed with breath carbon monoxide levels. CO levels <10ppm were contingently reinforced with increasing dollar amounts according to a procedure modified from Roll, et al (1996). After completion of the first week, subjects then received weekly counseling sessions at weeks 2, 3 and 4. Preliminary data on a pilot sample of 13 smokers indicated that 93% of subjects were confirmed abstinent throughout week 1, and subsequent abstinence rates at weeks 2, 3, and 4 were 39%, 34%, and 34% respectively. These initial results suggest that frequent behavioral counseling, in combination with contingency management of abstinence may be promising in assisting treatment-seeking smokers. We are currently evaluating the efficacy of a 4-week trial of frequent behavioral counseling sessions and contingency management. These results will also be presented.

This study was supported by NIDA grant # P50 DA04733.

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PO2 36  AN INCENTIVE BASED MODEL OF SMOKING CESSION AND RELAPSE

Laura M. Juliano, Ph.D., and Maxine L. Stitzer, Ph.D.

Analogue models of smoking cessation and relapse can facilitate controlled examination of addiction processes, such as lapse-relapse mechanisms. For ethical and practical reasons, studies that manipulate variables hypothesized to promote relapse preclude using samples of highly motivated quitters. We developed and evaluated an analogue model of quitting and relapse that involved a 10 day “practice” quit attempt using a sample of non-treatment seeking volunteers. In the context of this model, we are testing effects of a “programmed” lapse that are hypothesized to influence the relapse process. For the first 4 days of the quit attempt, participants receive brief counseling and monetary incentives to promote abstinence. After 4 days of biologically confirmed abstinence, participants are assigned to smoke 5 cigarettes or to remain abstinent. Subsequently, to this manipulation, all participants are encouraged to strive for continued smoking abstinence and given monetary incentives. Abstinence incentives decrease gradually over time from $12.00 to $6.00 per day. A de-escalating payment schedule is employed in order to provide motivation for continued abstinence while also allowing for a relapse choice. It is expected that this model will provide objective data on relapse by generating a smoking versus money cross-over point, and will be sensitive to effects of the experimental manipulations. Preliminary data suggest that the model is feasible with a sample of smokers from the community, and that a de-escalating payment schedule produces the desired pattern of responding to subjects not exposed to the smoking manipulation. Further results of the lapse manipulation will be presented and methodological issues discussed.

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PO2 37  SMOKING CESSION TRIAL PARTICIPATION: WHO DROPS OUT AND WHO STAYS IN?

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Participant attrition is a serious threat to all clinical trials, particularly treatment studies involving lengthy follow-up periods. It undermines validity and also costs both participants and researchers time and resources. Attrition in smoking cessation trials is especially troublesome when it takes place before the participant makes a quit attempt. One of the first steps in decreasing attrition is determining the types of smokers who are at greatest risk of dropping out prior to a quit attempt. Researchers could then target the particular needs of these sub-groups of smokers, in the hopes of decreasing the likelihood of future attrition. Data from participants who enrolled in an ongoing NIDA-funded clinical trial (DA12503) for female smokers (N = 193) were analyzed to address the above issue. Qualified participants were randomized into one of three behavioral treatment groups and completed a series of measures at their first visit. They were expected to begin nicotine gum therapy after a three-week pre-quit period. Participants who dropped out prior to quitting differed from those who made a quit attempt, scoring significantly higher on baseline depression, guilt, negative affect and weight concerns. African-Americans who enrolled in the study were significantly more likely than White participants to drop out prior to quitting. Further, participants randomized into the equal control condition wellness were significantly more likely to drop out prior to quitting than those who were assigned to either the experimental condition (exercise) or the control condition (standard care).

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PO2 38  PRELIMINARY FINDINGS FROM A TREATMENT STUDY OF HEAVY SMOKERS IN ALCOHOL RECOVERY: END OF TREATMENT OUTCOMES

David Kalman, Ph.D.,* Dennis Tirch, Ph.D., Walter, Penk, Ph.D., Cynthia Kaschub, B.A., Boston University, ENRM VAMC

In this study of heavy smokers in alcohol recovery, 130 participants are being randomly assigned to receive either two 21-mg nicotine patches (NP) or one 21-mg NP and one placebo patch for 4 weeks followed by 8 weeks of dose tapering. Medication assignment is double blind for the first 4 weeks of patch treatment. Participants are also receiving 5 counseling sessions. To be eligible for the study, participants must smoke >20 cigs/day, meet DSM-IV criteria for alcohol dependence (lifetime) and have at least 2 months of abstinence from all prescribed drugs. Follow-up evaluations are being conducted 4, 12, 24 and 36 weeks after each participant’s scheduled quit date. Findings will be presented for end-of-doubled blind (4 week) and end-of-treatment (12-week) follow-up for approximately 80 participants. We will report (1) the percentage of participants who achieved 4- and 12-week abstinence (7-day point prevalence and continuous) from smoking; (2) whether abstinence rate is associated with length of alcohol abstinence at the time of enrollment into the study; (3) whether smoking abstinence is mediated by selected predictors of treatment outcome (e.g., whether participants have smoked to cope with urges to drink during sobriety). Preliminary analyses indicate that approximately 24% of participants were smoking abstinence at 4 weeks and that length of alcohol abstinence at time of enrollment is associated with 4-week smoking outcome (p < .05).

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PO2 39  IDENTIFYING FACTORS FOR TAILORING SMOKING CESSION INTERVENTIONS IN GENERAL PRACTICE: A CROSS SECTIONAL STUDY ON THE ASSOCIATION BETWEEN RESPIRATORY COMPLAINTS, DEPRESSION AND NICOTINE DEPENDENCE IN SMOKERS

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BACKGROUND: Smoking remains a prevalent habit with serious consequences for public health. Although effective smoking cessation strategies are available to individuals and health care professionals, at least 70% to 80% of the smokers who try to quit relapse within the first year. In order to increase the success rate of available strategies, it is therefore recommended that the management of smoking cessation should be tailored. It already seems that general practitioners (GPs) are, to a certain extent, tailoring their smoking cessation advice. GPs seem more likely to advise smokers to stop smoking if they perceive their problems to be smoking related. Furthermore, we now depression and nicotine dependence have been identified as predictors of relapse. However, before smoking cessation strategies can be effectively tailored, we need to know how these variables are related.

AIMS: The aim of this paper is to describe the relationship between reported respiratory symptoms and depression, and to assess whether this relationship is stronger for nicotine dependent smokers compared to non-nicotine dependent smokers.

METHODS: A postal survey of 272 cigarette smokers who were motivated to quit smoking was conducted. We used the Beck Depression Inventory (BDI) to assess depression.

RESULTS: We found a strong relationship between respiratory complaints and depression. This relationship is stronger when the frequency of the complaints increases and the limitation in activities of daily living was higher. This relationship seems to be modified by nicotine dependence; the relationship between respiratory complaints and depression was stronger for the nicotine dependent smokers.

CONCLUSIONS: GPs and practice nurses need to gather baseline information on psychiatric disorders and nicotine dependence and assess the severity of the respiratory complaints smokers present themselves with, in order to increase the chance of a successful quit attempt.

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PO2 40  TREATMENT OF EXTREME TOBACCO DEPENDENCE: A CASE REPORT

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A 42-year-old male, his background morbidity was characterized by a bipolar, endogenous depression for 25 years and alcohol dependence for 10 years (the patient is abstinent for 1 year after three inpatient treatment procedures) has shown up at our clinic:

Tobacco and Nicotine Dependence were defined according the Vienna Standard Protocol: The 42 year old patient started smoking at 22, at the onset of therapy he smoked up to 120 cigarettes a day, the Fagerstrom Test for Nicotine Dependence (FTN) was 9, Carbon monoxide (CO) values were up to 125 ppm (-). The Tar Exposure value (TEV) was 1210, which results in a relative risk for lung cancer of 4.2 compared with a non-smoker. The patient described a Nicotine Pre Abstinence Syndrome (NPAS) since 10 years. A nocturnal Sleep Disturbing Nicotine Craving (NSDNC) was rare. The patient has tried to stop smoking several times, without a successful quit attempt. However, at his first visit his quit motivation was high. The patient was hospitalized in order to facilitate treatment conditions: The first day was used to get the patient familiar with NRT (nicotine replacement therapy). The second day was quit day and NRT was offered ad libitum. Abstinence was monitored by measurement of CO in the expired air. Regarding the treatment the patient choose a combination of 4mg NRT gum and Nasal spray (NNS) out of the product range. In the first week of treatment the patient used 20 pieces 4mg gum a day on the average and 40 hubs of NNS. Treatment was modified to cope with several withdrawal symptoms up to 45-50 hubs NNS and 24 4mg gums per day during week 2-4. Bupropion was added to supplement the NRT treatment from week 2 to week 8. The patient was discharged from hospital after 3 weeks. Daily contacts, mostly by telephone, were kept and the patient monitored his abstinence by self measurement of CO. NRT therapy was reduced during the following weeks constantly to eight 4mg gums in week 12.

The patient remained at a non-smoking status for 130 days, using still NRT but tries to titrate it.

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PO2 41  EVALUATING THE EFFECTIVENESS OF “CUE EXPOSURE THERAPY” BY MEASURING ITS ABILITY TO DIMINISH CUE STRENGTH OF PERSONAL SMOKING TRIGGERS

Stuart G. Ferguson, Louis S. Leland, Jr., Ph.D., Department of Psychology, University of Otago

This study was design to test a method of evaluating behavioural smoking cessation programs that was free of confounds associated with current assessment methods. Furthermore, it used this evaluation to assess a popular behavioural smoking cessation technique - Cue Exposure Therapy (CET).

The success of behavioural smoking cessation techniques has traditionally been based on their ability to initiate smoking cessation. It has been argued that this is not an appropriate evaluation for individual components of a treatment program. The evaluation method developed in this study measures how effective a behavioural technique is at breaking the association between smoking triggers and the smoking behaviour. This evaluation allows researchers to isolate the behavioural component of the addiction.

Measures of cue strength (the ability of a trigger to cause craving) were obtained for four personal smoking triggers for the ten participants. To do this, participants used guided imagery to ‘experience’ their personal triggers and then rated the level of craving this generated. Two of the triggers were then treated using a four-week course of CET while the remaining two cues remained untreated (as a control). After the treatment, a second measure of cue strength was obtained for all four triggers. Those triggers treated with CET showed a significant decrease in cue strength while the untreated triggers did not.

It was concluded that CET is an effective treatment for the behavioural component of the smoking addiction so long as the principal personal triggers are treated. The evaluation technique successfully isolated the behavioural component of smoking addiction and in doing so removed confounds associated with traditional assessment methods.

This study was funded by a grant from the Otago Charitable Trust.

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PO2 42  EXERCISE AS A BEHAVIORAL ADJUNCT TO NICOTINE GUM FOR SMOKING CESSION—PRELIMINARY FINDINGS

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The goal of the present ongoing NIDA-funded study (DA12503) is to test the effectiveness of an aerobic exercise intervention as an adjunct to nicotine gum therapy for sedentary female smokers. Both nicotine gum and exercise have been shown to improve mood, and both may potentially control postcessation weight gain, two key concerns for women as they attempt to quit smoking. Preliminary analyses were conducted comparing abstinence rates in the first 30 days post-quit (N = 134). Chi-square analyses compared point-prevalence abstinence (at day 3, day 7, day 14, and day 30) among three treatment groups all receiving nicotine gum therapy. The exercise group receives exercise plus brief counseling, the equal contact control group receives wellness lectures plus brief counseling, and the standard care group receives brief counseling only. Participants in the exercise and wellness groups were significantly more likely to remain abstinent 3, 7, and 14 days post-quit compared to the standard care group. However, abstinence at day 30 was not significantly different among groups. Continuous abstinence during the first 30 days post-quit also showed improved cessation rates for both the exercise and wellness groups over the standard care group when survival analysis was used. Results did not change appreciably when adjusting for psychosocial and demographic variables.

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PO2 43  SMOKING STATUS AND ITS RELATIONSHIP TO FITNESS AND PHYSICAL ACTIVITY

Mace Coday, Ph.D., Grant Somes, Ph.D., Haydn Smith, M.S., Karen Johnson, M.D., University of Tennessee; Abby King, Ph.D., Cheryl Albright, Ph.D., Stanford University; Bess Marcus, Ph.D., Brown University; Carolyn Voorhees, Ph.D., Johns Hopkins University; Stuart Cohen, Ed.D., University of Arizona

Health providers are an important source of preventive advice for patients. Given smokers’ higher rates of sedentary behavior and poorer fitness, providing physical activity (PA) advice via physician offices is a potentially powerful approach. The objective was to examine how smoking status relates to changes in fitness and PA in healthy primary care patients. The Activity Counseling Trial (ACT) was a randomized, controlled trial of sedentary adults ages 35-75 yr. with 24 months of intervention (3 arms varying in levels of PA advice) and follow-up. ACT providers delivered advice according to CDC/ACSM guidelines during non-acute visits. After adjustment for demographics, smokers (n=79) had lower VO2max (mL/kg) at baseline than former smokers (22.4 vs. 23.7, p<0.05) and never smokers (22.4 vs. 24.7, p<0.001), with former smokers (n=298) being significantly lower than never smokers (n=497; p<0.02).

Smokers had higher baseline scores on Beck Depression Inventory (BDI) than former or never smokers (7.7 vs. 6.3 and 5.9 respectively, p<0.02), and lower PA self-efficacy compared to never smokers (57.8 vs. 65.6, p=0.01). All smoking categories showed trends showed in improved VO2max, PA, depression, and PA self-efficacy from baseline to six months and baseline to 24 months, but there was no interaction of time or study arm with smoking status. Results suggest that exercise advice in primary care is only modestly helpful to smokers. More studies are necessary to develop protocols to tailor messages to assist sedentary smokers.

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PO2 44  
**DOES PERSONAL SPIRITUAL PRACTICE HAVE A ROLE IN SMOKING CESSATION? A PILOT STUDY**

David Gonzales, Ph.D.*, Heather Murphy, B.A., Donovan Redtomahawk, Elizabeth Allen, M.S., Oregon Health & Science University

The relationship between patient spiritual practices and treatment outcomes is receiving greater attention in medicine. Health care providers have begun to assess patients' interest in including personal spiritual practice as part of treatment. Spiritual practice is a key element in many interventions for alcohol and other drug dependencies, but has not commonly been included in interventions for tobacco dependence. Little is known about whether smokers believe they would benefit from including spiritual practice in their attempts to quit. This pilot study investigates current smokers' perceptions regarding the potential benefits of personal spiritual beliefs and practices in making a future quit attempt.

Participants were current smokers observed smoking on the OHSU campus who agreed to complete an 11 item staff administered survey of smoking behaviors and spiritual beliefs and were at least 18 years of age. Of the smokers surveyed by date (n=90) 51% were men and 49% were women. Overall, 86.7% reported having a spiritual practice or belief in a Higher Power, 67.8% thought that calling on a Higher Power might help them quit smoking and 67.7% thought it would be or might be helpful for cessation staff to encourage smokers to include spiritual practice in making a quit attempt.

Preliminary findings suggest that among smokers surveyed at OHSU, the majority are receptive to including their spiritual practice in future quit attempts and believe that including spirituality in cessation programs would be beneficial.

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PO2 45  
**POSITIVE PSYCHOLOGY AND SMOKING CESSATION: A CASE FOR LAUGHTER AS GOOD MEDICINE?**

Michele Pergadia*, Ph.D.1, Bonnie Spring, Ph.D.2,3, Dennis McChargue, Ph.D.2,3, Malia Richmond, M.S.2,3, Tara Kwon, B.A.1, Idong Ekandem, B.A.2, and Timothy Burke, B.A.1, Washington University School of Medicine, 1University of Illinois at Chicago, 2Hines VA Hospital, 3Washington University School of Medicine, 40 N. Kingshighway, Suite-One, St.Louis, MO 63108.

We hypothesized that the positive personal resources, optimism and resiliency, would promote maintenance of abstinence from smoking by enhancing active-coping responses to manage nicotine withdrawal. Forty-five adult smokers, ages 18-65, all of whom had a prior history of depression, participated in a day-long smoking cessation workshop, and subsequently paid to maintain bioverified-abstinence for 48-hours and then followed for 30 days to determine days-to-relapse. Path analyses, using hierarchical-multiple-regression, showed that optimism was not predictive but resiliency (particularly the challenge subscale) predicted more days-smoke-free (r = .367, p < .05). Evidence was mixed about whether increased active-coping during withdrawal mediated the relationship between resiliency and days-smoke-free. Of the active-coping scales, increases in humor mediated resiliency’s ability to enhance abstinence (R2D = .119, p < .05), but decreases in planning also mediated resiliency’s effect (R2D = .092, p = .05). Findings suggest that among smokers vulnerable to depression, those who score higher on resiliency show better maintenance of abstinence from smoking. Resiliency appears to protect against relapse during the early days of nicotine withdrawal by increasing the use of humor and decreasing the use of planning. Findings suggest that, at least among depression-prone smokers, more resilient individuals cope successfully with nicotine withdrawal by laughing a lot and setting plans aside. Perhaps traditional cognitive behavioral approaches that encourage mastery and control are misdirected for resilient individuals, who seem instead to thrive on relinquishing rather than seizing control.

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PO2 46  
**SURROGATES OF CESSATION OUTCOME**

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The relationship between patient spiritual practices and treatment outcomes is receiving greater attention in medicine. Health care providers have begun to assess patients' interest in including personal spiritual practice as part of treatment. Spiritual practice is a key element in many interventions for alcohol and other drug dependencies, but has not commonly been included in interventions for tobacco dependence. Little is known about whether smokers believe they would benefit from including spiritual practice in their attempts to quit. This pilot study investigates current smokers' perceptions regarding the potential benefits of personal spiritual beliefs and practices in making a future quit attempt.

Participants were current smokers observed smoking on the OHSU campus who agreed to complete an 11 item staff administered survey of smoking behaviors and spiritual beliefs and were at least 18 years of age. Of the smokers surveyed by date (n=90) 51% were men and 49% were women. Overall, 86.7% reported having a spiritual practice or belief in a Higher Power, 67.8% thought that calling on a Higher Power might help them quit smoking and 67.7% thought it would be or might be helpful for cessation staff to encourage smokers to include spiritual practice in making a quit attempt.

Preliminary findings suggest that among smokers surveyed at OHSU, the majority are receptive to including their spiritual practice in future quit attempts and believe that including spirituality in cessation programs would be beneficial.

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**PO2 47  REASONS FOR SMOKING AMONG RUMINATORS**

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Many smokers, especially those vulnerable to depression, report smoking to alleviate dysphoric mood states. We examined whether smokers who ruminate and may be at risk for prolonged and heightened dysphoria, endorse smoking to self-medicate their negative moods. We predicted that, among common reasons for smoking, rumination would be positively correlated with smoking for negative affect reduction. Forty-five smokers (45% female, mean age = 41.0 (SD = 12.4), mean Fagerstrom = 5.0 (SD = 2.3)) with a history of MDD attended a one-day smoking cessation workshop and were paid to quit for 48-hours. Before the workshop, participants completed the Why Do You Smoke questionnaire, which assesses motivations for smoking, and the Response Style questionnaire, which assesses the tendency to ruminate over dysphoric moods. Only cases with complete data on these questionnaires (n = 38) were entered into the correlational analysis. Results revealed that, even after controlling for gender and Fagerstrom, rumination was positively correlated with smoking for tension reduction (r = .37, p<.02). Except for handling of smoking paraphernalia (r = .35, p<.03), rumination was not correlated with any other reasons for smoking. Interestingly, the tendency to distract attention away from dysphoric mood, considered a positive way to initially cope with dysphoria, was negatively correlated with smoking for tension reduction (r = -.34, p<.03). Understanding a person’s motivations for smoking may help guide treatment interventions. Given that ruminative smokers appear to smoke in attempt to reduce their negative moods, they may be helped by negative mood regulation techniques during cessation.

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**PO2 48  NICOTINE WITHDRAWAL SYMPTOMS AS SURROGATES OF CESSATION OUTCOME AND POST-CESSATION DEPRESSION**

Lirio Covey, Rene Laje, Alexander Glassman, Fay Stener

The aim of this study was to assess the usefulness of nicotine withdrawal symptoms, assessed globally or individually, as surrogates or predictors of cessation outcome and post-cessation major depression. Data were obtained from 170 subjects who received counseling and placebo in a trial of a cessation drug. To minimize confounding due to continued tobacco use, only subjects who had either stopped smoking completely or reduced their smoking intake by at least 80% of baseline level within 3 days of Quit Day were included. Subject characteristics were: 52% female, 28% had a history of major depression, mean age=45.3 years (S.D.=11.1), mean cigarettes smoked daily=31.6 (S.D.=12.2), and mean FTQ score =6.9 (S.D.=1.3). Self-ratings on craving and 7 DSM-IV nicotine withdrawal symptoms (irritability, anxiety, restlessness, difficulty concentrating, appetite increase, and sleep difficulty) were obtained. The emergence of withdrawal symptoms was indicated by an increase in ratings on these symptoms between baseline and at the end of the first week following Quit Day. Week 1 data showed that withdrawal ratings increased across all symptoms, with greater changes among those who were partial abstainers than complete abstainers. The greatest changes occurred for craving and appetite increase; least for depression and anxiety. The total withdrawal score was not associated with treatment outcome (p=.12). However, when individual symptoms were examined in a simultaneous backward logistic regression, independent effects were observed for anxiety (p=0.03) and appetite increase (p=0.05). On the other hand, the total withdrawal symptom score showed an association with post-cessation major depression (p=0.06), and analysis of specific symptoms indicated, again, a predictive effect of anxiety (p=0.03).

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**PO2 49**  
**EFFECTS OF STRESS AND COPING ON TOBACCO TREATMENT**

*Thomas Payne, Ph.D., Karen Cropsey, Ph.D., Pam Martin, Ph.D., Jennifer McClure, Ph.D., Shawn Jeffries, Ph.D., Sheryl Catz, Ph.D., Mark Vander Weg, Ph.D., Ken Ward, Ph.D., Patrick Smith, Ph.D., and John Benesek, Psy.D.*, The University of Mississippi Medical Center

This study examines the impact of stressors and coping strategies on treatment-related variables. The 747 VAMC patients averaged 53.1 years of age, were Caucasian (69.9%) or African-American (29.2%), primarily male (86.9%), with a mean FTND score of 6.4 and 12.11 years education. Primary measures were the FTND, Weakly Stress Inventory, and Coping Strategies Inventory; outcomes included cessation status, session attendance (maximum = 6), smoking rate and tobacco withdrawal symptoms (sessions 1, 3, 6).

FTND and WSI scores predicted cessation. Number of sessions attended was predicted by Engagement coping style. Smoking rate was related to WSI score and Emotion-focused Engagement coping. Withdrawal score demonstrated significant relationships with the WSI, and Engagement, Disengagement, Emotion-focused Engagement, and Emotion-focused Disengagement coping. Of interest was the WSI x Emotion-focused Engagement x Time interaction for Withdrawal score, suggesting a moderating role of coping on the relationship between stress and withdrawal. Somewhat unexpectedly, WSI score and several coping dimensions were related to the FTND. Analyses of additional outcome measures (e.g., treatment follow-up) will be presented. Multivariate analyses will be conducted to identify relationships among sets of variables. Results will be conceptualized within a stress and coping model.

This study was completed while the first author was at the VA Medical Center in Jackson, MS. This work was not supported by extramural funding.

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**PO2 51**  
**LOW ATTACHMENT TO OTHERS INFLUENCES NICOTINE DEPENDENCE AMONG COLLEGE STUDENTS WHO ARE DEPRESSED AND SHY**

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University of Illinois Chicago and the Hines VA Hospital

Despite evidence that young adults who are socially detached from their parents and friends have an increased likelihood of initiating and maintaining smoking, mechanisms explaining this relationship are unknown. Psychosocial factors, like depression and shyness, may help explain the process through which detached individuals become dependent on nicotine. We tested the hypothesis that depression and shyness would either mediate or moderate the relationship between attachment and nicotine dependence.

Seventy-three undergraduates who averaged 19.8 years (49.3% female) participated in the study. Hierarchical regression analyses were conducted with ethnicity and state anxiety entered as covariates. Results showed that attachment predicted 6% of the variance in nicotine dependence (p < .01). Depression scores fully mediated this relationship as evidence by the elimination of the attachment-dependence relationship after controlling for depression. All other mediation requirements were met (p < .05). Shyness also moderated the influence of attachment on nicotine dependence (p < .05).

In essence, lower levels of attachment on nicotine dependence were explained by depression and were enhanced by shyness. Our findings lend support to the notion that affective and social vulnerabilities that act as barriers to forming appropriate attachments with others may substantially promote nicotine dependence among young adults.

This study was supported by VA Merit Review Entry Program grant and NIH grant K08 DA00467 to Dennis McChargue.

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**PO2 50**  
**IS MATERNAL DEPRESSION ASSOCIATED WITH EARLIERAGE OF CIGARETTE INITIATION AND GREATER QUANTITY SMOKED BY ADOLESCENTS?**

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Research has shown that the earlier a child begins to smoke and the more cigarettes smoked per day, the greater the risk for nicotine addiction. This longitudinal study examined the effects of maternal depressive symptoms on the age of onset and quantity of cigarettes smoked among 14-year-olds.

Depressive symptoms in the mothers were measured using the Center for Epidemiological Studies Depression Scale (CES-D). Maternal depression scores from the most recent follow-ups (children’s ages 10 and 14) were used in the analyses. Child’s self-reported age of initiation and cigarette quantity were collected at age 14.

Among 527 adolescents, 235 reported ever smoking. Average age of initiation for children of depressed mothers was 11.35 versus 12.04 for children of non-depressed mothers (p=0.04). Average daily cigarette quantity was 4.05 for children of depressed mothers versus 1.88 for children of non-depressed mothers (p=0.041).

Using regression analyses, maternal depressive symptoms at the 10-year assessment predicted earlier age of onset [b=-0.8, p=0.017] and greater daily cigarettes smoked among the 14-year-olds [b=1.8, p=0.021]. These analyses controlled for income, race, gender, presence of man in household, and mother’s and peer’s cigarette use. However, mother’s current depressive symptoms were not associated with either outcome. These data suggest that maternal depressive symptoms that occur prior to the onset of child’s cigarette use is a risk factor for earlier use and greater cigarette quantity smoked among adolescents.

This study was supported by NIDA (DA03872), NICHD (HD36890), NIAAA (AA06666), NIMH (MH15169).

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**PO2 52**  
**SMOKING CESSION AND MAJOR DEPRESSION: FAMILIAL ASSOCIATION AND GENDER EFFECTS**

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We examined the familial association of DSM-IV major depression (MDD) and two measures of smoking cessation in a genetically informative sample of adult (24 to 36 years old) Australian female and male twins interviewed by telephone survey in 1996-2000. Smoking cessation measures included (i) ‘difficulty quitting’ defined as respondent’s inability, on more than one occasion, to cut down or stop smoking, and (ii) ‘smoking status’ defined as being a current or ex-smoker. Significantly more men than women regular smokers (smoked 100+ cigarettes lifetime, n=3159) reported difficulty quitting (52.4% vs. 47.3%) and current smoking (68.5% vs. 58.7%). In women, MDD predicted increased risk of difficulty quitting and current smoking both before and after controlling for other psychopathology (ORs=1.3 to 1.4); in men, MDD was significantly associated with difficulty quitting before (OR=1.8) and after (OR=1.5) controlling for other psychopathology, but not with current smoking status. Magnitude of genetic influence on difficulty quitting and current smoking did not differ significantly across gender; 34% of the variance in both cessation measures was attributable to additive genetic factors and there was little evidence for an important role for environmental factors shared by family members. Controlling for the effects of MDD, we found estimates of the residual additive genetic influences on difficulty quitting (32% (19%-45%)) and current smoking (35% (21%-48%)) to be similar to the unadjusted estimates, indicating that MDD does not mediate genetic influences for these smoking cessation measures. Our results suggest that MDD cannot account for genes associated with smoking cessation in the short- or long-term.

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NICOTINIC RECEPTOR INVOLVEMENT IN THE ANTIDEPRESSANT EFFECTS OF NICOTINE IN FAWN-HOODED RATS

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A strong positive association between depression and smoking is evident by epidemiological studies. This has led to the hypothesis that smoking may be an attempt at self medication with nicotine by some depressed individuals. Indeed, antidepressant effects of nicotine in several animal models of depression have been recently demonstrated. Fawn-Hooded rats show depressive characteristics as evidenced by their immobility in the forced swim test (FST). Administration of nicotine to these animals reduces their immobility in the FST. In this study we sought to determine whether the antidepressant effects of nicotine in this animal model may be blocked by pre-administration of the nicotinic antagonist, mecamylamine. Adult male Fawn-hooded rats (N=9/group) were treated with a single dose of nicotine (0.4 mg/Kg, SC) or mecamylamine (0.5 mg/Kg, SC) followed by nicotine. Controls received saline. Nicotine significantly (p < 0.01) reduced the immobility in the FST. Pretreatment with mecamylamine almost completely blocked the effects of nicotine on immobility in the FST. Mecamylamine, at least at relatively lower concentrations, may be a more selective antagonist of the high-affinity nicotinic receptors. Interestingly, Fawn-Hooded rats also show a lower [3H]cytisine binding (selective for the high affinity nicotinic receptor subtype) in the striatum. Collectively, these data suggest involvement of the high-affinity nicotinic receptors in the antidepressant effects of nicotine in Fawn-Hooded rats. However, further studies are required to confirm this hypothesis.

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ANTIDEPRESSANT EFFECT OF NICOTINE IN WKY RATS, A PROPOSED ANIMAL MODEL OF DEPRESSION

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Wistar-Kyoto (WKY) rats show exaggerated immobility in the forced swim test (FST) compared to their control, Wistar rats. Because exaggerated immobility in the FST is reflective of depressive characteristics, WKY rats may be considered an animal model of depression. Antidepressant effects of nicotine in Flinders Sensitive Line (FSL) rats, another postulated animal model of depression have been previously demonstrated. In this study we sought to determine whether nicotine may also act as an antidepressant in WKY rats. Adult female WKY and Wistar rats (N=8/group) were treated with nicotine either acutely (0.2 mg/Kg, i.p., single injection), or chronically (0.2 mg/Kg, i.p., twice daily for 9 consecutive days). Pretreatment with the nicotinic antagonist mecamylamine almost completely blocked the effects of nicotine on immobility in the FST. Mecamylamine, at least at relatively lower concentrations, may be a more selective antagonist of the high-affinity nicotinic receptors. Importantly, Fawn-Hooded rats also show a lower [3H]cytisine binding (selective for the high affinity nicotinic receptor subtype) in the striatum. Collectively, these data suggest involvement of the high-affinity nicotinic receptors in the antidepressant effects of nicotine in Fawn-Hooded rats. However, further studies are required to confirm this hypothesis.

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THE INFLUENCE OF SMOKING ON THE PSYCHOPHYSIOLOGICAL ASSESSMENT OF PTSD

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In PTSD subjects, numerous studies have reported increased psychophysiological reactivity to trauma-related stimuli with elevated heart rate, skin conductance and facial electromyogram responses noted. Studies of neuroendocrine levels in PTSD have also been studied extensively but have yielded varying results. Researchers have shown a link between PTSD and smoking in male and female populations with various trauma histories. However, it is currently not known if the findings of psychophysiological hyperreactivity or neuroendocrine response to trauma-related stress are associated to smoking. The study reported here involves an examination of the influence of smoking on psychophysiological and neuroendocrine domains in a sample of 74 women with PTSD who experienced childhood sexual abuse. Nineteen women were current smokers. There were no other significant differences between the women with PTSD who smoked and nonsmokers on demographic variables. Women with PTSD who smoked had significantly higher baseline resting heart rates, shorter intervals between heart beats and a trend toward an exaggerated pre-ejection period measure compared to nonsmoking women in the psychophysiological assessment using impedance cardiography. Women with PTSD who smoked also showed a significantly elevated epinephrine level at baseline with a trend for increased cortisol at baseline compared to nonsmokers. These findings suggest that biological abnormalities associated with PTSD may be related to nicotine use. Future studies should take into account the smoking status of the clinical population and control for smoking in the design as well as interpretation of results.

CORRESPONDING AUTHOR: Nancy C. Bernardy, Ph.D.

SMOKING CESSION EFFORTS AMONG SUBSTANCE ABUSERS WITH AND WITHOUT PSYCHIATRIC COMORBIDITY

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Smoking prevalence remains high among individuals with substance use disorders and psychiatric disorders. Little is known about the impact of substance use treatment on smoking behavior, particularly among individuals with comorbid substance use and psychiatric disorders. This study examined spontaneous smoking cessation efforts among 120 substance abusers with and without psychiatric comorbidity. Participants completed an assessment of smoking prior to and again 6 months following treatment for substance abuse. A larger proportion of substance abusers with comorbid psychiatric disorders made quit attempts (54%), relative to those without psychiatric disorders (35%). The groups did not differ on the number of quit attempts made or days abstinent from cigarettes. The presence of psychiatric disorders in conjunction with a SUD does not appear to deter spontaneous smoking cessation efforts in early recovery.

This study was conducted at the VAMC San Diego Healthcare System. Supported by the VA Merit Review Grant #306.

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**PO2 57**  
**CIGARETTE SMOKING AMONG MARIJUANA VERSUS OTHER ILLICIT DRUG USERS**  
Richter K.R., Ahluwalia H.K., Resnicow K., Nazir N., Mosier M.C., Ahluwalia J.S.

AIMS: Most illicit drug users are marijuana users. We examine the strength of association between marijuana use and cigarette smoking, ascertain whether associations persist when controlling for other illicit drug use, and compare the marijuana/smoking relationship to the “hard” drug/smoking relationship.

**DESIGN, SETTING, AND PARTICIPANTS:** We used adult responses to the 1997 National Household Survey on Drug Abuse (n=16,661). Multivariate analyses used SUDAAN to account for sampling weights and controlled for age, race, sex, education, depression, treatment history, and alcohol use.

**MEASUREMENTS:** Past-month cigarette, alcohol, marijuana, and other drug use; non-recent marijuana use.

**FINDINGS:** Most (74%) marijuana users smoked cigarettes. The adjusted odds of being a smoker were 3.5 for recent marijuana users compared to non-marijuana users (P<.001). Non-recent marijuana users were also significantly more likely to be smokers. These odds were greater than the odds for smoking among mono-drug users and poly-drug users compared to non drug users (1.53 and 2.9 to 1, P<.0019).

Heavy marijuana users were heavier smokers.

**CONCLUSIONS:** Marijuana users are more likely to smoke than non-marijuana users and, surprisingly, more likely to smoke than other illicit drug users including poly-drug users. Links between marijuana and adverse health outcomes are tenuous, but cigarette-related mortality and morbidity are well documented. Due to the high prevalence of smoking, the strong association between cigarette and marijuana use, and the continued high risk for smoking when marijuana use is discontinued, marijuana users may experience more harm from tobacco than marijuana.

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**PO2 58**  
**INDUCTION BY NICOTINE OF ETHANOL-INACTIVATING AND PRO-CARCINOGEN ACTIVATING CYP2E1**  
Alina L. Micu, B.Sc., Lisa Howard, B.Sc., Sharon Miksys, Ph.D., and Rachel F. Tyndale, Ph.D., Department of Pharmacology, University of Toronto

Ethanol (EtOH) and Nicotine (Nic) are commonly used and co-abused drugs. CYP2E1 metabolizes EtOH and can generate toxic intermediates. CYP2E1 also bioactivates tobacco-smoke and other procarcinogens and several hepatotoxins. CYP2E1 activity is induced by EtOH and by other exogenous and endogenous substrates as well as by some pathophysiological states. In humans, cigarette smoking significantly increases CYP2E1 activity, as measured by chlorzoxazone metabolism in vivo. Recent data produced in our laboratory suggests that, like EtOH, Nic itself increases CYP2E1 activity in the rat liver. We hypothesized that very low doses of Nic, equivalent to passive smoking in humans, can also induce hepatic CYP2E1.

Rats were treated once daily with saline or Nic bitartrate (0.003, 0.01, 0.03, 0.1 and 1.0 mg base/kg s.c.). Using quantitative immunoblotting, we found significant induction of hepatic CYP2E1 with an ED50 of 0.004 mg/kg. Nic known mechanisms for induction of CYP2E1 include transcriptional, post-transcriptional and post-translational regulation. CYP2E1 mRNA levels were not altered by Nic treatment suggesting post-transcriptional regulation. Our findings suggest that Nic, which is present in tobacco smoke at several-fold higher concentrations than any other potential CYP2E1 inducers, may increase CYP2E1-induced toxicity in smokers, passive smokers and people treated with nicotine (e.g., smokers, patients with Alzheimer’s disease, ulcerative colitis, neuropsychiatric motor disorders), and may contribute to the pathologies and cross-tolerance observed in alcoholics and smokers.

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**PO2 59**  
**BUPROPION-SR TREATMENT FOR SMOKING AMONG ALCOHOLICS**  
Maher Karam-Hage, M.D., and Kirk J. Brower, M.D., University of Michigan Addiction Research Center and Department of Psychiatry

Smoking is still a common problem with devastating consequences to the general population and, in particular, to alcohol-dependent patients because of its higher prevalence (70-80% of alcoholics are smokers). During the last 10 years, published prospective trials have linked quitting (vs. smoking) cigarettes to reduced relapse rates in treated alcoholic and other patients with substance use disorders. Existing data correlate smoking with both craving for alcohol and relapse. We report a naturalistic clinical series consisting of 27 alcoholic patients, who received at least one month of treatment for alcohol dependence and expressed interest in quitting smoking within one to 6 months of abstinence from alcohol. They smoked a mean of 26.8 cigarettes/day (SD=11.9; range=20-60), and 24 out of 27 (89%) had a comorbid Axis I psychiatric diagnosis. More than half of the sample had health problems related to smoking, mainly respiratory (i.e., emphysema, asthma, chronic bronchitis). Most patients (21/27) were started on bupropion-SR 150 mg qAM x 7 days and the other 6 (22%) were started on 100 mg qAM (due to pre-existing problems with anxiety or insomnia). On day 8, both groups were increased to twice a day administration of their starting dose. At 2-3 weeks (after 1-2 weeks of BID dosage) patients were followed and they reported that decreased the number of cigarettes smoked (mean of 8.6 ± SD 6.2) because of: “low interest in smoke”, or “not thinking about cigarettes” as they used to, and even “having nausea like” or “distasteful experiences” when smoking a cigarette or smelling others’ smoke.

A paired-samples t-test showed significant decline in number of reported smoked-cigaretes from pre- (26.8 ±11.9) to post-bupropion (8.6 ± 6.2) at p<0.001. In ten patients we collected breath CO levels as a marker for the reported decline in smoking. The decline from baseline (mean = 23.3 ± 13.5; range=11-50) to follow-up (mean = 12.2 ± 7.9; range = 4-31) was significant (p=0.014). The second and third follow-ups did reveal no difference in those parameters (one month intervals after first follow-up). None of the patients relapsed to alcohol during this time but 2 did not follow at 3 months. Further visits for up to a year among 14 of them revealed ongoing abstinence from alcohol in most patients (3 patients had 1-2 slips each as determined by self-report). Eleven out of the remaining 25 (44%) did not follow-up at one year, we had to assume a big number were drinking, smoking or both.

Seven (26%) patients managed to quit smoking and stay quit up to 3rd follow-up. Further controlled studies are needed to test the efficacy and effectiveness of bupropion for smoking cessation among alcoholics and other drug users.

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PO2 60  SMOKING AND DRINKING FOLLOWING SUBSTANCE USE TREATMENT: SUPPORT FOR THE PRIMING HYPOTHESIS

Marina Unrod, Ph.D.*, Mark Myers, Ph.D., Travis Cook, B.A., and Sandra Brown, Ph.D., University of California San Diego/VAMC San Diego

The relationship between tobacco and alcohol use following treatment for substance use disorders has several important clinical and theoretical implications. The data remain unclear with regard to whether smoking serves as a coping strategy (coping hypothesis) or is a risk factor for relapse (priming hypothesis) in early recovery. The present study is an extension of previous research examining the relationship between smoking and drinking among 100 smokers with and without psychiatric comorbidity following treatment for substance abuse. Participants completed an assessment of smoking and drinking prior to and again 6 months following treatment. Six months following treatment, smoking rates decreased for 54% of the sample and increased for 27%. Smoking behavior changes were unrelated to participants’ psychiatric comorbidity status. Quantity of daily cigarette use positively correlated with number of drinking days, number of drinks, and average drinks per drinking day, 6 months following treatment. Participants who decreased their smoking quantity had fewer number of drinking days, fewer total number of drinks, and fewer average drinks per drinking day 6 months following treatment. Results are consistent with previous research indicating spontaneous reduction in smoking rate among a large proportion of smokers following substance use treatment. Current findings are consistent with the priming hypothesis that predicts a positive relationship between drinking and smoking.

This study was conducted at the VAMC San Diego Healthcare System. Supported by the VA Merit Review Grant #306.

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PO2 61  WOMEN WHO ARE TOBACCO AND ALCOHOL DEPENDENT: HOW ARE THEY DIFFERENT?

Joy M. Schmitz, Angela L. Stotts, Patricia Hokanson, Shelly Sayre, Katherine DeLaune Substance Abuse Research Center, University of Texas–Houston

There is evidence that women, as compared to men, may smoke less for nicotine and more for non-nicotine effects of smoking such as external cues. The extent to which this holds true among women who are tobacco and alcohol dependent is unknown but could have implications for level of motivation to quit smoking. In this study we compared female alcoholic (N = 44) and nonalcoholic (N = 50) smokers on measures of nicotine dependence, smoking cues, motivation to quit, and psychological state. The GLM multivariate procedure was used to test for the effects of group on each set of dependent variables. For nicotine dependence (years smoking, baseline smoking rate, FTND, QSU, CO level, cotinine level, and nicotine withdrawal (NWF)), the group effect approached significance (p = .09) with NWF scores higher among alcoholic (M = 10.1) than nonalcoholic women smokers (M = 7.1, p = .08). No group differences were found for smoking cues (Social, Negative Affect and Craving subscales of the Smoking Confidence Questionnaire) or for motivation to quit smoking (Self-Efficacy and Processes of Change scores). For psychological state, which included depression (BDI) and perceived stress (PSS), the group effect was statistically significant (p < .0001) with BDI scores higher among alcoholic (M = 13.7) than nonalcoholic women smokers (M = 7.3, p < .0001). These preliminary analyses indicate that women who are tobacco and alcohol dependent experience more severe nicotine withdrawal and depressive symptoms. The significance of these findings with respect to being potential barriers to smoking cessation will be discussed.

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PO2 62  TOBACCO SMOKING AND PSYCHIATRIC AND SOCIAL PROBLEMS AMONG FOUR DRUG ABUSE GROUPS

Allan Lundy, Ph.D.*, Bradley R. Meier, Ph.D., and Ashwin A. Patkar, M.D., Jefferson Medical College

Although tobacco smoking in the general population has declined in recent decades, 65% - 95% of abusers of illicit drugs still smoke. Thus, substance abusers are far more likely to die from smoking-related illnesses than from illicit drug use. As part of an ongoing exploration of ways to improve treatment services to high-risk populations, this presentation focuses on psychiatric and social problems related to smoking in four substance-abusing groups: opiate abusers, powder cocaine users, crack smokers, and marijuana users. Tobacco use among crack and marijuana users is particularly interesting, as all three substances share the same mode of ingestion. At our inner-city substance abuse clinic, we have for years included the Fagerstrom Test for Nicotine Dependence (FTND) in our intake procedure. The current sample includes 55 opiate abusers, 29 who use cocaine in powder form, 141 crack smokers, and 52 marijuana users. In addition to the expected differences in smoking habits across the groups, some relationships between smoking and psychiatric and social problems varied across the groups. For example, total FTND scores and alcohol use were related among marijuana users (r = .39, p < .05) as in the general population, but not among the other groups (r = -.20 to .14). FTND scores were also highly related to a number of psychiatric indicators among opiate abusers (e.g., Addiction Severity Index psychological composite scores, r = .60, p < .01), but much less so among the other groups. Relationships between specific smoking behaviors and various social/behavioral problems also differed across groups. We hope eventually to use this and other information to tailor smoking cessation counseling to specific substance abusing populations.

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PO2 63  SMOKING STATUS AND SUBSTANCE USE SEVERITY IN A RESIDENTIAL TREATMENT SAMPLE

Marc L. Steinberg, M.A.*, Jonathan A. Krejci, Ph.D., and Douglas M. Ziedonis, M.D., M.P.H., Robert Wood Johnson Medical School

Cigarette smoking (n = 208) and non-smoking (n = 165) individuals seeking residential treatment for substance abuse and identifying alcohol as their major problem substance on the Addiction Severity Index were compared on demographic, substance use, and psychiatric variables. The sample was 47.8% female and 94.7% Caucasian with an average age of 36.98. Smokers were younger (F(1,319) = 25.264, p < .001), less educated (F(1,317) = 17.724, p < .001), and more likely to be male (Chisquare[1] = 9.478, p < .001) when compared to non-smokers. Hierarchical regression equations tested the hypothesis that the unique variance contributed by smoking status would predict substance use severity variables. A significant change in R squared after entering covariates in the first block of the regression would suggest that the unique variance associated with smoking status significantly predicted the dependent variable of interest.

As hypothesized, smoking continued to significantly predict days of drug problems (p < .001), alcohol use (p < .036), and intoxication (p < .028) in the previous 30 days even after adjusting for age, education, and gender via regression analyses. More impressively, smoking status predicted days of alcohol problems (p < .004) even when controlling for days of alcohol use via regression analyses. In addition, smoking was a significant predictor of days of psychiatric problems even after adjusting for demographic variables. It is concluded that cigarette smoking is a marker for substance use severity or for characteristics that contribute to substance abuse severity.

This study was conducted at Pavilion International Treatment Program in North Carolina in conjunction with the Division of Addiction Psychiatry at Robert Wood Johnson Medical School. No outside funding source.

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**PO2 64**

**NICOTINE AND ALCOHOL USE AMONG ADJUDICATED ADOLESCENTS**

David F. Rubenstein, Psy. D.*, Leo Korein, Victor Lidz, Ph. D., and Shilpa Saroo, M.S., MCP Hahnemann University

Adolescent nicotine and alcohol use is a major problem in the U.S. with far-reaching and multi-dimensional negative consequences. Cigarette smoking is strongly correlated among adolescents with alcohol use and initiation of other illicit substances. Adolescent alcohol abuse can often lead to impaired judgment and reasoning resulting in unprotected sex, drunk driving, or sexual victimization. Long-term nicotine and alcohol abuse can also lead to an increased vulnerability of acquiring severe medical conditions including liver, pulmonary, cardiovascular, and gastrointestinal diseases. Despite the numerous health risks, over the past decade cigarette smoking has increased among 8th, 10th, and 12th graders. In addition, 18.6% of adolescents aged 12-17 have reported using alcohol in the past month. Levels of nicotine and alcohol use and their adverse effects appear to be greater among adjudicated adolescents. In our study of adjudicated adolescents referred for substance abuse treatment, the rate of tobacco and alcohol use was much higher than has been reported for representative samples of adolescents. Mean age of onset for nicotine use was also markedly younger. The adolescents’ histories suggest that early tobacco smoking may also have been related to early initiation of alcohol use and early abuse of dependence on illicit drugs. Drug abuse treatment and social service programs for high-risk youth often ignore smoking and drinking. We argue that smoking cessation and prevention of alcohol abuse should be integral to all substance abuse treatment, both to help abuse of illicit drugs and to prevent long term medical disorders.

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**PO2 65**

**EARLY EXPERIENCES WITH TOBACCO AND ALCOHOL IN CURRENT DAILY SMOKERS**

Judith L. Marks, Ph.D.*, Cynthia S. Pomerleau, Ph.D., Ovise F. Pomerleau, Ph.D., U of MI

Initial sensitivity to nicotine and alcohol may affect patterns of future use and dependence. Individuals sensitive to nicotine’s rewarding effects are more likely to become smokers, whereas negative effects fail to predict smoking status. High sensitivity to alcohol’s effects (increased body sway/subjective intoxication) has been related to decreased alcoholism risk, though a differential impact for positive and negative effects has not been reported. Since smoking and alcohol use are strongly linked in humans, and animal studies indicate cross-sensitivity, it seems plausible that initial sensitivity to both substances might be associated in humans.

We studied 341 current smokers (81.2% women; 81.5% Caucasian), age=33.01 (SD=10.3), smoking 18.9 (SD=8.16) cigarettes/day. Of these, 173 (50.7%) tried cigarettes before alcohol, 75 (22.0%) tried both at the same age, and 93 (27.3%) tried alcohol before cigarettes. Ratings of first experience with alcohol and cigarettes (pleasure, displeasure, nausea, relaxation, dizziness, headache, and pleasurable “buzz”) were significantly but modestly correlated and ranged from .14, p<0.008 for dizziness to .28, p<0.0001 for relaxation. CAGE score (positive GE2) was related to pleasurable effects, relaxation, and dizziness from the first drink, and displeasurable effects, buzz, and headache from the first cigarette. FTQ was significantly related to pleasurable effects (r=.12, p<0.03) and dizziness from the first cigarette but showed no relationship with initial effects of alcohol. Since animal studies indicate that common genetic factors may determine initial sensitivities to both ethanol and nicotine, our findings suggest that research on common genetic mechanisms in humans may shed further light on vulnerability to dependence on nicotine and alcohol.

**Supported by DA06529.**

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**PO2 66**

**RELIABILITY OF REPORTS OF INITIAL REACTIONS TO SMOKING EPISODES**


Reactions to initial smoking episodes may help explain why some youth go on to become regular smokers, whereas others do not. For this reason, researchers have become increasingly interested in initial reactions to smoking (IRTS); however, most often IRTS are measured retrospectively, and their reliability has not been examined.

We assessed 372 youths from a larger study, identifying all participants who were initial non-smokers, later reported smoking, and responded to IRTS items in two consecutive annual surveys. IRTS items asked participants whether they experienced the following symptoms during their first smoking event: coughing, feeling sick, feeling dizzy, feeling high, or feeling relaxed. We computed Cohen’s kappa for IRTS items to determine agreement between Time 1 and Time 2 reports. We also assessed whether the IRTS items performed better as predictors of future smoking, or as correlates of current smoking intensity. Participants were divided into regular smokers (at least weekly) and experimental smokers to create the dependent variable. Using logistic regression, we generated two models, one for each IRTS items set, and compared them using the Bayesian Information Criteria (BIC).

Kappa values for most IRTS demonstrated weak reliability over time (0.22-0.32). However, the symptoms of “feeling dizzy” and “coughing” demonstrated moderate agreement beyond chance (0.41-0.45). Comparison of model fit using the BIC revealed that IRTS items, as a set, are better correlates of current smoking than predictors of future smoking. Correlates of regular smoking included “feeling relaxed,” “coughing” (negative association), and “feeling dizzy.” The only prospective predictor of regular smoking was “feeling high.”

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**PO2 67**

**METHADONE PATIENTS’ VIEWS ON THE RELATIONSHIP OF CIGARETTE SMOKING TO DRUG USE AND DRUG TREATMENT**

Robert M. McCool, M.S.*; Kimber P. Richter, Ph.D., M.M.H.; Matthew S. Mayo, Ph.D.; University of Kansas Medical Center

Most persons using illicit drugs smoke cigarettes. As groundwork for future experimental research, we conducted exploratory focus groups and interviews with 78 patients from 5 Methadone Maintenance Treatment (MMT) centers. Participants included either cigarette smokers who had a) never tried to quit, b) had quit and relapsed, or c) who had quit permanently. Patients were prompted through survey and open-ended questions to discuss the relationship between their smoking, methadone use, and drug treatment. Patients also spontaneously described their smoking and illicit drug use. We audiotaped, transcribed, and coded discussions using Nudist4 qualitative software. Patients’ comments regarding their reasons for smoking reflected environmental, psychological, and physiological influences. Environmental factors included proximity to smoking peers and treatment professionals. Psychological factors included boredom, frustration, and anger that patients attributed to drug and treatment dependency. Physiological factors included smoking to neutralize the flavor of methadone, manage withdrawal, and increase enjoyment of drug use. To identify intervention strategies for treatment providers, future research should explore 1) how drug use and treatment influences— or even reinforces— cigarette smoking, 2) how providers can reduce systemic cues to smoke within substance use treatment, and 3) methods that drug treatment patients have used to effectively quit smoking. In addition to the above, other influences on patient smoking and recommendations will be discussed.

This study was conducted while the first author was at KUMC. Supported by CSAP (6 T36 ST08354), NIDA (K01 DA00450), and RWJF Generalist Physician Faculty Scholar Award (035866).

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PO2 68  TOBACCO SMOKING AND TREATMENT OUTCOME IN COCAINE DEPENDENCE

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Despite a close association between tobacco and cocaine use, whether smoking predicts an adverse outcome for cocaine-dependent patients has not been systematically studied. We investigated whether severity of nicotine dependence was related to treatment-outcome for cocaine-dependent individuals. Standardized assessments of nicotine dependence (FTND), cocaine use and personality were obtained for 105 African-American cocaine-dependent outpatients. Outcome measures included negative urine drug screens (UDS), days in treatment, dropout, and number of treatment sessions attended. The sample was stratified into cocaine-positive and cocaine-negative groups based on admission UDS and relationships between nicotine dependence and outcome measures were examined in each group. In the cocaine-negative group, patients with higher FTND scores were more likely to use cocaine during treatment and to drop out of treatment while FTND scores were not related to outcome in the cocaine-positive group. It seems that severity of tobacco use predicts poor outcome for cocaine-dependent patients who are cocaine-free at the time of admission into outpatient treatment.

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PO2 69  PSYCHOSOCIAL VARIABLES RELATED TO SMOKING TREATMENT IN HIV-POSITIVE SMOKERS

Gary Humfleet, Ph.D.*, University of California, San Francisco

High smoking rates are found in HIV-positive populations. Cigarette smoking increases the likelihood of serious HIV-related medical conditions. Thus, it is important to develop effective treatments for HIV-positive smokers. Psychosocial variables related to smoking treatment outcome have not been studied in HIV-positive smokers. This study investigates psychosocial variables related to smoking cessation as a function of HIV status in a sample of 68 HIV-positive and 67 HIV-negative gay/bisexual male smokers. Each participated in a one-time interview and survey assessing incidence of major depressive episodes (MDE), negative mood, perceived health control, optimism, perceived stress, level of nicotine dependence, and smoking stage of change. It was hypothesized that HIV-positive smokers would report higher rates of MDE, higher levels of negative mood and stress, lower levels of optimism, and lower levels of perceived health. Mean age was 39. Mean daily cigarettes = 19.4. Mean FTND score was 5.0. Contrary to the hypotheses, HIV-positive and HIV-negative smokers did not differ on measures of negative mood, perceived health control, optimism, or perceived stress. However, both groups had significantly higher negative mood scores than a community sample of male smokers collected independently. HIV-positive and HIV-negative smokers also reported very high rates of MDE, 68% and 53% respectively. Significant differences were found on stages of change with HIV-positive smokers reporting higher rates of contemplation and preparation for quitting than HIV-negative smokers (p<.003). Findings suggest that HIV-positive and HIV-negative gay male smokers have high levels of negative mood and history of depression which should be considered when developing smoking treatment interventions.

Supported by California TRDRP Grant 91T-0234.

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PO2 70  SMOKING CESSION IN A MULTI-ETHNIC HIV-POSITIVE POPULATION

Damon J. Vidrine, M.S., Amy B. Lazev, Ph.D., Ellen R. Gritz, Ph.D., UT—M.D. Anderson, Roberto C. Arduino, M.D., UT—Houston Medical School

A series of structured interviews was conducted with a sample (n=49) of current smokers receiving care at a county-funded inner-city HIV/AIDS clinic in Houston, Texas. The objectives of these interviews were to assess interest in participation in a smoking cessation program and to identify possible barriers to participation. Demographic composition of the sample was as follows: 79% male, 22% White, 61% Black, and 16% Hispanic. The mean (+/-SD) age was 41+/-8.6 years. Participation barriers included lack of access to a telephone (59%), high number of household moves (61% reported at least one move), and lack of transportation (95%). Examining the number of moves and lack of telephone access together, 74% of the participants either moved or had their phone service disconnected within the past year. Participants were asked a series of items designed to assess interest in smoking cessation interventions. Eighty-three percent of the participants reported they were at least moderately interested in quitting smoking, and 37% reported that they were extremely interested in quitting smoking. A behavioral intervention consisting of personal sessions with a smoking cessation counselor was more highly endorsed than a behavioral intervention consisting of group counseling sessions. Participants expressed more willingness to complete follow-up study assessments if they were not required to make additional visits to the clinic. These findings demonstrate the need for a smoking cessation intervention for this population, the population’s receptiveness to such an intervention, and important barriers to consider in the design of an intervention.

This project was funded by UT M.D. Anderson Cancer Center.

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PO2 71  SMOKING BEHAVIOR IN A MULTI-ETHNIC HIV-POSITIVE POPULATION

Ellen R. Gritz, Ph.D., Damon J. Vidrine, M.S., UT—M.D. Anderson, Roberto C. Arduino, M.D., UT-Houston Medical School, Benjamin C. Amick, Ph.D., UT—Houston SPH

The purpose of this cross-sectional pilot study was to describe the smoking behavior of an HIV-positive, low SES, multi-ethnic target population. Questionnaires were collected from 348 consecutive patients receiving care at a county-funded inner-city HIV/AIDS clinic in Houston, Texas. Demographic composition of the sample was as follows: 78% male, 25% White, 44% Black, and 29% Hispanic. The mean (+/-SD) age was 40+/-7.9 years. Forty-five percent of the participants were infected through heterosexual contact, 35% through heterosexual contact, and 11% through drug use. The prevalence of current smoking in the sample was 47%—mean of 15+/-10.9 cigarettes per day. The mean age at which respondents began smoking was 17+/-5.5 years and the mean number of years smoked was 22+/-10. The population had a relatively high level of nicotine addiction—63% reported smoking their first cigarette of the day within 30 minutes of waking. Several demographic and behavioral variables were significantly associated with smoking status. Females were less likely to be smokers (OR=0.53, 95% CI 0.30-0.92). Hispanics were less likely to smoke compared to Whites (OR=0.35, 95% CI 0.19-0.66). Current alcohol use (OR=3.1, 95% CI 1.9-5.0) and current drug use (OR=2.4, 95% CI 1.4-4.1) were significantly associated with smoking status. Together with the literature that links smoking among HIV/AIDS patients to numerous adverse health outcomes, the high prevalence of smoking observed in this pilot study provides a strong rationale for a smoking cessation intervention targeted to the specific needs of this population.

This project was funded by UT M.D. Anderson Cancer Center.

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PO2 72  SMOKING CHARACTERISTICS OF LUNG CANCER PATIENTS AND THEIR FAMILY MEMBERS

Gregory A. Otterson, M.D., Kristine K. Browning, M.S., C.N.P.*; Mary Ellen Wewers, M.P.H., Ph.D., Miguel A. Villalona-Calero, M.D., Patrick Ross Jr., M.D., Ph.D., Ohio State University, Columbus, Ohio

The timeframe of diagnosis and treatment of lung cancer may represent a unique opportunity for intervening with patients who smoke, as well as family members, given the notion of a “teachable moment.” The purpose of this study was to describe demographic and smoking history characteristics of lung cancer patients and their family members. The setting was an urban, Midwest, academic, tertiary-care thoracic oncology clinic where lung cancer patients undergoing combinations of surgery, chemotherapy, and radiation therapy are managed. Patients (n=100) and their family members or caregivers (n=134) were asked to fill out an anonymous questionnaire. Patients were primarily male (51%) with a mean age of 63 (SD=10). Family included mostly females (68%) whose average age was 52 (SD=13). Ninety percent of patients who currently smoked (n=19) and 62% of family members who smoked (n=32) were willing to quit smoking within the next 30 days to 6 months. Family members (87%) “strongly agreed” or “agreed” that smoking is a cause of lung cancer and 54% of family members believed a personal risk of lung cancer. Among family members who smoked, 80% believed themselves to be at risk. This preliminary data suggests that patients, as well as family members, may be motivated to quit smoking during treatment of lung cancer. Among family members, the perceived risk of developing the disease may serve as a basis for implementing a smoking cessation intervention at this time.

This study was supported by NCI P30 CA16058.

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PO2 73  EFFECT OF SMOKING, ALCOHOL, AND DEPRESSION ON QUALITY OF LIFE IN HEAD AND NECK CANCER PATIENTS

Sonia A. Duffy, Ph.D.*; Jeffrey E. Terrell, M.D., Marcia Valenstein, M.D., David Ronis, Ph.D., Karen Fowler, M.P.H., and Amy Donaldson, B.S.

Smoking and alcohol use are often interrelated and are associated with comorbid depression: all three of these behaviors/disorders are highly prevalent in head and neck cancer patients. Continued smoking, alcohol use, and depression are likely to adversely affect the already compromised quality of life of head and neck cancer patients. To examine the relationship between smoking, alcohol use, depression, and quality of life, 382 head and neck cancer patients were surveyed. Descriptive statistics and regression analyses were conducted. Smoking, alcohol use, and depression were the primary independent variables. The eight SF-36 and four Head and Neck Quality of Life (HNQoL) scales were the dependent variables. Over one-third (38%) continued to smoke and half (49%) drank alcohol. Not quite half (41%) screened positive for depression. Smoking had a negative association on six of the SF-36 and three of the HNQoL scales. Surprisingly, alcohol was not associated with any of the quality of life scales. As expected, depression had a strong, negative association on all eight of the SF-36 and all four of the HNQoL scales. Smoking, alcohol use, and depression are “changeable” factors and interventions targeted at these behaviors/disorders may improve quality of life in head and neck cancer patients. Consequently, we have developed and are testing a combined, nurse-administered smoking, alcohol use, and depression intervention.

This study is being conducted at the University of Michigan, supported by a grant from Smithkline Beecham and at the Ann Arbor VAMC, supported by grant IR38-500.

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PO2 75  RISKY BUSINESS: RELATIONS AMONG CVD RISK FACTORS, SMOKING SEVERITY, PSYCHOSOCIAL FUNCTIONING, AND HEALTH AWARENESS

Katherine A. DeLaune, M.A.*; Joy M. Schmitz, Ph.D., Angela L. Stotts, Ph.D., and Shelly L. Sayre, M.P.H., Substance Abuse Research Center, University of Texas—Houston

Cardiovascular disease (CVD) is the leading cause of death among women in the US, accounting for approximately one third of all deaths each year. Tobacco smoking is a significant risk factor for CVD, and frequently women who smoke exhibit additional risk factors as well. This study examined CVD risk factors in relation to several domains associated with smoking cessation prognosis: psychosocial functioning, health awareness, and severity of nicotine dependence. A sample of 127 treatment-seeking female smokers presented with risk factors that were categorized as controllable (e.g., inactive lifestyle) or uncontrollable (e.g., family history of CVD). Logistic regression analyses included total number, and then controllability, of risk factors as dependent variables. Number of risk factors related significantly to severity of nicotine dependence (R2=.09, p<.0001), including cigarettes per day (R2=.10, p<.013) and years smoking (R2=.15, p<.001), and to perceived susceptibility to CVD (R2=.08, p<.049). Controllability had a stronger association with cigarettes per day (R2=.12, p<.001) and years smoking (R2=.28, p<.0001), and a similar association with perceived susceptibility (R2=.08, p<.0001). Controllability also related significantly to self-esteem (R2=.07, p<.009). These findings indicate that women with a greater number of CVD risk factors exhibit more severe nicotine dependence and higher perceived vulnerability to CVD. Women with controllable risk factors experience less severe nicotine dependence, perceive themselves as less vulnerable to CVD, and exhibit greater self-efficacy than women with uncontrollable risk factors.

This study was supported by NIDA grant DA-08888-06.

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A common question about smoking cessation studies is how representative of the general population of persons who want to quit is the sample of volunteers. Although we presented parameters for determining representativeness in an earlier publication (Addiction 92:469, 1977), we felt it was appropriate to update this information given changes in smoking behaviors (e.g., occasional smoking). We used 1998 National Health Interview Survey data to present population-based data. For example, among US adult (>18 yrs) smokers who had quit smoking for one or more days because they were trying to quit, the mean age was 39.1 years, the mean number of cigarettes smoked per day was 14.7, and mean age of initiation of regular smoking was 18 years. Additionally, 51.8% were women, 76.7% were non-Hispanic White and 78.2% had > 12 years of education. The poster presents demographic information for smokers who had participated in a local cessation program including 95% CI’s. To illustrate the utility of this information, when we compared our sample in a smoking reduction study to the national demographic data, we found our sample to be substantially older (mean age=44 years), more likely to be female (70%), and heavier smokers (average 27 cigs/day). Participants in treatment programs may not be representative of the national population of smokers. The national population data could be used as a comparison to assess the representativeness of local samples, and to adjust local data for biases and make predictions on the national level about the effects of tobacco control initiatives.

Funded by a Senior Scientist Award (JH) from NIDA.

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**PO3 01**

**FACTORS ASSOCIATED WITH EXPOSURE TO MOVIE TOBACCO USE**

Sargent, James; Dalton, Madeline; Beach, Michael; Tickle, Jennifer; Heatherton, Todd

**ABSTRACT BACKGROUND:** Recent studies demonstrate a strong, direct association between viewing movie tobacco use and adolescent smoking, making it important to understand what factors affect such exposure.

**OBJECTIVES:** To describe exposure to movie tobacco use in a sample of adolescents and determine what factors contribute to it.

**DESIGN:** Cross-sectional survey.

**SETTING:** We surveyed 5998 students from 15 randomly selected New Hampshire and Vermont junior high schools (grades 5-8).

**MAIN OUTCOME MEASURE:** Dependent variable: number of tobacco depictions seen from 50 randomly selected popular contemporary movies.

**INDEPENDENT VARIABLES:** Media access (number of movie channels, cable TV, satellite TV, video access, theater access); Parenting factors (R-movie restrictions, television restrictions, authoritative parenting); Demographics (grade in school, sex, parent education); Other characteristics of the child (sensation seeking, rebelliousness, self esteem, grades in school).

**RESULTS:** There were 4522 students with complete information. On average, the students had seen 17 of the 50 movies, from which they viewed a median of 91 tobacco depictions (interquartile range 49, 153). Exposure increased with grade in school, and boys saw an average of 17 more tobacco depictions than girls. Exposure increased by about 10 depictions for each additional movie channel and for every 2 videos watched per week. Exposure also increased significantly in those going to the movie theater more than once per month. Parent R-movie restrictions had the largest and most significant association with movie tobacco use, resulting in an average reduction of 60 movie tobacco depictions. Television viewing restrictions had a much weaker effect (-10.4 depictions). There was no association between authoritative parenting or parent education and exposure to movie tobacco use.

**CONCLUSION:** Adolescent exposure to movie tobacco use is decreased when parents do not subscribe to movie channels, limit videos to no more than two per week, and restrict access to R-rated movies.

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**PO3 02**

**THE INFLUENCE OF TOBACCO MARKETING ON COLLEGE STUDENTS**

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Currently, an estimated 28% of college students in the U.S. smoke cigarettes. Smoking among college students has been increasingly nationally. Tobacco marketing has been shown to influence adolescent smoking, however, few studies have examined the role of tobacco advertising and promotions among college smokers. Students from the University of Kansas, Lawrence were screened and all smokers and a random selection of non-smokers were eligible to participate. In this paper, we present results for 365 students. Of these participants, 68% were freshman and 21% were sophomores. 52% were males and 92% were white. Of the current smokers (smoked in the past 30 days), the average number of cigarettes smoked was 7.3 for males and 6.2 for females. Only 2% of the current smokers reported smoking within the first 5 minutes of waking up while the majority smoked their first cigarette after 1 hour (68%). Additionally, 55% of the current smokers reported that their smoking had increased since starting college. We also examined differences between current smokers and non-smokers. Current smokers were more likely to have close friends who smoke, poorer grades in college, siblings or mother who smokes, and live in off-campus housing. After adjusting for all these predictors, receptivity to tobacco marketing was a significant predictor of current smoking with an odds ratio of 2.4 to 3.6 for moderate and high levels of receptivity to tobacco advertising and promotions compared to students with low receptivity. Students are constantly exposed to tobacco marketing on college campuses and in establishments near the campus. We will present more detailed results related to tobacco marketing and smoking among college students.

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**PO3 03**

**WHICH ADOLESCENTS ARE MOST RECEPTIVE TO TOBACCO INDUSTRY MARKETING? IMPLICATIONS FOR COUNTER-ADVERTISING CAMPAIGNS**

Janet Audrain, Ph.D.*, Caryn Lerman, Ph.D., University of Pennsylvania; Kenneth P. Tercyak, Ph.D., Alexandra E. Shields, Ph.D., Angelita Bush., M.S., and Carlos F. Espinel, B.S., Georgetown University

This study sought to identify adolescents most receptive to tobacco advertising based on individual differences in novelty-seeking personality and other key variables. Confidential self-report surveys were completed by 1,071 high school freshmen at 5 public high schools. The survey included validated measures of novelty-seeking personality, smoking habits, peer and family smoking, and tobacco advertising receptivity. Multiple logistic regression analysis was used to evaluate the independent associations of these variables and demographics with receptivity to tobacco advertising. Of the ninth graders, 44% had moderate to high levels of advertising receptivity and 54% had minimal to low levels of receptivity. Higher levels of receptivity were associated with ever smoking (OR = 2.59; CI = 1.99-3.39) and novelty-seeking personality (OR = 2.14; CI = 1.57-2.93). The association of novelty-seeking personality and tobacco advertising receptivity was most pronounced among adolescents who had never had a puff of a cigarette. Counter-advertising messages should consider individual differences in novelty-seeking, since novelty-seekers may be most receptive to tobacco industry promotional campaigns.

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PO3 04 DIFFERENCES IN TOBACCO CONSUMPTION PATTERNS BY PRIMARY USE MOTIVATION

Brian Colwell*, Ph.D.; Stacey L. Stevens, Ph.D., Texas A&M School of Rural Public Health; Dennis W. Smith, Ph.D., University of Houston

SAMPLE: 824 Texas youth attending a mandatory tobacco awareness program as a result of being ticketed for tobacco possession provided these data. The sample was 72.5% male, 76.3% white, and had a mean age of 16 years. Mean daily cigarette consumption was 10.6 (s.d. = 82).

METHODS: Respondents described the primary situation that usually motivated them to smoke. Situations were grouped into 6 categories: negative affect, positive social situation, social pressure, self-described dependence, weight control and use with alcohol or other drugs (AOD). Fagerstrom Test of Nicotine Dependence (FTND) items were also scored. Data were analyzed by use of univariate ANOVA.

FINDINGS: Groups differed significantly on mean daily cigarette consumption (F(5,692)= 5.45, p <.001). Group means were: AOD (n=50, m=14.6, sd= 10.9); positive social situations (n=173, m=12.2, sd= 9.7), self-reported dependence (n = 182, m = 12.6, sd = 9.5), negative affect (n = 282, m = 10.9, sd = 8.8), social pressure (n = 9, m = 3.6, sd = 6.4). Significant differences in mean FTND scores were also noted, ranging from 4.05 for those who used with AOD 1.3 for those primarily due to social pressure. The mean for those with self-reported dependence was 3.7.

CONCLUSIONS: Consumption patterns vary significantly among youth based on their primary motivations for using tobacco. Such information should be integrated into cognitive-behavioral programs that assess motives for use and develop skills & strategies for coping with urges. The overall low FTND scores indicate relatively low levels of nicotine dependence in the sample. Self-reports of nicotine dependence appears to be an unreliable indicator of dependence.

This research was supported by funding from the Texas Department of Health.

CORRESPONDING AUTHOR: Dr. Brian Colwell.

PO3 05 ALABAMA TOBACCO FREE FAMILIES: A MEDIA AND SOCIAL MARKETING PROGRAM TO REDUCE TOBACCO USE

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INTRODUCTION: the Alabama Tobacco Free Families program (ATOFF) is a four-year, community-based program of media and policy change promoting reduction of tobacco use among women of childbearing age. ATOFF is being conducted in eight counties serving a representative sample of the Medicaid clinical population.

OBJECTIVE: the primary objective is to reduce the smoking prevalence rate of pregnant females in Medicaid-supported maternity care, as well as that of all women of childbearing age. ATOFF is expected to reduce the number of low birth weight infants among this population. The 1998 rate, 10.2%, ranked Alabama 50th in the nation.

METHODS: ATOFF will focus on raising awareness about tobacco use risks to the family, especially to mothers and infants. A three-component intervention includes: 1) a mass media/health communications campaign; 2) a community organization/social marketing component, including education through schools, churches, and worksites and tobacco use policy changes to affect social norms; and 3) a professional practice component, including education and support for health care organizations and providers. The primary message is for females to remain tobacco-free prior to and during pregnancy. The secondary message is to maintain a tobacco-free home environment for the protection of all family members, especially children.

RESULTS: the initial semi-annual telephone survey conducted among women in the counties established a baseline smoking prevalence of 25% among the population. Data from the first semi-annual, cotinine-confirmed surveys conducted among the target clinical population revealed a prevalence of 27%, although the 6% deception (cotinine-confirmed) among self-reported nonsmokers would increase the rate to 33%.

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PO3 06 USAGE OF POSITIVE TELEVISION ADVERTISING TO MOTIVATE PREGNANT SMOKERS TO CALL A SMOKERS’ HELPLINE

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Reaching pregnant smokers and motivating them to quit smoking has been an ongoing challenge. Since 1998, the Arizona Department of Health Services (ADHS) has funded a variety of advertising campaigns encouraging pregnant smokers to call the Arizona Smokers’ Helpline (ASH) for help in quitting tobacco. Focus groups conducted by an advertising agency employed by ADHS revealed that pregnant women did not like negative advertising which targeted the issue of smoking during pregnancy. Focus group participants reported these ads made them feel guilty about smoking. During two four-week ad flights airing between March and June 1999, and again during one five-week ad flight airing in March and April 2000, ADHS sponsored a television advertisement that featured positive images of young pregnant women and a positive message: “You have the power to give life; you have the power to quit.” Historically, calls to the Helpline have been evenly split between male and female clients. When comparing call volume of callers who heard about ASH via television during the Pregnant Power ad flights to such call volumes during other English-language ad flights between July 1998 and December 2000 (excluding prime quitting months of December and January), the proportion of ASH clients who were female increased significantly (p<.0005) during the empowerment advertising. Furthermore, during the Pregnant Power campaign, the proportion of ASH clients who were women under age 25 increased significantly (p<.003), and the proportion of ASH clients who identified themselves as pregnant increased significantly (p<.000001). This project was supported by the Tobacco Education and Prevention Program of the Arizona Department of Health Services.


PO3 07 UNREALISTIC OPTIMISM AMONG SMOKING AND NON-SMOKING STUDENTS


Theories of health behaviour suggest these behaviours are influenced in part by the perception of personal risk of a given outcome. Unrealistic optimism refer to the tendency to perceive one’s own circumstances as being more positive than a comparison group of similar others. A survey of students’ health and lifestyles, including perception of risk of several potential negative outcomes, was undertaken in collaboration between four district health authorities and the universities of Oxford and Exeter in the United Kingdom. A self-completion questionnaire was sent to 2500 full-time students, of which 49% responded.

For all potential negative outcomes perceived risk was seen to be significantly lower than average. A principal components analysis of the perceived risk of all potential negative outcomes suggested that a single component could account for 47% of the variance in responses. Among cigarette smokers, the perceived risk of cancer was seen to be significantly greater than average (t=3.12, p=.002), but the perceived risk of heart disease was not seen to be significantly different to average (t=-1.43, p=.153). A linear regression analysis suggested that number of cigarettes smoked per day was positively associated with perceived risk of cancer (Beta=0.12, p=.002) and perceived risk of heart disease (Beta=0.12, p=.002)

Finally, the perceived risk of all potential negative outcomes was also significantly greater among smokers than among non-smokers, suggesting a global tendency among smokers to regard themselves at greater risk of negative health outcomes.

The results are discussed in the context of the relationship between unrealistic optimism and health behaviours, and the impact this may have on health promotion and public health initiatives.

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PO3 08  ATTITUDES TOWARDS RESTRICTIONS ON PUBLIC SMOKING: A NATIONAL SURVEY

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Many states are considering increasingly restrictive clean air laws. Using a national sample from the U.S. Current Population Survey (September 1998, January 1999, and May 1999 supplement), we examined adult support for various restrictions on indoor smoking (N = 268,703; 52.8% female; 85.4% white; age mean = 45.5 yrs, range 18 – 90 yrs). Six questions examined whether respondents believed smoking should be allowed in all areas, some areas, or not at all in six frequently visited public locations (restaurants, hospitals, indoor work areas, bars and lounges, indoor sporting events, and indoor shopping malls). Except for bars and lounges (17.6%), less than 2% of respondents thought that smoking should be unrestricted indoors. Conversely, approximately half of respondents thought that smoking should be completely banned in hospitals (53.4%), indoor work areas (43.8%), indoor sporting events (46.7%), and indoor shopping malls (44.9%). Fewer respondents thought that smoking should be completely banned in restaurants (33.4%) and bars and lounges (18.6%). Smoking status significantly impacted attitudes toward restrictions. For instance, a large proportion of never smokers believed that smoking should be completely banned in the six locations (range = 28.1% for bars and lounges to 66.3% for hospitals) while few smokers endorsed a complete restriction on smoking (range = 6.0% for bars and lounges to 52.9% for hospitals). Thus, public support exists for increasingly restrictive indoor smoking laws, particularly among citizens who do not smoke. Other predictors of support for strong clean air policies will be presented along with implications for tobacco control lobbying groups.

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PO3 10  SHOULD THE LEGAL PURCHASE AGE FOR CIGARETTES BE 21?

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Most adolescent smokers obtain their cigarettes through social sources. If these sources are older, and can legally purchase cigarettes, more stringent rules about selling tobacco to minors may have little impact. We analyzed data from the 1999 California Tobacco Surveys, a large population-based telephone survey. Of the 83.2% (+4.6) of adolescent ever smokers who reported that they usually got their cigarettes from others, approximately 11 (21.5%+2.5%) used economic transactions, where someone else bought cigarettes for the teen, and 1 (63.5%+4.4%) relied on social transactions, where no money changed hands. Of those who usually had someone else buy cigarettes for them, 56.5% (+6.9) used suppliers who were 18-20 years old, and another 25.1% (+6.3) had suppliers who were over 21. Most of the time (65.7%±1.1%), these suppliers were friends. Among those who usually relied upon purely social transactions to obtain their cigarettes, the majority (73.7%) were given cigarettes by someone who was under 18, another 22.1% were given cigarettes by someone who was 18-20 years old, and very few (4.2±1.7%) were given cigarettes by someone 21+ years old. Not surprisingly, over 90% of those who were usually given cigarettes reported that these cigarettes came from friends (87.0±2.5%) or a boyfriend/girlfriend (3.5±1.6%). Until peer approval of smoking and sharing cigarettes is reduced, it will be difficult to significantly reduce adolescents’ access to cigarettes. Alternatively, raising the purchase age to 21 years might reduce access by increasing the age gap between those who are legal to buy and those who routinely get their cigarettes from others.

This study was conducted while the first author was at UCSF. Supported by contract # 15657 from CA-DHS.

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PO3 09  ENVIRONMENTAL DESIGN: AN UNTAPPED APPROACH TO TOBACCO CONTROL RESEARCH

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Environmental design focuses on relationships between people and the built and natural environment, and involves the synthesis of theory and practice from the humanities, natural sciences and the social sciences. This multi-disciplinary approach is well suited to addressing complex human-environment interactions, and provides a new way of studying tobacco-related issues that inform policy and practice. This presentation will describe how the theoretical and methodological processes used in environmental design can contribute to tobacco control research.

Environmental design draws on theories and methodologies used in landscape architecture, architecture, industrial design, planning, geography and environmental science. This multi-disciplinary perspective requires consideration of natural, social, cultural, economic, technological and communication processes. Key methodologies used in these disciplines include bio-physical inventory, cultural mapping, observation, historical analysis, focus group workshops and community participation.

We offer two examples that incorporate an environmental design approach to tobacco control research. The first, which examines smoking in outdoor public places, focuses on physical factors (design features, spatial relationships, context of place) and social factors (interactions between smokers and non-smokers) that may influence smoking behaviour. The second example demonstrates the potential of geographic information systems (GIS) to identify relationships among factors related to smoking behaviour and tobacco control interventions. GIS allows the mapping of geographical data on social, economic, cultural and communication processes, along with data on smoking prevalence, which may be analyzed for themes and patterns that indicate changes in smoking behaviour. We conclude that environmental design offers a useful and novel approach to research on tobacco control.

Sponsored through salary support from the Ontario Tobacco Research Unit.

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PO3 11  USING GEOGRAPHIC INFORMATION SYSTEMS TO DETERMINE COMMUNITY-LEVEL PREDICTORS OF YOUTH TOBACCO USE

Maribet C. McCarty, Ph.D.*, Vijay K. Nangia, M.S., Jean L. Forster, Ph.D., Vincent Chen, M.B.A., University of Minnesota

Initiation of tobacco use largely begins in adolescence and is influenced by behavioral, sociodemographic, and environmental factors. While individual-level risk have been studied extensively, less is known about community-level risk factors for tobacco initiation. Recent technological advances have made mapping and spatial analysis software (geographic information systems [GIS]) more readily available and useable to those outside the geography field. We piloted the use of GIS in identifying community-level predictors of adolescent tobacco use. Using data from the Minnesota Adolescent Community Cohort Study (MACC), we examined the association between community-level characteristics and adolescent tobacco use. The MACC study is an observational study of 3600 adolescents age 12-16 nested in 60 randomly selected geo-political units [GPUs] in Minnesota. These GPUs consist of counties, school districts, planning districts, neighborhoods, or out-state cities. Data related to tobacco use behaviors and attitudes are collected through telephone surveys every 6 months. We examined the association between baseline adolescent tobacco use, the availability of tobacco (as measured by the density and location of tobacco retailers), and aggregate community-level sociodemographic characteristics. Preliminary analysis revealed that the overall prevalence of ever smoking was 19% for this sample and ranged from 5% to 31% across GPUs. Maps illustrating the association between prevalence of ever smoking, community-level sociodemographic characteristics and density of tobacco retail outlets will be shown.

This study was funded by a grant from the Minnesota Medical Foundation’s School of Public Health Faculty Grants Program and the National Cancer Institute (ROI-CA86191 to Jean L. Forster, PI).

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In Louisiana many teachers/staff smoke in restricted areas on high school campuses making it difficult to promote a no-tobacco policy. To aid in moving toward no-tobacco high schools, teachers and staff (n = 531) from 11 schools in Acadiana were surveyed within a student smoking prevention program. The sample was predominately female (61%) and white (74%) with almost one-half being > 46 yrs old with a mean of 14.5 yrs (+ 10) teaching experience. Smoking prevalence was 13% with female smoking higher than male (16% vs 9.5%, p=0.03). More than half (53%) were in precontemplation or contemplation and not planning to quit in next six months. Half of smokers (50.8%) smoked on campus. Of these the majority (85%) smoked in designated areas and during the school day. More than 25% of all teachers did not know their school tobacco policy, with no significant difference between smokers and non-smokers. The majority of non-smoking teachers expressed concern about students seeing teachers smoke, but the majority of smoking teachers did not express this concern (68.8% vs 53.7%, respectively, p=0.0003). Similarly, the majority of non-smoking teachers supported a no-tobacco school policy, while the majority of smoking teachers did not (88.2% vs 59.2%, respectively, p<0.0001). These data confirmed the influence smoking teachers could have on non-adoption of a school no-tobacco policy; however, principals can now be approached with smoking prevalence data and the need for educating teachers and staff about tobacco use on the school campus.

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**PO3 14** COMMUNITY DIFFERENCES IN PREVENTION, TREATMENT AND ENFORCEMENT OF TEEN TOBACCO USE

Erin Ruel, M.A., Sandy Slater, M.S., Frank Chaloupka, Ph.D., University of Illinois at Chicago; Gary Giovino, Ph.D., M.S., Roswell Park Cancer Institute

Research shows that many addicted smokers initiated tobacco use before the age of 18, suggesting that if first-use is delayed most people might never start smoking. Communities have initiated programs to address teen tobacco use. This study investigates how programs designed to reduce teen smoking vary across communities using data from interviews with community leaders in health agencies, police departments, and coalitions. In particular, the type and extent of existing programs to reduce youth tobacco use at the local level is addressed. Data for this study come from multiple sources. Primarily, data are from key community informant interviews from 1999 and 2000. Communities were selected based on a nationally representative sample of 8th, 10th and 12th grade public schools in the contiguous United States. For each index school a community was defined based on the area from which the school draws the majority of its students. Once communities were defined, a list of police agencies and health agencies were gathered and interviewed. A snowball referral procedure identified relevant coalitions in the communities and made sure the individual most knowledgeable about teen smoking programs and policies would be interviewed. Preliminary results show that local communities have extensive programs for youth and that socio-economically challenged communities do not differ much from more privileged communities.

This study was conducted by the first author at the University of Illinois at Chicago. Support was provided by The Robert Wood Johnson Foundation #033009.

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**PO3 13** MEASURING THE STRENGTH OF STATE ENFORCEMENT OF LAWS PROHIBITING THE SALE OF TOBACCO TO MINORS

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Minors’ access to tobacco products from retail sources remains high, despite evidence indicating that tobacco control policies and programs in the late 1990s may have led to some decline in availability. Research to assess the effectiveness of state and local enforcement programs could be enhanced by a standardized method of evaluating these programs. To this end, state enforcement officials were interviewed in 15 states to determine how state programs were funded, organized and implemented, and related to local enforcement programs. An index to aggregate these constructs will be described and applied to each state to assess the strength of enforcement. Ultimately, these measures, as well as comparable measures at the local level, will help model predictors of sales to minors in the 75 nationally representative communities participating in the Business Practices and Minors’ Access to Tobacco study. Such indices also can be used to construct measures of promising practices, to benchmark state programs, and to provide state program officials with a continuous monitoring system to evaluate effectiveness.

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**PO3 15** FAMILY LIFE-EVENTS OF LOW SES HISPANIC SMOKERS WITH AN ASTHMATIC CHILD: PREVALENCE AND RELATIONSHIPS TO OUTCOME IN AN ETS-REDUCTION TRIAL

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Exposure to Environmental Tobacco Smoke (ETS) is a causal factor in the development and exacerbation of pediatric asthma. Research suggests stressful life events (LEs) undermine asthma-related health outcomes. This study explored LE prevalence and relationships to outcomes (e.g., ETS exposure indices; asthma severity; health service utilization) in an ETS-reduction trial. For each family (N=179), counselors assessed occurrence of 55 specific LEs (grouped into 6 categories: Household; Financial; Work/School; Family; Legal, and Health) and per-item distress. Sum scores of LEs and Distress (1 = a little –to- 4 = extremely) were calculated per category and overall. Families experienced 3.47 (3.90) mean Total LEs with a mean per-item Distress score of 43 (.48). Thirty-nine percent experienced over three life events simultaneously. Preliminary regression analyses modeled relationships between LE and outcome difference scores (6-mo F.U.-Baseline). Change in asthma severity was associated with Work/School Distress (p<.001), Legal Distress (p=.005), and Total LEs (p=.003). Change in children’s log urine cotinine was related to Health LEs (p=.006) and Health Distress (p<.001). The only utilization outcome related to LEs was “no care sought for illness” predicted by Financial Distress (p<.001), Work/School Distress (p<.001), Family LEs (p<.001), Legal LEs (p<.001), Health LEs (p<.001), and Total Distress (p<.001). Preliminary results tentatively suggest that LEs mediate key outcomes in an ETS-reduction intervention. Ongoing analyses are pending.

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PO3 16 IDENTIFYING URBAN CHILDREN AT RISK FROM ENVIRONMENTAL TOBACCO SMOKE EXPOSURE

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OBJECTIVE: To identify children at risk from the harmful effects of environmental tobacco smoke (ETS) exposure inside or outside the home.

BACKGROUND: While health risks to children with ETS exposure are well known, interventions targeting the primary residence may not address other sources of ETS exposure impacting health. Urine cotinine, a nicotine metabolite, is a biomarker of ETS exposure in children.

METHODS: Non-breastfed infants and children accompanied by an adult caregiver were recruited from a children’s hospital pediatric clinic. A research assistant administered questionnaires to caregivers, including questions regarding sources of ETS exposure and attitudes toward ETS effects on children’s health. Urine samples were collected for cotinine analysis. Exposure was categorized as no/low/high based on whether smoking was allowed in the building (low) or room (high) when the child was present.

RESULTS: Completed questionnaires were obtained for 230 children; 58 urine samples underwent cotinine analysis. Children were primarily African-American (93%); the average age was 5.4 years. Sixty-five percent of children were identified as ETS exposed. Overall, 38.7% lived with at least 1 smoker; 42% were exposed outside the home. ETS exposure outside the home was more likely to be high exposure (79% versus 52%). High exposure children had significantly higher urine cotinine values (p < 0.05). While >95% of caregivers believed ETS to be harmful to children, <50% felt their child’s health had been affected by ETS.

CONCLUSIONS: Urban children are likely to be exposed to ETS, and caregiver report can identify high levels of exposure. Caregivers may underestimate the harmful effects of ETS exposure.

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PO3 17 APPLICATION OF SOCIAL COGNITIVE THEORY TO PARENTS’ ETS PROTECTION BEHAVIOR

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Theory driven approaches are needed for interventions which may reduce environmental tobacco smoke (ETS) exposure, especially for low income families where ETS exposure is more common. Components of Social Cognitive Theory (SCT) were examined in a survey of 714 parents who smoke and who accompanied children in an urban pediatric emergency department. The parent sample was 77% female, average age 30, 60% White race, 32% income < $15,000, 58% Medicaid; children were 53% male, mean age 3. A hierarchical multiple regression model was constructed to determine whether ETS outcome expectancies (OE), ETS attitudes (importance of protection) and self efficacy (temptations) contributed to explaining ETS protection behaviors (e.g. smoke outside), after controlling for potential confounders. Overall, the model accounted for 23% of variance (R = 0.482; p<.001). Demographic variables accounted for 7% of variance, while addition of OE and the ETS attitudes accounted for an additional 16% (p<.001). Self-efficacy significantly added to the model, although only for an additional 1% of variance (p<.05). Individual variables in the final model demonstrated that ETS attitudes contributed significantly to the model (beta = 0.369, p<.001), followed by the child’s age (beta = - 0.134, p<.001). Findings showed that SCT constructs are useful in explaining ETS protection behaviors among parents of younger children. Interventions with parents should encourage understanding of importance of ETS protection, and improve confidence in how to avoid this harm to their children.

This study was supported by National Cancer Institute, RO1CA74538.

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PO3 18 PERCEIVED RISKS AND BENEFITS ASSOCIATED WITH QUITTING: EFFECTS OF GENDER AND DEPRESSIVE SYMPTOMS

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Expectations concerning anticipated risks and benefits associated with smoking cessation have been shown to be related to intentions to quit and treatment outcome. However, there are no validated measures that comprehensively assess the perceived risks and benefits associated with smoking cessation. To this end, we have developed a self-report instrument (Perceived Risks and Benefits Questionnaire: PRBQ) to comprehensively assess perceived risks (weight gain, increased negative affect, reduced ability to attend or concentrate, social ostracism, loss of enjoyment, increased craving) and benefits (health, general well-being, self-esteem, finances, physical appeal, social approval) associated with quitting. An initial sample of 212 treatment seeking smokers (50% female) completed the instrument. Overall, greater likelihood ratings of perceived risks and benefits were associated with female gender. Subjects with increased depressive symptoms, assessed with the CES-D, anticipated greater likelihood of risks upon quitting, whereas subjects with low levels of depressive symptoms anticipated greater likelihood of benefits upon quitting. Perceived risks were negatively associated with motivation to quit for females, whereas for males, perceived benefits were positively associated with motivation to quit. Additionally, perceived risks and benefits of quitting were differentially related to motivation to quit across gender and depressive symptoms. Knowledge of perceived risks and benefits associated with smoking cessation is critical for public education campaigns and could inform intervention strategies designed to modify sex-specific beliefs that are associated with lowered behavioral intentions to quit smoking.

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PO3 19 OFFERING NRT-ASSISTED GRADUAL REDUCTION INCREASES QUIT INTEREST

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Nicotine replacement therapy (NRT) is proven effective for smoking cessation, but most quit efforts are still undertaken without the benefit of treatment. Currently available NRTs require smokers to stop smoking abruptly. Offering smokers alternative ways to use NRT for quitting may increase quitting and use of treatment. This study assessed whether offering smokers the option of using NRT to quit by gradual reduction would increase self-reported intent to quit and to use NRT. 1000 current U.S. smokers were surveyed about their quitting plans for the next year; for a random half, the 7 quitting options initially included gradual NRT (NRT: “using nicotine gum to help you cut your smoking in half until you are ready to quit”). Among those offered GNRT, 6.5% stated they would use this method. However, when GNRT was removed as an option, 22.2% who chose GNRT subsequently opted for quitting without NRT and 4.0% opted for not quitting at all. In a further within-subjects test of the effect of offering GNRT, the group initially not offered GNRT was subsequently offered this option, and asked to re-evaluate their plans. 15.5% of the sample then stated they would use GNRT. In this post-test, 16.4% of those who initially chose quitting without NRT and 6.4% who were not planning to quit at all, subsequently opted for GNRT when it was offered. These results suggest that the offering of NRT-assisted gradual quit methods could increase both use of treatment and the number of smokers who attempt to quit.

This study was supported by GlaxoSmithKline Consumer Healthcare (GSK) and conducted by Hickman Brown Research. The authors not affiliated with GSK perform consulting services on their behalf.

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PO3 20
HARM REDUCTION THROUGH REDUCED TOBACCO EXPOSURE IN CONTINUING SMOKERS

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Harm reduction in continuing smokers is a major public health priority. Therefore, whether tobacco control programs, through strategies primarily aimed at protecting nonsmokers, can reduce cigarette consumption is of interest. Data from Tobacco Use Supplements to the 1992-93, 1995-96 and 1998-99 Current Population Surveys were used to contrast daily smoking prevalence in California (relatively longstanding tobacco control program) with the rest of the US. Standardized daily smoking prevalence in California declined from 14.6% in 1992-93 to 13.9% in 1995-96 and to 12.4% in 1998-99. In the rest of the US, these rates were 18.8%, 18.3% and 16.7%. In 1999, only 5.3% of Californians with some college smoked daily (6.9% in rest of US), levels comparable to medical doctors in 1990. From the mid 1970s to the mid 1980s, about 25-30% of US smokers smoked >25 cigarettes/day. In 1999, only 8.3% of California smokers were heavy daily smokers (13.6% in rest of US). In 1992-93, 16.3% of California smokers both worked and lived in smokefree environments, increasing to 28.6% by 1998-99, but only 16.4% of smokers in the rest of the US were subject to both restrictions (like California in 1992-93). In 1998-99, several questions assessing where smokers should be allowed to smoke indicated California smokers felt significantly more constrained than smokers in the rest of the US. Smokefree homes and workplaces and the degree of constraint were both significantly associated with lower daily cigarette consumption in multivariate analyses. Smoking restrictions and social norms fostered by tobacco control programs are related to reduced consumption among continuing smokers.

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PO3 21
USING RADON RISK TO MOTIVATE SMOKING REDUCTION: REPPLICATION AND EXTENSION

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We use utility company “bill stuffers” to invite smoking households to request a free Radon test kit. Households receive test results and messages emphasizing that smoking reduction is the best risk reduction action.

In prior research we showed that brief phone calls were superior to pamphlets in prompting new household smoking bans and marginally improved quit rates. We present 3 month outcome data from a new study employing a 2 x 2 design: brief phone counseling vs. pamphlet; targeted video vs. pamphlet. We hypothesize that both phone calls and video will significantly reduce smoking. Over 700 households have been accrued and three-month followup will be available for analysis from at least 600. Utility companies provide a cost-effective way of reaching smoking households and the Radon-Smoking synergy serves to motivate behavior change.

CORRESPONDING AUTHOR: Edward Lichtenstein.

PO3 22
RISK PERCEPTION AND COGNITIVE DISSONANCE AMONG SMOKERS

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Despite the well-known relationship between smoking and illness, many individuals continue to smoke, suggesting that smokers may not perceive the full risks of smoking. In fact, research suggests that the personal relevance of health risks is minimized by smokers, as would be predicted by Festinger’s cognitive dissonance theory. The theory postulates that dissonance can be reduced by changing one’s behavior or cognitions. In this study, we attempted to induce dissonance in 144 college smokers by asking them to prepare educational videos about (1) the risks of smoking or (2) the feasibility of quitting (in a 2x2 factorial design). Their subsequent intentions to quit as well as other risk-reducing cognitions were measured. As predicted, smoking history and smoking-related expectancies were both correlated with magnitude of dissonance (ps < .05). Moreover, dissonance magnitude was associated with the reported use of dissonance reducing strategies, including intending to quit smoking and believing that tobacco use was out of their control due to nicotine addiction (ps < .05). Main effects for the experimental manipulations were not found. However, an interaction suggested that intentions were increased by both manipulations, but that the effects were not additive (p < .05). Also, risk perceptions were increased by the health risk manipulation alone, but not when quitting feasibility was also targeted (p < .05), which is consistent with a cognitive dissonance explanation. These findings may have implications for the development of tobacco control messages and interventions.

Funded by the University of South Florida.

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PO3 23
EXPOSURE TO SECONDHAND TOBACCO SMOKE AND THE ASSOCIATION WITH ADVERSE FEMALE REPRODUCTIVE HEALTH OUTCOMES

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OBJECTIVE: To assess the association between exposure to secondhand tobacco smoke and adverse female reproductive health outcomes.

RATIONALE: Active smoking by women is associated with adverse female reproductive outcomes. Many of the epidemiologic studies to date, have found a dose-response relationship. Furthermore, secondhand tobacco smoke has been determined to be causal for some diseases such as lung cancer and heart disease, however, the relationship with reproductive outcomes are not extensive and show mixed results. Therefore, there is a need to supplement our knowledge concerning the negative reproductive health impacts as they relate to secondhand tobacco smoke exposure.

METHODS: The study population includes women who were observed at Roswell Park Cancer Institute in Buffalo, New York between 1982 -1999, who completed a comprehensive epidemiological questionnaire. Data obtained include demographics, smoking history, past and present secondhand tobacco smoke exposure, and pregnancy related outcomes - ever having a miscarriage, ever having a stillbirth, and ever having difficulty becoming pregnant, where the problem lasted more than one year. Logistic regression analyses will be performed on the 10,867 females who indicated they never smoked, while adjusting for covariates, to assess the independent effects that secondhand tobacco smoke exposure has on reproductive health outcomes.

RESULTS: Analyses indicate that approximately 47% experienced exposure to secondhand tobacco smoke in their home while they were growing up, with about 28% saying they were currently exposed at work, and 40% who said they were currently exposed at home. There are about 16% who had a miscarriage and 3% who had a stillbirth. Nearly 8% indicated that they had experienced difficulty in getting pregnant. When women exposed to secondhand tobacco smoke were compared with women not exposed, were there several small, but measurable differences, all in the direction of increased adverse reproductive outcomes. Analyses will be extended, controlling for relevant confounding influences.

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PO3 24  ENVIRONMENTAL TOBACCO SMOKE REDUCTION: CAREGIVERS' PERCEPTIONS OF THE PEDIATRICIANS ROLE

Brian J. Drozdowski, Kelly A. Craig, Anne M. Mortensen, John A. Hopper, Wayne State University

Many pediatricians do not routinely address tobacco exposure: understanding caregivers’ perceptions of environmental tobacco smoke (ETS) exposure may lead to better models for advice and counseling. In this study, we describe caregiver interest in receiving advice on reducing ETS exposure and caregivers’ reports on the extent of pediatrician counseling about reducing exposure. We interviewed 155 caregivers of children seen at an urban children’s hospital-based resident practice. A majority of patients in the practice were African-American and Medicaid eligible. Twenty-three percent of caregivers were smokers (n=35), and 59% of caregivers had at least one exposed child (n=91). Most caregivers reported that they were asked about their child’s environmental tobacco smoke exposure during the past year (77.6%), but fewer than one-third were asked during that day’s encounter (32.0%). Ninety percent of caregivers with smoke exposed children wished to reduce exposure, and 59.5% would like exposure reduction advice. Interest in reducing exposure did not differ between caregivers who smoke and those who do not smoke. Among smoking caregivers, 89.7% would like to reduce ETS, and another 72.4% would like the pediatrician’s advice on how to do so. Most caregivers (82%) of exposed children reported changing their lifestyle to reduce their children’s exposure, and 21.1% of these people said these changes were made in response to the pediatrician’s advice. Forty-six percent of all caregivers thought ETS reduction advice should be given at each visit. Caregivers of smoke-exposed children would like advice to reduce tobacco smoke around their children. Pediatricians should not perceive parental beliefs about tobacco as a barrier to counseling.

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PO3 25  PUBLIC POLICY AND THE TOBACCO INDUSTRY: AN HISTORICAL INVESTIGATION OF PERSISTENT SMOKING

Howard I. Kushner, Ph.D.*, Colin Talley, Ph.D., Claire E. Sterk, Ph.D.

This historical investigation focuses on the ways in which the U.S. public health community, government agencies, and the tobacco industry responded to the discovery that a licit and widely used substance, cigarettes, was the cause of serious illness and death. The health hazards of smoking have been known since the 1950s, and have been at the core of many health education campaigns. Nevertheless, a substantial proportion of the population continues to smoke. We hypothesize that much of the reason for the persistence of smoking in the U.S. is the result of contradictory institutional responsibilities and responses. For example, while the public health community primarily is concerned with the health consequences of smoking, the tobacco industry focuses on the economic dimensions, and among the government agencies are those whose charge it is to educate people about health as well as those responsible for protecting and expanding the market economy. Thus, persistent smoking results from the tension between the individual right of freedom of choice and the societal responsibility to protect its citizens’ health and welfare. For this study, we reviewed and analyzed how public health, government agencies and the tobacco industry responded to the knowledge about the health hazards of smoking, while identifying the response from each of these institutions and the interactions among them. Through this examination, we will be able to provide a historical context for understanding the institutional role in dealing with the health hazards of smoking and to identify those responses that have been most or least effective. This historical knowledge will enable us to develop the most effective institutional direction that will help address the problem of why people persist in smoking despite knowledge about the dangers to themselves and others.

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PO3 26  TOBACCO INDUSTRY LINKS TO ACADEMIA IN CANADA

Joanna E. Cohen, Ph.D.*, Alison L. Halyk, M.L.I.S.*, Pamela E. Kaufman, Ph.D., Mary Jane Ashley, M.D., Ontario Tobacco Research Unit, University of Toronto

SRNT recently approved a position statement recommending the Society continue to not accept tobacco money and to ‘not endorse the support of its members’ research or their participation in other tobacco activities funded by’ this industry. It is now understood that the tobacco industry seeks to link itself with academia to gain respectability and legitimacy. However, few systematic studies have examined these links. The purpose of this study is to explore the nature and extent of relationships between the tobacco industry and Canadian universities and medical schools. A survey was conducted of all universities and colleges in Canada (n=92). Questionnaires were sent to appropriate university officials to determine institutional policies and practices with regard to tobacco industry research funding, donations and investments. To date, 69% of 352 applicable surveys have been returned (77% among Anglophone and 42% among Francophone institutions). Nine percent of respondents reported receiving tobacco industry research funding and half (51%) reported receiving tobacco donations between 1996-1999. One quarter (25%) reported investing in tobacco stocks or bonds in 1999. No respondent had a policy banning tobacco research funds or donations; one avoided tobacco investments.

Final data will be presented, including total research and donations funding from the tobacco industry. The purposes and designated recipients of these funds will be summarized. Conflict-of-interest policies regarding research funding, donations and investments, and perceived barriers to enacting such policies, will be reviewed. Implications for tobacco control will be discussed.

Supported by National Cancer Institute of Canada grant #011045.

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PO3 27  NETWORK OF DIRECTORSHIPS: LINKS BETWEEN TOBACCO COMPANIES AND UNIVERSITIES

Alison L. Halyk, M.L.I.S.*, Joanna E. Cohen, Ph.D., Ontario Tobacco Research Unit, University of Toronto

Historically, links between corporations and universities are ubiquitous and multi-leveled. One facet of this corporate-public institution liaison is the network of directorships that exists between tobacco industry officers and university officers. These relationships may contribute to the legitimacy and normalcy of tobacco industry business. The purpose of this study is to examine the extent of the network of directorships involving officers and directors of tobacco companies and universities in Canada.

To identify the range and nature of these relationships, Who’s Who in Canada and the Directory of Directors are being consulted. These sources provide access to biographical information on persons in business and academia by name and by occupation. Names and positions of corporate directors and executives are listed and details regarding previous and current executive positions, appointments and directorships are provided. The nature and duration of these dual affiliations will be presented. Preliminary findings suggest substantial cross-appointments. For example, at the time Robert Pritchard was president of the University of Toronto and a Director of the Toronto Hospital, he was also Director of IMASCO, the holding company for Canada’s largest tobacco company. Researchers in other countries could use these methods to determine whether these types of affiliations exist on a global level.

Supported through a grant from the National Cancer Institute of Canada.

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**PO3 28**

**CIGARETTE SMOKERS’ PERCEPTIONS ABOUT “NATURAL TOBACCO” AND “ADDITIVE-FREE” CLAIMS**


In the 1990’s, as the use of additives in cigarettes became a concern in the United States, similar concerns were expressed in the Canadian marketplace despite the fact that almost no Canadian cigarettes contained tobacco additives. During this period, a few cigarette brands began displaying words like “natural tobacco” and “additive free”.

The purpose of this study was to develop some understanding of smokers’ perceptions of these terms, to explore smokers’ beliefs regarding cigarettes toxicity, and to verify the impact of these terms on smokers’ purchase and consumption behaviour.

Twelve in-depth, face-to-face interviews were conducted in June 2001 with French-speaking, Montreal-area smokers who smoked the same cigarette brand. This relatively new brand, introduced when there were no requirements to list toxic emissions on the packs, proeminently displayed the terms “natural tobacco” and “additive free.” Interviews, using a pack mock-up, photographs and balloon-tests, lasted 60 minutes.

Results show that these smokers were long-time smokers (average 30 years), educated, had tried to quit a few times, were aware of tobacco’s health hazards, and were hoping to eventually quit smoking.

Results further show that these terms have a major impact on these smokers’ reason for choosing or switching to this brand. Smokers clearly understand and believe these terms. In their mind, this brand is the least toxic on the market, even less toxic and without the sensory disadvantages usually associated with light cigarettes. This belief influences the smokers in continuing to smoke or in hoping to quit.

_Funded by Health Canada._

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**PO3 29**

**CHANGES IN PERCEPTIONS ABOUT LOW TAR CIGARETTES AND HEALTH BELIEFS: THEIR RELATIONSHIP WITH SWITCHING BEHAVIOR, ATTEMPTS TO QUIT, AND SMOKING CESSATION**

Joseph E. Bauer, Ph.D., Nina E. Davis, Andrew Hyland, Ph.D., Michael Cummings, Ph.D., MPH

**OBJECTIVE:** To assess the relationship between changes in perceptions about low tar cigarettes and health beliefs with the outcomes of switching behavior, attempts to quit, and smoking cessation.

**RATIONALIE:** It is conceptualized that when people’s health beliefs become more positive, they will engage in better health behaviors. It is reasoned that these attitude and behavioral changes are along a trajectory that would culminate in smoking cessation.

**METHODS:** The study population includes 1,293 smokers in 10 matched pairs of U.S. communities who participated in the Community Intervention Trial for Smoking Cessation (COMMIT) - in 1989, 1991, and 1993. Logistic regression analyses were run, adjusting for multiple covariates, to assess independent effects on the outcome variables.

**RESULTS:** Respondents who came to believe that quitting smoking would avoid future health problems were 2x more likely to quit smoking in the future, than those who didn’t change that attitude. People who maintained a belief that low tar cigarettes were safer, were more than 2X as likely to attempt to quit smoking in the future, than those who didn’t think they were safer. People who maintained a belief that second-hand tobacco smoke causes lung cancer, were 60% more likely to attempt to quit in the future, than those that didn’t believe that. People who attempted to quit smoking were 2X as likely to have quit smoking in the future, than those who didn’t make an attempt to quit. Surprisingly, there was no relationship between changing or maintaining of positive health beliefs and the future behavior—switching to smoking low tar cigarettes.

**CONCLUSION:** Although changes in perceptions about low tar cigarettes and health beliefs are predictive of future attempts to quit smoking and future smoking cessation, they are not associated with switching to smoking low tar cigarettes.

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**PO3 31**

**SMOKERS UNDERSTANDING OF CIGARETTE DELIVERY: AUSTRALIAN DATA**

Ron Borland and Anita Lal, VicHealth Centre for Tobacco Control

This paper reports on a survey of 306 Australian smokers with the aim of exploring their understanding of cigarette delivery and their views about products labelling and related issues. Smokers were asked about tar, nicotine and CO deliveries of their normal brand, with only 42% knowing their tar level, 21% nicotine levels and 8% CO levels. Only 25% know that the levels reported on the pack are supposed to assess levels of smoke ingested. Most thought the levels referred to the amount in the tobacco. Furthermore, only 25% had any idea that the information on levels was misleading as an indicator of what smokers typically take in. Only 20% knew that blocking filter vents affected consumption, but another 30% said they were aware of the role of vents after prompting. While smokers generally did not think light and mild related to health when asked, when those who didn’t were specifically challenged, “does this mean they are less harmful to your health or not”, more thought they were less harmful, 49% giving overall holding some belief about reduced harm.

We conclude that smokers have poor knowledge of what they take in and most do not understand the current ISO-based product information, which may be just as well as it is misleading. There is a real need to find better ways to effectively communicate information to smokers about what levels of harmful products they are ingesting.

Funded by grants from National Heart Foundation and VicHealth.

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**PO3 32**

**SMOKERS IN PRIMARY CARE: WILL THEY ENTER FORMAL SMOKING CESSATION PROGRAMS?**

Danielle E. McCarthy, B.A.*, Michael C. Fiore, M.D., Stevens S. Smith, Ph.D., Mark E. Zehner, C.C.R.C., and Timothy B. Baker, Ph.D., University of Wisconsin–Madison.

Past research has suggested that smokers are unwilling to enter formal quit-smoking programs. In this study, patients identified as smokers at primary care clinics were invited to participate in a study offering free treatment to quit smoking. Of the 5,039 invitations to participate, 62.5% were accepted whereas 37.5% were refused. Only those patients whom we were able to contact and who met eligibility criteria were enrolled in the study, resulting in a total sample size of 1,913. Of these participants, 84.5% picked up no-cost nicotine patches from participating pharmacies.

In addition to NRT, three levels of counseling treatment intensity were available, through either random assignment or self-selection. Of the 937 participants (48.3%) who were allowed to self-select their own treatment intensity, 231 (24.7%) elected to receive only the nicotine patch, 304 (32.4%) elected to receive the nicotine patch and individualized telephone support and mailings, and 402 (42.9%) elected to receive the highest intensity treatment, consisting of nicotine patches, telephone support and mailings, and individual counseling sessions.

Results showed that the majority of smokers invited to participate in a quit smoking study in a primary care setting were interested, and that smokers selected higher intensity treatments when given the opportunity. Factors associated with interest in participation and patch pick-up were identified using logistic regression analyses. Treatment outcome data will also be presented, as a function of treatment condition and patient characteristics. This study was conducted at the University of Wisconsin–Madison.

Supported by National Cancer Institute Grant # NCI 1 R01 CA17377.

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PO3 33 CREATING REALISTIC EXPECTATIONS FOR HEALTH CARE PURCHASERS: INITIAL AWARENESS AND USE OF AN INSURANCE BENEFIT FOR SMOKING CESSATION

Marguerite E. Burns, M.A., Timothy Bosworth, Ph.D., Joey Campbell, Michael C. Fiore, M.D., M.P.H.

BACKGROUND: Health insurance coverage for smoking cessation treatment (SCT), particularly for pharmacotherapy, remains uncommon. Uncertainty about benefit use and cost may impede health care purchasers’ demand for such coverage. This poster presents Year One data from a three-year observational study designed to reduce this uncertainty.

METHODS: In 2001, the State of Wisconsin added insurance coverage for SCT to the insurance package provided to its ~ 200,000 State employees, retirees, and their dependents. Tobacco-related measures were added to the 2001 Consumer Assessment of Health Plans Survey for this population. 11,889 State employee/retiree households were randomly selected and stratified by 19 health plans. 5865 individual interviews were completed (61% response rate). A content analysis of health plan promotional materials was conducted to assess promotion of the SCT benefit.

RESULTS: 13.8% of respondents reported smoking every day or some days. 8.3% of all respondents, and 22.9% of smokers reported being aware of the SCT benefit. Of aware smokers, 32% reported using the SCT benefit including one or more prescription medication. The level of health plan promotion did not substantially affect health plan member awareness of the SCT benefit.

DISCUSSION: Under these “natural conditions” of health plan promotion, members’ initial use of a new SCT benefit is modest. Health care purchasers’ concerns regarding high rates of up front benefit use and associated costs may be unfounded. Instead, stimulating demand for benefit use may require their attention.

Support from the Robert Woods Johnson Foundation, grant # 042084, is gratefully acknowledged.

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PO3 34 HEALTH CARE PRACTITIONERS’ MOTIVATION FOR TOBACCO DEPENDENCE COUNSELING

Geoffrey C. Williams, M.D., Ph.D.*, Chantal S. Levesque, Ph.D., Allan Zeldman, M.A., Scott Wright, B.A., Edward L. Deci, Ph.D., University of Rochester

BACKGROUND: Health care practitioner (HCP) motivation for adopting systematic tobacco dependence counseling such as the AHRQ’s 4A’s remains poorly understood. Methods: HCP’s (N=220) completed questionnaires assessing self-reported tobacco dependence counseling behaviors, autonomous and competence motivations, and support from insurers and instructors, before and 3 months after attending a tobacco dependence training workshop. Outcomes: Change in use of AHRQ model, and time counseling. Results: Structural Equation Modeling revealed change in autonomous motivation for counseling significantly predicted change in use of the AHRQ model (p.e.a.39, p.c.05), and time counseling (p.e.a.47, p.c.05), while change in competence did not. Instructor supportiveness predicted change in HCP autonomous (p.e.a.27, p.c.05) and competence (p.e.a.18, p.c.05) motivations. Conclusion: HCP training for tobacco dependence counseling may need to support practitioner autonomy in order to be maintained over time.

Supported by a grant from the New York State Department of Health, and conducted with the Medical Society of the State of New York.

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PO3 35 IDENTIFYING SMOKE AND FORMER SMOKE IN MANAGED CARE: PERFORMANCE OF AUTOMATED DATA SYSTEMS

Paul Fishman¹, Elizabeth P. Merkile², Ella Thompson¹, David Drisol³, Susan J. Curry⁴, ¹Center for Health Studies, Group Health Cooperative, ²Pfizer, Inc., ³University of Illinois-Chicago

The first step toward effectively providing smoking cessation services is identifying smokers. Many health plans are experimenting with alternative methods of identifying smokers in order to extend outreach efforts. We evaluated the method of establishing smoking status employed by Group Health Cooperative (GHC), a large mixed model HMO serving over 500,000 individuals in Washington State.

Since 1990 GHC has included smoking status as a vital sign logged in the patient’s medical record. In 1996, GHC began capturing this data for inclusion in its automated database. At each outpatient visit, clinicians document the smoking status of all patients as: “current smoker”, “recent quitter” (within the last year) or “never smoked.” This is then coded on the electronic record of the visit.

We surveyed a sample (N=1,112) of GHC enrollees electronically identified as either recent quitters or current smokers to assess their self reported smoking status. Concordance between automated capture and self-report of smoking status achieved a Kappa statistic of 5 based on 75% accuracy between the two measures. Errors were evenly distributed among incorrect identification of smokers and former smokers. These results suggest that automated capture of smoking status is a reliable method of determining smoking status with managed care populations and presents an opportunity for targeted outreach for cessation services.

This study was supported by a grant from Pfizer, Inc. to the first author.

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PO3 36 TOBACCO CONTROL POLICIES IN 11 VANGUARD U.S. MANAGED CARE ORGANIZATIONS


To assess tobacco control policies of U.S. managed care organizations (MCOs) with above-average tobacco treatment scores in the Health Plan Employer Data and Information Set (HEDIS), we conducted telephone interviews of key informants at 11 nonprofit staff-model MCOs in 1999. Ten plans had tobacco guidelines consistent with U.S. Public Health Service Tobacco Treatment Guidelines. Five plans gave feedback and financial incentives to providers for guideline compliance. Most plans also did clinician training (but did not reach most clinicians); provided other support including dedicated budgets, staff, and an oversight committee; and recommended office systems to support provider efforts. Fewer actively facilitated office system implementation. All plans offered some coverage for tobacco cessation pharmacotherapy and behavioral counseling, though not to the extent recommended by current guidelines. The study demonstrates that multiple system supports for tobacco control can be implemented by U.S. health plans. To comply fully with USPHS tobacco treatment guidelines, even these vanguard plans could take additional actions: (1) extending tobacco guidelines to special populations such as children, parents, pregnant women and hospitalized smokers; (2) expanding provider performance monitoring systems to track efforts beyond simple advice to quit, (3) offering more training, feedback and incentives to clinicians, and (4) expanding system-level supports, including ways to identify smokers and more complete coverage of tobacco dependence treatment.

Funding: NCI grant (U19 CA79689) to the Cancer Research Network.

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PO3 37 PATTERNS IN THE TREATMENT OF COLLEGE SMOKERS BY HEALTH CARE PROVIDERS

Jennifer Scott Koontz*, M.P.H., Kari Jo Harris, Ph.D., M.P.H., Kolaowole S. Okuyemi, M.D., M.P.H., Jasjit S. Ahluwalia, M.D., M.P.H., M.S., University of Kansas Medical Center

Recent studies have shown that 30% of college students currently use tobacco. In spite of this growing problem, limited smoking cessation information exists about college students. Brief clinician advice is an effective cessation intervention, producing a 7-10% quit rate among adults. To examine advice among college students, 233 current smoking students and 115 non-smoking students at the University of Kansas completed a 266-item survey. When asked about counseling by their health care providers, 77% of student smokers reported being asked about smoking in their lifetime. Of those who had been asked, 57% of smokers were advised to quit smoking, 22% were given specific advice on how to quit, 5% were helped with setting a quit date, and 4% were offered follow-up. Older students were more likely than younger students to be asked (OR = 1.33, 95% CI = 1.023,1.729), while male students (OR = 0.45, 95% CI = 0.267,0.757) and those from towns of less than 10,000 people (OR = 0.16, 95% CI = 0.057,0.430) were less likely to be asked about smoking in their lifetime. Non-daily smokers were less likely to be advised to quit, compared to daily smokers (OR = 0.40, 95% CI = 0.193,0.836). Smokers who accurately reported their smoking behavior were more likely to be advised to quit (OR = 6.20, 95% CI = 3.009,12.772) and given specific advice (OR = 7.07, 95% CI = 2.074,24.079). Low rates of provider counseling pose a health risk for this population.

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PO3 38 TOBACCO CONTROL IN KANSAS

Won S. Choi, Ph.D., Amy C. Morgan, Jasjit S. Ahluwalia, M.D., M.P.H., University of Kansas School of Medicine

Since the Master Settlement Agreement many states have implemented Comprehensive Tobacco Control Programs using the nine “best practices” as recommended by the Centers for Disease Control (CDC). In the state of Kansas, tobacco control prevention has occurred on two fronts. The first was a $500,000 grant from the state tobacco settlement given to the county of Saline to initiate a tobacco control program with all nine CDC components. Seven enhancement grants averaging $30,000 from the CDC were given to counties throughout Kansas using two or three of the components to initiate tobacco control programs. Saline County is located in central Kansas with a population of 56,200. The Saline County Adult Tobacco Survey was conducted between June and August, 2001 and collected information on smoking-related attitudes and behaviors. In this paper, we present findings from 1,801 adults in Saline County, Kansas (56% response rate). Most of the respondents were female (69%), white (92%), and had some college education (62%). Approximately 21% of the respondents were current smokers. More than half (53%) of the residents reported being exposed to ETS in a place other than the home or workplace. In addition, 47% of these respondents who reported being exposed to ETS, were exposed in restaurants in their community. Approximately 75% of Saline County residents dine out at least once a week and of these respondents, 77% would not change their frequency of dining out, 13% would increase, and only 8% would dine out less often if all restaurants in Saline County were smoke-free. Finally, 75% of the residents reported that they would support an additional tax on a pack of cigarettes. We will present additional results from our baseline survey for Saline County, Kansas.

Funding: Kansas Department of Health and Environment.

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PO3 39 DEVELOPMENT OF AN EVALUATION SYSTEM FOR THE TRANSDISCIPLINARY TOBACCO USE RESEARCH CENTERS

Glen D. Morgan, Ph.D.*, National Cancer Institute & William M. Trochim, Ph.D., Cornell University

Seven Transdisciplinary Tobacco Use Research Centers (TTURCs) were established in 1999 via funding by NCI, NIDA, and RWJF to: bridge disciplinary barriers; establish new conceptual frameworks and methods to understand and treat tobacco use; speed transfer of innovative approaches to communities nationwide; and, create a core of new tobacco control researchers. The centers are midway through five years of funding.

NIH has the dual responsibility to ensure appropriate stewardship of funds while promoting scientific discovery in the TTURC initiative. However, there is currently no standard approach for evaluating TTURCs processes and outcomes. This paper describes the development of an evaluation system for the TTURCs.

The evaluation system was developed collaboratively, with transdisciplinary and trans-center participation throughout. The TTURCs and key stakeholders engaged in a web-based brainstorming in which they generated 262 potential outcomes. These were subsequently edited to a final set of 97 outcomes used the web to conduct a pile sort and importance rating. Multivariate analyses (multidimensional scaling; hierarchical cluster analysis) of these data yielded both a measurement framework “map” and a classification of the 97 outcomes into 13 construct areas.

The TTURCs then collaboratively reviewed content areas and proposed nearly 250 specific measures across the 13 content clusters. These were entered into a database, classified both by content area and by potential measurement method, and a panel of evaluation measurement experts developed a draft measurement system that was then reviewed by the TTURCs, pilot tested and revised. The final evaluation system was designed to address several criteria including feasibility, efficiency, collaboration, and rigor.

The paper discusses the implications of this effort both for the TTURCs and for the evaluation of other large multi-center research initiatives.

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PO3 40 SEARCHING FOR DATA ON TOBACCO USE IN DEVELOPING COUNTRIES: USING THE DHS AND RHS SURVEYS TO ESTIMATE PREVALENCE

Shawna L. Mercer, Ph.D.*, and Meredith A. Reynolds, Ph.D., Centers for Disease Control and Prevention

National, population-based data on tobacco use in many developing countries are currently limited. This study sought to compile and evaluate the utility of available data on tobacco use from two of the most extensive population-based, household survey programs of demographic and health indicators carried out in developing countries: the Demographic Health Surveys (DHS) of Macro International Inc. and the Reproductive Health Surveys (RHS) of the Centers for Disease Control and Prevention. We present a template for data extraction and display that identifies similarities and differences between the surveys and we consider the usefulness of the data for calculating and comparing prevalence estimates. Tobacco use questions are only somewhat regularly included in these surveys and question wording follows a number of different formats. Many surveys only include female respondents. Tobacco use questions are generally not asked of male respondents. Several surveys exclude women who have never been pregnant. Although the final survey reports are widely disseminated and used to inform health policy, tobacco data are often mentioned only briefly, if at all. Among women, for whom the DHs and RHS data are the most informative, we found wide variability in the prevalence of tobacco use and of quitting during pregnancy both across age groups and countries. We outline recommendations for future surveys and discuss ways in which the existing data can assist health officials and practitioners as they seek to identify and prioritize current and future needs for tobacco use surveillance, prevention and cessation.

Secondary data analysis: no funding required.

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**PO3 41**  
**EPIDEMIOLOGICAL CONSEQUENCES OF SEVERE TOBACCO DEPENDENCE? THE LUNG CANCER EXAMPLE IN AUSTRIA**

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Approximately 3200 lung cancer patients die each year in Austria, and Austrian males have a four times higher risk dying of lung cancer than females. The incidence rate of lung cancer has decreased over the 1984-1996 period, for females increased. An analysis of variance (ANOVA) was used to identify significant differences in the mean age at death of lung cancer patients in Austria. The patients were divided into three groups according to their year of death. The first group consisted of patients dying between 1976 and 1982, the second group between 1983 and 1989, and the third group between 1990 and 1996. Males and females were analyzed separately.

While the annual mean age at death of female lung cancer patients did not change significantly (P=0.976) over the 20-year observation period (1976-1996), we found that the annual mean age at death of male lung cancer patients decreased significantly over this period (P<0.0001)

Some factors may account for this trend are discussed. Early onset of tobacco smoking might be one reason, as adolescent smokers in the 1950s and 1960s may have had different smoking patterns than earlier generations of smokers. Consequently they may have developed lung cancer at a relatively young age in the 1980s and 1990s. This could have contributed to the decreased male mean age at death during the 1990s, even though general life expectancy is increasing and the mortality and incidence rates of male lung cancer patients are decreasing.

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**PO3 42**  
**IMPACT OF OVER-THE-COUNTER AVAILABILITY ON NICOTINE REPLACEMENT THERAPY**

Jacqueline M. Major, M.S.*, and David M. Burns, M.D., University of California, San Diego

Information in the Smoking and Tobacco Control Monograph 12 (NCI, 2000) sparked further research on methods of cessation assistance. Since nicotine gum and nicotine patches were approved for over-the-counter (OTC) sale in the year 1996, a comparison of data collected in 1996 to data collected in 1999 was of special interest. The purpose of the study was to investigate the effect of using Nicotine Replacement Therapy (NRT) on cessation status among current and former smokers in California. This poster compares current smoking and cessation status to cessation aids used by adult smokers from two population-based surveys, California Tobacco Surveys 1996 and 1999. Along with demographics, smoking status, smoking history, recent attempts to quit and corresponding dates of last quit were obtained. Ever smokers, aged 25 and older, who made a cessation attempt one year prior to the survey were analyzed. Prevalence and means were used to investigate the relationship of NRT to cigarette cessation status. A significant difference with NRT used in combination with other cessation aids was present in the 1996 data. An increased proportion of those who quit smoking less than 3 months in duration was present for the 1996 data (19.5%, 4.2 95% CI), but not for the 1999 data. Further evaluation showed that the mean duration of cessation varied as a function of cessation aid used. Preliminary results suggest that the increased fraction of the 1996 population who report being former smokers for less than 3 months may be an artifact of over-the-counter availability. However, possible increases in other measures such as cigarette price, health insurance or physician’s advice to quit may actually be masking an effect present in the 1999 data.

This study was funded by the Tobacco Related Disease Research Program grant # BRt-0094.

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**PO3 43**  
**POST MARKETING SURVEILLANCE OF NICOTINE REPLACEMENT THERAPIES**

Edgar H. Adams, Sc.D., Harris Interactive; Barbara H. Korberly, Pharm.D., Pharmacia Consumer Healthcare; Mary K. Maguire, Pharm.D., McNeil Consumer Healthcare; Mikael A. Franzon, Ph.D., Pharmacia Consumer Healthcare

The availability of nicotine transdermal patch, nasal spray and inhaler increased the armamentarium of nicotine replacement therapies but concerns were raised that they might be used by students as a “Gateway Drug” or to maintain nicotine dependence. A series of biannual surveys were conducted among students in grades 7 through 12 in 1997, 1998, and 1999. A total of 198,662 surveys were collected from a representative sample of 200 schools in 8 geographic regions across the United States. Lifetime prevalence of use of the patch and spray was low ranging between 0.3 and 1.2 percent. Daily use of the patch ranged from 0.07 to 0.1 percent. Even among current smokers lifetime prevalence of the transdermal patch was only 5 percent and daily use was 0.04 percent. Use for the most part was experimental, 75 to 80 percent of students who tried the nicotine patch used it only a few times. This pattern was also true among current smokers. Although current smokers were more likely to use nicotine replacement therapies and to use at an earlier age than “never smokers.” Over the 3 years, the prevalence of use of NRT’s was low across all 6 grades and 8 regions. For example, over the 3 years, lifetime prevalence of the patch ranged from 0.9 to 1.2 percent. The prevalence of these products was so low that the hypothesis that the patch or spray might act as a “gateway drug” does not seem tenable.

This study was funded by McNeil Consumer Healthcare and Pharmacia Consumer Healthcare.


**PO3 44**  
**POST MARKETING SURVEILLANCE OF NICOTINE REPLACEMENT THERAPIES AS “GATEWAY DRUGS”**

Edgar H. Adams*, Sc.D., Paul A. Nisbet, Ph.D., Harris Interactive; Mikael A. Franzon, Ph.D., Barbara H. Korberly, Pharm.D., Pharmacia Consumer Healthcare and Mary K. Maguire, Pharm.D., McNeil Consumer Healthcare

Concerns have been raised that the nicotine inhaler, and the nicotine gum and patch may act as ‘gateway drugs’ that lead to the use of illicit drugs in younger populations. This analysis uses data from waves 5 and 6 of a larger post-marketing surveillance program to address this issue. Waves 5 and 6 included 65,300 students in grades 7 through 12 including 8,456 12th graders. The primary analysis was restricted to twelfth graders in order to allow sufficient exposure time to understand the ordering of use. The data were analyzed by overall prevalence of drug use, smoking status, use of nicotine replacement therapies, and age of first use. Of the total sample, 25 percent were categorized as current smokers, 3.2 percent as light smokers, 37 percent as ex-smokers, and 37 percent as never smokers. Age of first use appeared to follow the pattern of tobacco use slightly preceding alcohol followed by marijuana and cocaine. Initiation of the gum and inhaler clearly followed initiation of all of these other drugs. Although the inhaler has only been on the market for a couple of years the gum and patch have been available for several years so the results cannot be explained by lack of potential exposure because the inhaler is a relatively new product in the U.S. The modal age of first use of the gum and patch was 16 to 17, suggesting that a gateway hypothesis is not supportable.

This study was sponsored by Pharmacia Consumer Healthcare.

PO3 45 ARE PHARMACEUTICAL AIDS HELPING SMOKERS IN THE CALIFORNIA POPULATION TO QUIT?

John P. Pierce, Ph.D.*, Elizabeth A. Gilpin, M.S., University of California, San Diego

Assisting smokers to quit successfully is a major public health goal. In controlled clinical trials, nicotine replacement therapy (NRT) and/or the antidepressant bupropion have increased cessation rates by 50-100% in moderate-to-heavy smokers. NRT became available over the counter in 1996 and has been heavily promoted to the general population. Data from the large, population-based California Tobacco Surveys (1992, 1996 and 1999) were used to establish trends in quitting behavior among respondents who reported smoking in the year before the survey. Between 1992 and 1999, the percentage of smokers making a quit attempt in the last year increased over 60% (38.1% to 61.5%), and use of pharmaceutical aids among quitters increased from 9.3% in 1992 to 17.2% in 1999, resulting in over a 3-fold increase in the number of California smokers using such aids. However, many smokers are not using the aids according to recommended guidelines: the median duration of use was only 14 days (much less than the 6-12 weeks recommended). However, quitters whose health plans helped pay for NRT used it longer. Fewer NRT users in 1999 had adjunct behavioral assistance than in 1996 when NRT went over the counter. Additionally, over a third of the new users between 1996 and 1999 were lighter smokers (<15 cigarettes/day) for whom these products have not been shown to have benefit. While pharmaceutical aid use increased short-term quitting success in moderate-to-heavy smokers, there was little long-term advantage. Further research is needed concerning use of these aids in self-directed quit attempts, including overcoming barriers to effective use.

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PO3 47 TOBACCO USE BY MASSACHUSETTS COLLEGE STUDENTS: LONG-TERM EFFECT OF THE MASSACHUSETTS TOBACCO CONTROL PROGRAM?

Nancy Rigotti, M.D.*, Susan Regan, Ph.D., Nicola Majchrzak, M.P.H., John Knight, M.D., Harvard Medical School; Henry Wechsler, Ph.D., Harvard School of Public Health

Since 1993, the Massachusetts Tobacco Control Program (MTCP) has aimed to reduce youth tobacco use with mass-media counteradvertising, school-based tobacco education, youth access and clean indoor air regulations. Massachusetts (MA) youths who were teenagers when MTCP began are now young adults. If the program had long-term effects, college students who attended high school (HS) in MA and were exposed to the MTCP should have lower tobacco use than students who attended HS outside MA and were unexposed to MTCP. We analyzed the 1999 Massachusetts College Alcohol Survey, which assessed tobacco use in a random sample of students at 11 4-year MA public colleges. Response rate was 56% (n=1252). One-third of respondents used tobacco in the past month; 46.4% used tobacco in the past year. Current tobacco use was lower among public college students who had attended HS in MA vs. those who attended HS in another state (31.5% vs 42.6%, p=.006). The effect persisted after adjustment for age, sex, race, parental education and students college residence (adjusted OR 0.67, 95% CI: 0.46, 0.97, p=.034). We conclude that tobacco use is common among MA public college students. Students who were exposed to MTCP as adolescents are less likely to use tobacco than their peers who were not exposed to this program. The MTCP may have reduced tobacco use among this group of young adults.

Funding: Grant from MA Department of Public Health.

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PO3 48 TOBACCO USE BY MASSACHUSETTS COLLEGE STUDENTS: DISCUSSING ISSUES WITH STUDENTS AND ADMINISTRATORS

Nicola Majchrzak, M.P.H., M.S.W.*, Elyse Park, Ph.D., Nancy Rigotti, M.D., Massachusetts General Hospital

Tobacco use by college students increased in the 1990s. Little is known about college students’ or administrators’ views of college students’ tobacco use, awareness of prevention and cessation resources or the extent and effectiveness of campus tobacco control policies.

As part of a study of tobacco use in 11 Massachusetts public colleges, we interviewed 4-5 key administrators at each school and conducted 6 focus groups (3 with smokers, 3 with non-smokers) with 62 students at 3 colleges. Focus group participants were aged 18-22 years, 56% male, 5% non-white.

Most smokers were aware of the health consequences of smoking but believed they were not addicted to nicotine, could quit easily, and were comfortable with their tobacco use. Few expressed intentions to quit while in college. Both smokers and nonsmokers were reluctant to intrude on smokers’ wish to smoke. Neither students nor administrators were well informed of campus or community resources to assist smokers wishing to quit. Students and administrators knew about campus clean indoor air policies but had different perceptions of the success of policy implementation. Students reported that policy noncompliance was common and rarely sanctioned, while administrators thought policy compliance was high and did not require stricter enforcement. Neither students nor administrators were aware of policy details regarding tobacco sales or marketing.

In summary, tobacco use by college students was not regarded as a high-priority problem by students or administrators. No-smoking policies needed more stringent enforcement. Further study is needed to identify effective tobacco prevention and cessation messages and interventions for college students.

Funding: Grant from MA Department of Public Health.

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PO3 49  THE ROLE OF TRAIT SELF-OBJECTIFICATION AND APPEARANCE AWARENESS IN SMOKING AND EATING BEHAVIORS IN YOUNG WOMEN
Zaje A. T. Harrell, University of Michigan

Self-objectification theory links the cultural requirement that women engage in constant appearance monitoring with mental health outcomes. Self-objectification, the practice through which an individual views her body from a third person perspective is a dimension of individual difference. In relationship, women who are more vulnerable to images of thinness and glamour have been found to be more likely to engage in weight control smoking. The current study examined the role of self-objectification in young women’s smoking behavior. A model was proposed in which trait self-objectification mediates the relationship between awareness of sociocultural appearance standards and smoking outcomes. Trait self-objectification and smoking status were also examined as predictors of eating behavior. Data was collected from young women, 70 never smokers and 60 smokers. Smokers scored significantly higher on a measure of trait self-objectification (t (128) = 2.97, p = .004) and eating behaviors (t (128) = -2.62, p = .01). However, smokers and never smokers did not significantly differ in appearance awareness (t (128) 1.36, p = .176). A logistic regression revealed a suppression effect in which higher appearance awareness decreased the odds of smoking, while self-objectification increased the odds of smoking. Self-objectification and smoking status were also significant predictors of eating behaviors (F (2, 127) = 7.99, p = .001). These findings support the use of self-objectification as a contributor to individual differences in young women’s smoking and mental health outcomes.

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PO3 51  DOES MEDICAL EDUCATION HELP PREVENT STUDENTS FROM SMOKING?
Shiu-Shing Wong,* Ph.D., Tong Zhu, M.D., and Shu-Hong Zhu, Ph.D.*, University of California, San Diego

In 1996, a total of 1,896 students from twelve colleges (four were medical colleges) in three Chinese cities were surveyed using a self-administered questionnaire for smoking patterns, smoking-related knowledge, and attitudes and beliefs toward smoking. About half of them (980) were medical students. The age ranged from 16 to 30 (mean=20.6, SD=1.5), and 60.5% were male. The results show that there was little difference in smoking behavior between medical and non-medical students across multiple measures. The smoking prevalence for male medical and non-medical students was 40.7% and 45.1% (p=.14), respectively. For females, it was 4.4% and 6.0% (ns), respectively. Medical and non-medical students had similar percentages of ever smokers (53.9% vs. 57.7%, ns), established smokers (34.2% vs. 39.6%, ns), current smokers (26.8% vs. 29.8%, ns), and smoking more than 5 years if they were currently smoking (49.3% vs. 52.0%, ns). However, among current smokers, medical students were much more likely to be occasional smokers than non-medical students (75.3% vs. 60.6%, P<.001). These data suggest that medical education had little influence on the decision to smoke for these Chinese students. In fact, smoking prevalence increased as these medical students received more years of education. However, medical education does seem to reduce the consumption level of medical students who smoke.

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PO3 50  THE INFLUENCE OF BEST FRIENDS ON ADOLESCENT SMOKING
Kristin Koetting O’Byrne, Jennifer E. Taylor, Melissa L. Hyder, C. Keith Haddock, Ph.D., W.S. Carlos Poston, Ph.D., M.P.H., University of Missouri-Kansas City

Past research has documented that peer influences, including having friends who smoke, has a substantial impact on adolescent smoking initiation. Although peers generally have an effect on youth tobacco use, it is likely that having a best friend who smokes has a stronger effect. Therefore, this study investigated the link between adolescent smoking status and accepting the offer to smoke from a best friend among 838 junior high and high school students (58% female; in grades 7-12; mean age 15.1 years; 14.1% ethnic minority; 19.4% smokers). While it was not surprising that most (93.8%) smokers said they would smoke if their best friend offered, a significant proportion of adolescents who were nonsmokers (10.6%) indicated that they would smoke if their best friend offered. Thus, more that 1 in 10 adolescents reported they would initiate smoking if asked to do so by their best friend. Next we conducted a logistic regression analysis of traditional risk factors for smoking initiation to determine factors that would increase the odds that a nonsmoker would smoke a cigarette if their best friend offered. Results suggested that adolescents who believe that smoking was more socially attractive (OR = 1.89; p<.001) and those who reported poorer family functioning (OR = 0.94; p<.001) were more likely to smoke if their best friend offered them a cigarette. These results have important implications for researchers and practitioners involved in smoking prevention.

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PO3 52  A QUALITATIVE ANALYSIS OF COLLEGE STUDENTS’ SMOKING: PERCEPTIONS AND INTEREST IN CHANGE
Harris, K.J., Wilson, T., Ahluwalia, J.S.

Although tobacco smoking is increasing among college students, little detailed information is lacking on students’ own perceptions of and experience with key issues related to their tobacco use. To explore these issues, 12 single gender focus groups were conducted with male (n=41) and female (n=44) undergraduates at a Midwestern University. Graduate assistants recruited participants individually by approaching students on campus and conducting a brief screener. Groups were further stratified by level of smoking to obtain information from non-regular (smoked no more than 4 of the last 30 days and, on the days smoked, smoked at least 1 cigarette/day) and regular (smoked at least 20 out of the last 30 days and, on the days smoked, smoked at least 7 cigarettes/day) smokers. The two-hour groups were facilitated students using semi-structured questions and students completed brief surveys. Responses were audiotaped, transcribed, and coded for main themes using grounded theory approaches. Non-regular smokers, on average, smoked 9.8 (males) and 8.9 (females) days out of the last 30 and smoked 3.4 (males) and 2.9 (females) cigarettes on the days they smoked. Regular smokers, on average, smoked 29.7 (males) and 29.3 (females) days out of the last 30 and smoked 11.9 (males) and 13.4 (females) cigarettes on the days they smoked. Main themes included issues related to (1) motivation and interest in reducing and quitting, (2) smoking expectations and differences between lower and upper-level grade classes, (3) addiction, and (4) study recruitment. Information from this formative study can assist researchers in designing and implementing interventions to address tobacco smoking among college students.

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PO3 53  
SMOKING TOBACCO WHILE IN COLLEGE: BASELINE ANALYSIS FROM A LONGITUDINAL SURVEY  
Harris, K.J., Grobe, J., McCarter, K., Nazir, N., Gerkovich, M., Choi, W.S., Catley, D., Ahluwalia, J. S.

Although tobacco smoking is increasing among college students, little in-depth information is available to describe their smoking patterns or the development of their tobacco use. In January 2001 597 undergraduate students at a midwestern university completed screening questions while a sub-sample of 116 non-smokers and 234 smokers (defined as any smoking in the last 30 days) completed a 296-item in-depth questionnaire. Screening data revealed that 44% smoked on 1 or more days in the past 30 days and of those who smoked, most (71%) reported smoking less than daily. Significant differences between daily and non-daily smokers completing the in-depth assessment (47% female, 92% white, 68% freshman) were found. Daily smokers had more symptoms of depression, smoked longer at their current rate, had made more quit attempts, were more likely to have increased their smoking while in college, reported more respiratory symptoms, were more likely to live with smokers, and received more smoking-related counseling from their health care providers. Non-daily smokers were more confident that they could quit and reduce smoking and were more likely to have rules about smoking in their home. There were no differences in levels of social support or self-esteem. To track smoking initiation and progression, freshman who completed the first assessment (n=237) will be asked to complete a follow-up in their junior year. Information from this analysis and forthcoming follow-up can assist researchers in targeting, designing, and implementing interventions to address tobacco smoking among college students.

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PO3 54  
EVIDENCE THAT TOBACCO USE TRAJECTORIES IN ADOLESCENTS ARE ASSOCIATED WITH SMOKING AMONG FIRST-DEGREE RELATIVES  
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SRI International, 1Oregon Research Institute, 2UCSF

Developmental trajectories of adolescent tobacco use may reflect genetic suscep-
tibility to become a regular smoker. This analysis constructed developmental smoking prototypes for 276 adolescents from the “SMOFAM” study, a longitudinal family cohort study. These adolescents (67% female) averaged 13.1 ± 1.5 years of age at baseline, had complete smoking data for the first 10 years of annual follow-up, and completed a family smoking history interview at the most recent follow-up. Eight features characterizing trends in smoking behavior over the adolescent/young adult years were defined and standardized. 138 non-smokers formed one cluster, and the standardized feature scores for the remaining 138 ever-smoking participants underwent k-means cluster analysis resulting in six distinct clusters. The clusters accounted for a substantial proportion of overall feature variability (pseudo F statistic=99.5). The percentage of first-degree relatives who were ever smokers was significantly different between the cluster groups, F = 19.6, p < 0.0001. Individuals from no or low-smoking clusters reported the lowest percentage of first-degree relatives who ever smoked, 32% and 46%, respectively. Individuals who started to smoke at an early age and maintained a high level of consumption had the highest percentage of first-degree relatives who ever smoked 84%. These results indicate a relationship between prevalence of smoking among first-degree relatives and developmental tobacco use phenotypes among adolescents.

Study supported by grants 7PT-2001 and 7PT-2002 from the University of California Tobacco-Related Diseases Research Program.  
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PO3 55  
DOES AFFECT AND PERSONALITY INTERACT TO PREDICT NICOTINE DEPENDENCE AMONG COLLEGE-AGE MALES?  
Dennis E. McChargue, Ph.D.*, University of Illinois Chicago and the Hines VA Hospital; Lee M. Cohen, Ph.D., Texas Tech University; and Jessica Werth Cook, M.A., University of Illinois Chicago and the Hines VA Hospital

Evidence suggests that mood states contribute to the development of nicotine dependence among smokers and smokeless tobacco users. Many assume that tobacco use disorders, regardless of the form of administration, are maintained by nicotine’s ability to regulate positive and negative mood states. The present study (n=43) explored whether certain mood states predicted dependence to either cigarettes or smokeless tobacco. We further explored whether personality characteristics (e.g., extroversion and neuroticism) mediate or moderated these relationships. Hierarchical regression analysis controlling for age and social desirability was used for all analyses. Results showed that positive affect predicted dependence to smokeless tobacco (p<.05) and that this relationship was moderated by extroversion (p<.05). As such, positive affect’s influence on smokeless tobacco dependence only existed among low extroverts (p<.001). Cigarette dependence, on the other hand, was predicted by dysphoria (p<.05). Subsequent analyses revealed that this relationship was fully mediated by neuroticism (p<.01). Our results suggest that dependence to cigarettes and smokeless tobacco among college-aged males may have different affective correlates and that certain personality characteristics explain or enhance these effects of mood on dependence.

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PO3 56  
HOW SCHOOL AND FAMILY CONTEXTS BUFFER ADOLESCENT DEPRESSION AND ITS EFFECTS ON CIGARETTE SMOKING  
Scott P. Novak, Ph.D., Harvard Medical School, Richard R. Clayton, Ph.D., University of Kentucky School of Public Health

Recent years have witnessed a growing recognition of the dynamic interplay between social contexts (e.g. family, peers, schools, and neighborhoods) and its effects on the development of adverse behavioral and mental health outcomes. This research seeks to contribute to this burgeoning area by examining how the relations between depressive symptomology and cigarette use (use in past week and quantity smoked) are moderated by family and school environments. Drawing on 3 separate waves of data (1995-1997) of 27,544 adolescents aged 9 through 18 attending 58 public school in Kentucky, we use Hierarchical Linear Modeling (HLM) procedures to explore these complex interactions. Our findings suggest that students who exhibited higher levels of depressive symptoms were less likely to smoke in schools with a sup-portive teacher climate compared to similar adolescents attending schools where teachers exhibited less emotional involvement. Although these relations were consistent across gender and parental living arrangements (single parent vs. multiple), sub-group comparisons revealed that in schools with the least supportive teachers, highly depressed girls of single parent households were more likely to smoke than similarly depressed girls of two parent households or boys living in single and multi-
ple parent households. However, gender differences were substantially smaller in schools with more supportive environments for both types of living arrangements. This research underscores how individual differences in gender and psychological dispositions may be differentially affected when exposed to high risk parental and school environments.

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PO3 57  DIFFERENCES IN PSYCHOSOCIAL CHARACTERISTICS BETWEEN DEPRESSED AND NON-DEPRESSED YOUNG ADULT TOBACCO USERS

Kristin Vickers, Ph.D.*, Christi Patten, Ph.D., Kristi Lane, Ph.D., Darrell Schroeder, M.S., Matthew Clark, Ph.D., Robert Colligan, Ph.D., Ivana Croghan, Ph.D., Richard Hurt, M.D., Jeannette Eckel, Melissa Bucholz, Laura Florin

The prevalence of smoking in the U.S. is currently highest (27.9%) among young adults ages 18 to 24 years. There are few data on the psychosocial characteristics of young adult tobacco users. The relationship between depression and smoking has been well documented, but little is known about the characteristics that differentiate depressed and non-depressed tobacco users. This study examined the relationships between tobacco use, depressive symptoms, coping responses to depressed mood, weight concerns, level of physical activity, and interest in exercise among young adults. A survey was administered to a convenience sample of university undergraduates, ages 18-24 years. Of the 681 respondents (72% female), 36% were current tobacco users. Current tobacco users reported higher levels of CES-D assessed depressive symptoms (p < .001) and lower stage of change for exercise (p = .04) than non-tobacco users. Depressed tobacco users (CES-D score of > 15) reported more maladaptive coping to depressed mood on the Response Style Questionnaire (p < .001), more frequent use of tobacco to cope with depressed mood (p = .02), greater weight concern (p = .001), and less physical activity (p = .05) than non-depressed tobacco users. Depressed (34%) and non-depressed (25%) tobacco users reported a comparable level of interest in an exercise intervention for stopping tobacco use (p > .10). These findings support the rationale for providing an exercise intervention for young adult tobacco users with depression.

Supported by a supplement to the Mayo Clinic Cancer Center Grant #CA15083 from the National Cancer Institute.

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PO3 59  THE EFFECT OF THE TOBACCO RETAIL ENVIRONMENT ON YOUTH SMOKING BEHAVIOR

Sandy Slater, M.S., Erin Ruel, M.A., Frank Chaloupka, Ph.D., University of Illinois at Chicago; Lloyd Johnston, Ph.D., Patrick O'Malley, Ph.D., Yvonne Terry-McElrath, M.A., University of Michigan, and Gary Giovino, Ph.D., M.S., Roswell Park Cancer Institute

This study examines what effect tobacco placement, advertising, promotions, and cigarette prices have on youth smoking behavior. Store and student data were obtained from community data collection activities in the Spring and Summer of 1999. Selection of communities was determined by the location of separate nationally representative public school samples of 8th, 10th, and 12th grade students. Students were administered surveys that included questions on youth smoking behavior. For each index school, a catchment area, or community, was then defined, reflecting the area from which the school draws the majority of its students. A list of all likely tobacco retailers located within the specified census blocks was generated. Information on cigarette placement, price for premium and low priced cigarettes, promotions, advertising, and number of stores located per catchment area were extracted from this data set. After controlling for grade, level, region, degree of urbanization, and socioeconomic factors such as age, ethnicity and income, preliminary results using aggregated data show significant differences in youth smoking behavior for price, promotions, and the number of stores located in the area. Results suggest that the retail environment does have some influence on youth smoking behavior.

This study was conducted by the first author at the University of Illinois at Chicago. Supported by The Robert Wood Johnson Foundation #033009.

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PO3 58  RECRUITMENT OF ADOLESCENT PARTICIPANTS INTO A LONGITUDINAL STUDY OF SMOKING TRAJECTORIES: WHO PARTICIPATES?

Kathleen R. Diviak, Ph.D.*, Sarah L. Kohler, B.S., John J. O'Keefe, B.A., Robin J. Mermelstein, Ph.D., and Brian Flay, Ph.D., University of Illinois at Chicago

Recruitment of adolescents into smoking research is often a difficult problem (e.g., McCormick et al., 1999). This study reports predictors of responsiveness to recruitment in a longitudinal, natural history study of adolescent smoking behavior. Entire classes of 8th and 10th grade students at 14 schools (N=4,109) completed brief surveys asking about their smoking history and current cigarette use, attitudes, demographics, and the smoking behaviors of family and friends. Based on responses to this screening survey, 1,046 students (ranging from susceptible nonsmokers to current smokers) were selected to participate in the longitudinal study, and overall, 49.7% agreed to participate. Univariate analyses revealed that females were significantly more willing to participate than males (53.8% vs. 45.7%), chi-square (1, N = 1019) = 6.77, p < .01; Caucasians (52.7% response) were significantly more likely than their African-American (38.9%) or Latino (42.7%) counterparts to participate, chi-square (2, N = 915) = 9.07, p < .05. School was a significant factor in responsiveness, with recruitment rates ranging from 25.4% to 63.6%. Recruitment rates did not vary by parental smoking status or by child grade. Tenth-grade males who were recent takers of cigarettes had the lowest responsiveness rates. Multivariate analyses revealed that overall, gender, race, and grade were significant predictors of willingness to participate. Implications for recruitment strategies for various types of smoking studies will be discussed.

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PO3 60  EFFECT OF BUYER, CLERK, AND NEIGHBORHOOD ETHNICITY ON ILLEGAL CIGARETTE SALES

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An unacceptably high proportion of retail outlets continue to illegally sell cigarettes to minors. Employing underage youth to perform compliance checks is currently the only available mechanism for determining which merchants are likely to sell. To better understand the effect of buyer, clerk and neighborhood ethnicity on sales rates, we employed African-American and White 16 and 17-year-old girls to make buy attempts in 230 stores in the Greater Baltimore area. Following each buy attempt, an adult entered the store openly and interviewed the clerk to establish the clerk's ethnicity. The store location was matched to Census data to determine neighborhood characteristics.

RESULTS: African-American girls were significantly more likely to be able to buy cigarettes than were White girls (p<0.01). A sale was most likely to occur when the clerk and minor were of different ethnicity than when they were of the same ethnicity (p = .031). Indian/Pakistani clerks sold cigarettes to minors more often than any other clerk ethnic group, and White clerks were least likely to sell (all p<0.05). Sales were highest in neighborhoods with the highest proportion of African-American population (p<0.01). Additional influences of clerk, store, and neighborhood characteristics will be discussed.

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PO3 61  INFLUENCE OF NEIGHBORHOOD CHARACTERISTICS ON THE PRICE OF MARLBORO AND NEWPORT CIGARETTES

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Smoking rates are higher among lower SES populations and in states with lower cigarette prices. Understanding the variation in cigarette pricing is critical to initiatives aimed at lowering tobacco use. To determine whether the price of premium cigarettes varies by neighborhood characteristics, prices with taxes of either Marlboro (n=725) or Newport (n=715) packs were recorded in a nationally representative sample of 1,440 stores. Marlboro cigarettes were included because of dominance in the market, and Newports because of their popularity among African-American smokers. 80%–90% of whom choose menthol cigarettes. GPS receivers were used to geocode each store, and the geocodes were matched to Census data.

RESULTS: Mean uncorrected price was $3.86 (95% CI $3.83 to $3.90), with no significant difference between the brands. Cigarette prices were significantly lower in census tracts with lower median household income, higher population density, and higher proportion of African-Americans. Brand interaction with neighborhood ethnicity (p=0.001), whereby in the highest quartile of proportion A-A population (compared to lowest quartile), the price of a pack of Marlboro decreased by 22 cents and the price of Newports by 40 cents. The relationship between these results and store characteristics, such as size of store, advertising and promotions, and industry incentives to merchants will be discussed.

Supported by National Cancer Institute Grant No. RO1CA86232.

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PO3 62  AFRICAN AMERICAN ATTITUDES TOWARD CIGARETTE TAXATION

Gary King, Robyn Mallett, Lynn Kozlowski, and Robert L. Bendel

BACKGROUND: Research suggests that raising taxes on cigarettes decreases the prevalence of smoking and provides revenue for tobacco cessation and prevention programs. Low-income smokers may be particularly affected by an increase in cigarette taxes, and therefore may be more opposed to regressive taxes on tobacco. As the African American community has a high proportion of smokers and low-income persons, we examined the hypothesis that lower-income African Americans are more opposed to such policies than higher-income African Americans.

METHODS: Random digit dialing was used to select 1,000 African American adults in 10 congressional districts across the United States. Respondents answered questions regarding attitudes toward taxes on cigarettes, personal smoking history, and demographic information.

RESULTS: Opposing tax increases on cigarettes was inversely related to annual family income and education. A multiple logistic regression model revealed that income was the only statistically significant socio-demographic predictor of opposition to raising taxes. Respondents whose incomes exceeded $15,000 were 2.1 to 3.2 times more likely to state that even if increasing taxes on cigarettes affects African American smokers more than any other group of smokers, they would not be opposed to raising taxes. The adjusted model also indicated that African Americans who disagreed with the opinion that the tobacco industry gave donations to black organizations to help the community were more likely OR=1.5, 95% CI 1.05-2.18) to state that they were not opposed to raising taxes even if it represented a regressive tax.

CONCLUSIONS: Even though raising taxes on cigarettes may disproportionately affect low income African Americans, the African American community generally supports raising taxes on cigarettes.

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PO3 63  PREDICTING THE ADOPTION OF HOME SMOKING RESTRICTIONS BY INNER CITY AFRICAN-AMERICAN SMOKERS WITH CHILDREN

Felix A. Okah*, M.D., Kolawole S. Okuyemi, M.D., Kevin McCarter, Ph.D., and Jasjit S. Ahluwalia, M.D.

In cross-sectional studies home smoking restriction (HSR) is associated with the presence of non-smoking adults in the home (NSA), motivation to quit (SC), cigarettes per day smoked (CPD), and efforts to limit smoking. However, it is unknown whether adoption of HSR among smokers who do not have one is associated with changes in these characteristics. Our study population consisted of 180 African American smokers who have children in their homes but no HSR, participating in a double blind, placebo-controlled randomized trial assessing the efficacy of bupropion for smoking cessation. We tested for associations between HSR 6 months after enrollment in the study and age, gender, treatment status, NSA, quit status at 6months, changes in SC and in CPD between baseline and 6months. Mean age was 41.7yrs, and 78% was female. Of 180 smokers, 41% had adopted HSR after 6 months. Adoption of HSR was associated with presence of non-smokers in the home (p=0.08) and increased motivation to quit (p=0.09) but not with age, gender, education, treatment, CPD or NS. Among smokers with children, future adoption of HSR is associated with the presence of a non-smoker in the home, additional evidence of a role for non-smokers in limiting children’s ETS exposure through HSR.

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PO3 64  THE INFLUENCE OF ANTI-SMOKING PARENTING STRATEGIES ON CHILDREN’S SELF-EFFICACY TO RESIST CIGARETTES

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Self-efficacy has been found to identify children who are likely to become smokers. Parents’ communication about smoking and reactions to children’s smoking may be important determinants of children’s self-efficacy. This study examines the relationship between anti-smoking parenting strategies and children’s self-efficacy to resist cigarettes. Participants were 81 parent-child dyads comprised of children aged 8-13 (M=10.7, SD=2.3; 54% female) and parents/guardians (89% mothers) aged 25-57 (M=35.2, SD=6.5). The sample was ethnically and economically diverse (30% Caucasian, 25% African American, 30% Latino; modal household income = $15,000-24,999). Children and parents completed parallel measures of the likelihood of four specific anti-smoking strategies if the child tried a cigarette: discuss, punish, negatively react, or persuade. Paired t-tests indicated that children perceived parents would be significantly more likely to punish and negatively react, and less likely to discuss or persuade, than parents. Although 36% of parents were daily smokers, parental smoking did not predict children’s self-efficacy to resist cigarettes. Hierarchical regression analyses indicated that after controlling for child age and gender, children’s perceptions of anti-smoking parenting strategies accounted for 15% of the variance in self-efficacy (p<.05). A significant positive association was found between children’s self-efficacy and their perception that their parent would discuss the risks of smoking (Beta = .26, p<.05). In contrast, children who perceived their parent as trying to persuade them against smoking (e.g., make them feel guilty) reported less self-efficacy to resist (Beta = .24, p<.05). Results suggest specific strategies that parents can use to help their children increase self-perceived ability to resist smoking.

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PO3 65  **ARE WORKSITE RESTRICTIONS ASSOCIATED WITH SMOKING LEVEL, INTENTION TO QUIT AND NOT SMOKING IN THE HOME?**

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Previous research has shown a significant relation between worksite restrictions and both smoking status and level of smoking. In this study, we examine the relation between restrictions in the workplace and level of smoking, intention to quit, and smoking in the home. We include respondent reports of enforcement levels as a measure of compliance. We also examine attitudes toward restrictions and the acceptability of smoking as potential modifying variables. Data were collected by computer-assisted telephone interviews from May to October, 2000 in a population-based survey (N=2778) of Ontario Canada adults, aged 18+. A large majority (78%) reported that smoking was restricted to the outdoors in their workplace, and 92% estimated that smokers complied with the restrictions all or most of the time. Almost one-quarter (24%) smoked currently (median daily intake, 16.5 cigarettes). 48% of smokers had tried to quit in the past year, and 54% were contemplating quitting in the next six months; 48% said that their smoking had gone down as a result of restrictions at work, while only 3% said it had gone up. Smokers restricted at work were slightly less likely to smoke inside their homes, to have rules about smoking in their home and to favor restrictions in workplaces generally. We discuss implications for workplace policies.

Research conducted at the Ontario Tobacco Research Unit, University of Toronto; supported by a grant from the Ontario Ministry of Health and Long-Term Care.

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PO3 66  **INVESTIGATING SEX DIFFERENCES IN SMOKING CESSION AND RELAPSE IN A SURVEY OF OLDER AMERICANS**

Tracy Falba, Sherry McKee, Stephanie O’Malley, Cheryl Oncken, Carolyn Mazure

Sex differences in smoking cessation have been reported from a variety of treatment studies and some population studies, but little evidence exists on the robustness of this relationship across different outcomes observed for the same individuals. Using the Health and Retirement Study, this analysis examines sex differences for historical quits in a population of ever smokers (n=5889), and for relapse from long-term quits (n=3424). Additionally, the analysis follows baseline smokers (n=2463) from 1992 to 1998, examining the impact of sex on recent quits (during the study period), and on relapse from recent quits (n=977). Demographic, environmental, health, psychiatric, and substance use variables are considered as mediators and moderators of the effect of sex on cessation and relapse. The simple associations between sex and these outcomes reveal that women are much less likely to have quit historically, but those who quit are not more likely to relapse. Women are less likely to quit during the survey period, although less than historically. Among recent quitters, women are more likely to relapse. In the multivariate analyses, these effects are dampened by inclusion of other controls, and sex differences for recent quits and relapses are not significant. However, the extended analysis illustrates that certain characteristics more common in women than men, such as being single and having higher rates of psychiatric or emotional problems, are important determinants of relapse and negatively affect cessation. The different findings for historical smoking behavior and recent smoking behavior illustrate the dynamic nature of these relationships and the importance of looking across outcomes.

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PO3 67  **WEIGHT CONCERNS AMONG AFRICAN-AMERICAN SMOKERS: A PILOT STUDY EXAMINING SUBPOPULATION DIFFERENCES**

Lisa Johnsen, Ph.D.*, Northwestern University; Andrea King, Ph.D., and Roslyn Riley, B.S., University of Chicago

Among Caucasian females, excessive concerns about body weight and shape are related to smoking initiation and may inhibit smoking cessation. In contrast, few studies have examined weight concerns among African-American smokers. Instead, it is often assumed that African-American smokers do not have concerns about body weight and shape due to the greater cultural emphasis they place on being overweight. However, African-Americans are not a homogeneous group and the degree to which African-American smokers identify with their own ethnic group might affect whether they report weight concerns. This pilot study examined the relationships among identification with African-American ethnicity (AA-ID), weight concerns, and body mass index (BMI), in African-American female smokers enrolled in a community-based smoking cessation program. We hypothesized that greater AA-ID would be related to less concerns about body weight and shape. Fourteen African-American female smokers participated [Means(SD): Age:45(11) yrs; Education: 12(3)yrs; BMI: 28.2(9.1); CO: 14(10) ppm; cigarettes/daily:13.8]. Greater AA-ID was related to greater body satisfaction (.63;p<.05), accounting for 71% (.p<.01) of the variance. There were no significant correlations between AA-ID and Cognitive Restraint (r=.08) or Drive for Thinness (r=.15). AA-ID was also correlated with lower BMI (.71;p<.01), but BMI was not related to any of the weight concern measures (all p>0.05). Results suggest that African-American smokers who identify more strongly with their ethnic group have less body shape concern than those who identify more strongly with other ethnic groups. Results support the notion that African-Americans are a heterogeneous group, and that examining AA-ID may help to differentiate which African-American smokers have concerns about body shape. Continued exploration of these factors may aid in understanding which aspects of weight concerns are related to smoking.

This study was conducted while Dr. Johnsen was at the University of Chicago. Supported by a NIH-NRSA fellowship (LJ), and grants from the Illinois Department of Public Health (AK) and AAH1133 (AK).

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PO3 68  **SMOKING CESSION PATTERNS IN ADULT MALES FOLLOWED FOR 35 YEARS**

Arthur J. Garvey, Ph.D.*, Taru Kinnunen, Ph.D., Zandra Quiles, Ph.D., Harvard School of Dental Medicine; Pantel S. Vokonas, M.D., Normative Aging Study, VA Medical Center

The prevalence of cigarette smoking has decreased over the past 35 years. Most prevalence estimates, however, are based on cross-sectional surveys that are vulnerable to misclassification errors. We used prospective data collected on a cohort of adult males to provide information on smoking cessation patterns over the period 1963-1998.

Subjects were from the Normative Aging Study, whose 2,280 members represent a middle-class sample residing in the greater-Boston area. We calculated quit rates for each year from 1963-1998, and we also sub-divided the sample by age group, education status, and amount smoked, and calculated quit rates for these subgroups.

The majority (64%) quit smoking. Yearly rates of cessation rose substantially in the period 1965-1969, and remained high for the next 30 years. The most striking subgroup differences were between light (15 cigarettes per day or less) and heavy smokers (greater than 15 cigarettes per day), with light smokers significantly more likely to quit. Older smokers had significantly higher cessation rates compared to middle-aged and younger smokers. The most highly-educated smokers were marginally more likely to quit than the least educated.

Results suggest that the majority of male smokers will quit smoking over a protracted period of time. Though heavily-dependent smokers were less likely to quit than lighter smokers, even the majority of heavily-dependent smokers quit over time. Our results are robust and encourage, and suggest that almost 2 out of 3 adult male smokers will eventually quit smoking.

Conducted at the Harvard School of Dental Medicine; supported by grant DA10073.

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PO3 69 HOSTILITY AND SMOKING CESSION: THE NORMATIVE AGING STUDY

Ari Haukkala, Taru Kinnunen, Zandra Quiles, Avron Spiro III, Arthur J. Garvey

Hostility is a negative emotion that may relate to smoking cessation. Because hostility is a broad, multidimensional concept, the aim of this study is examine how different hostility dimensions are related to self-reported reasons for smoking and how they may predict cessation in a long-term follow-up study.

Data were obtained from 1,340 current and former smokers from the Normative Aging Study who completed a reasons for smoking scale in 1973. CMI hostility scales (Irritability, Psychological problems) were completed in all follow-up assessments. In 1986, they completed hostility scales from the MMPI (Cook-Medley Ho, Cynicism, Hostile affect, Hostile attribution, Aggressive responding). Hostility dimensions had moderate correlations with negative affect reduction and addiction dimension, but no associations to other reasons for smoking (habit, stimulation, pleasure). Among smokers, hostility dimension did not have significant association to the number of cigarettes. Hostility scores from both MMPI and CMI did not predicted smoking cessation during the follow-up.

Despite smokers consistently having higher hostility scores than others, hostility was not important predictor of smoking cessation in this study. Most of the hostility dimensions used here reflected cognitive component of hostility. It was not possible assess directly anger experiences that may be more relevant to smoking than expression of anger or cognitive aspects of hostility.

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PO3 70 HARD CORE SMOKERS: SMOKING PATTERNS AND PERCEIVED ADVANTAGES AND DISADVANTAGES

Claire E. Sterk, Ph.D.*, Howard I. Kushner, Ph.D.

The objective of this paper is to enhance our understanding of hard core smokers. Much public health prevention and intervention attention has focused on those who might initiate smoking, specifically adolescents. In addition, the large proportion of people who have been able to quit smoking is viewed as a major public health success. However, one in four smokers continues and this group has been largely ignored. Based on in-depth interviews with a convenience sample 20 active hard core smokers, we asked hard core smokers to define their habit as well as the meaning it has to them. In addition, the face-to-face interviews addressed themes such as patterns of smoking, including efforts to cut down or cease smoking, and the perceived advantages and disadvantages of continued smoking. The data analysis included the constant comparison method common in grounded theory. The qualitative data management package, QSR Nu*dist, was used to organize the textual data. The findings revealed the importance of definition of hard core smoking that is grounded in the experiences of those who continue to smoke. In addition, the smoking patterns of hard core smokers varied substantially, hinting at the presence of a typology consisting of various subgroups. Finally, many described disadvantages as well as advantages of smoking. Most disadvantages focused on smoking-associated negative health consequences, while the advantages included forms of self-medication to control, for example, emotions and to cope with stress. The finding of this exploratory study reveal the importance of continued qualitative research among this largely ignored group of smokers as well as the need for subsequent large-scale quantitative and intervention studies. Finally, the findings serve as baseline data for social and health service providers as well as policy makers.

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**Rapid Communications Posters**

**RP-1**

PASSIVE IMMUNIZATION AGAINST NICOTINE ATTENUATES DEPENDENCE AS MEASURED BY MECAMYLAMINE PRECIPITATED WITHDRAWAL


Passive immunization against nicotine has been shown to interfere with the distribution of nicotine to the brain and to attenuate several pharmacological actions of nicotine. The present study determined whether such immunization would interfere with the initial development of nicotine dependence as assessed by mecamylamine-precipitated abstinence syndrome. Twelve rats were rendered nicotine-dependent by 7 days continuous sc infusion (3.15 mg/kg/day) via Alzet osmotic minipump. At the beginning of nicotine infusion and 3.5 days later, six rats received 150 mg IgG (immune IgG) from rabbits immunized against nicotine with NicVaxTM an experimental nicotine conjugate vaccine prepared by Nabi (Rockville, MD). Six rats received equivalent doses of normal human IgG.

On the seventh day of nicotine infusion, all rats were challenged with 1 mg/kg sc of the nicotinic antagonist mecamylamine HCl. They were then observed for nicotine abstinence signs over 30 minutes under “blind” conditions. The rats treated with immune IgG during nicotine exposure had significantly fewer precipitated abstinence signs, p<0.008. They had fewer occurrences of every category of abstinence sign, with significant reductions in gasps/writhes, teeth chatter/chews and shakes/tremors. The results raise the possibility of immunization with NicVaxTM against the acquisition of nicotine dependence or its re-acquisition during relapse in ex-smokers. They also suggest that nicotine antibodies can be remarkably resistant to saturation by very high levels of cumulative nicotine exposure.

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**RP-2**

BLOCKADE OF NICOTINE-INDUCED LOCOMOTOR SENSITIZATION BY A NOVEL NEUROTENSIN ANALOG IN RATS

Paul Fredrickson, M.D.*; Mona Boules, Ph.D.; Sally Yerbury; Elliott Richelson, M.D.; Mayo Clinic, Jacksonville, FL

Neurotensin is a tridecapeptide with anatomic and functional relationships to dopaminergic neurons. Because dopaminergic neurotransmission is implicated in addictive behavior and because neurotensin modulates dopaminergic neurotransmitter systems, we tested effects of a neurotensin analog (NT69L) on nicotine-induced hyperactivity. Previously, we showed that NT69L, which appears to cross the blood-brain barrier, blocks cocaine-and D-amphetamine-induced hyperactivity in rats (Boules et al., 2001).

METHODS: Male Sprague-Dawley rats were randomly assigned to receive daily injections for 15 days with one of the following combinations: saline/nicotine (0.35mg/kg), NT69L(1mg/kg)/nicotine, or saline/saline, with a 30 minute period between injections. On day 15 each group was given saline/nicotine or NT69L/nicotine and tested in an activity chamber.

RESULTS: Rats injected with nicotine over a 15-day period had a significant increase in locomotor activity consistent with nicotine-induced locomotor sensitization. A single injection of NT69L on day 15 prior to nicotine injection markedly decreased nicotine-induced hyperactivity. Although 15 daily injections of NT69L lessened its effect, statistically significant reductions in hyperactivity to nicotine persisted throughout the study. There was no significant difference in activity between rats injected with NT69L/saline and saline/saline. Thus the activity reduction was not due to sedation.

DISCUSSION: Neurotensin and dopaminergic systems are closely related in the ventral tegmental area and nucleus accumbens. A role for neurotensin in the behavioral properties of psychostimulants has been proposed.

CONCLUSION: The present study is the first report, to our knowledge, of a possible role for neurotensin in the development of nicotine dependence, and suggests that neurotensin analogs such as NT69L may be explored as treatment for nicotine and other psychostimulant abuse.

This work was supported by the Mayo Foundation.

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**RP-3**

IN VITRO BRAIN METABOLISM OF NICOTINE-&#61508;1′(5′)-IMINIUM ION (NIM) AND PARTITION STUDIES OF NIM AND COTININE USING C57BL MICE

Mui-Chiung Tsai and John W. Gorrod*, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, Essex, UK

In vitro metabolism of nicotine-&#61508;1′(5′)-iminium ion (NIM) has been studied using freshly prepared fortified mouse (C57BL) brain homogenates. Increasing the incubation time up to 60 min showed that NIM was slowly partially metabolized to cotinine. This suggests that mouse brain exhibited a “limited” aldehyde oxidase activity in vitro. Li et al., 1992 has shown that both nicotine and NIM have similar small &%1508;log P values when determined using octanol/aqueous and cyclohexane/aqueous systems, so that they might be expected to pass through the blood-brain barrier (BBB). Therefore, in vivo partition studies of NIM and cotinine were performed using mice. When NIM was administered intraperitoneally to mice, no NIM was detected in brain homogenates prepared 20-min after administration; whereas cotinine was detected. The results strongly suggest that NIM could not cross the BBB. The detection of cotinine in the brain could be due to its formation from NIM outside the brain and then transported to the brain. When cotinine was administered IP to mice, its level in the brain peaked at 20 min after which it gradually decreased. Unlike nicotine, the passage of cotinine (with a large &%1508;log P) into the brain would not be expected. However, our study has shown that cotinine can pass through the BBB of mice. At 20 min after administration, only about 0.63% of the administered cotinine was found in the brain, meaning more than 99.0% of cotinine was distributed throughout the body. After one hour only a small reduction of brain cotinine (0.17%) resulted. Therefore, the elimination of cotinine in the mouse brain appears a very slow and saturable process.

CORRESPONDING AUTHOR: J.W. Gorrod.
**RP-4**

**CHARACTERIZATION OF BIOCHEMICAL PATHWAYS INVOLVED IN NICOTINE TREATMENT USING PATHWAY-FOCUSED CDNA MICROARRAYS**

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Previously, by using neural-focused CDNA microarrays, we determined that transcriptional response to chronic nicotine administration was dependent on the brain region under investigation. Of 1117 genes examined, we found nicotine transcriptional response produces highly correlative gene expression profiles between nucleus accumbens and prefrontal cortex versus other brain regions studied. Furthermore, we found that certain functional groups of genes were likely targets of nicotine addiction, such as those belonging to phosphatidylinositol and growth factor signaling pathways. To better understand biochemical pathways potentially involved in nicotine addiction, a pathway-focused microarray, which encompass networks of genes regulated by secondary messengers like calcium, diacylglycerol, and inositol 1,4,5-trisphosphate, has been developed in our laboratory. Using this novel pathway-focused microarray, a series of analyses were conducted to investigate how different signaling pathways respond to chronic nicotine administration. The results demonstrated that networks of genes regulated by secondary messengers like calcium, diacylglycerol, and inositol 1,4,5-trisphosphate were involved in nicotine addiction. These findings provide a molecular basis for understanding the complex mechanisms underlying nicotine addiction.

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**RP-5**

**EVIDENCE FOR AN INVOLVEMENT OF D2 Dopamine Receptor in Mediating Nicotine Tolerance in Rats**

Raka Jain*, S. Varma and D. Mohan

The aim of the present study was to assess the role of dopamine in nicotine-tolerant rats. This was accomplished by examining the effects of selective D1 and D2 dopamine receptor antagonists in nicotine tolerant rats. Male Wistar rats (125-150 g) treated chronically with nicotine via Alzet mini osmotic pump implant was tolerant to the motor depressant effects of nicotine. Motor activity was measured using video path activity monitor. Nicotine (0.1-5.76 mg/kg, s.c) caused and increased in motor activity in chronically nicotine treated rats. The selective D2 antagonist eticlopride (0.1-5.76 mg/kg, s.c) did not block nicotine-induced hyperactivity, as inhibition in motor activity was observed, whereas the excitatory effect was seen via D1 antagonist SCH 23390 (0.1-5.76 mg/kg, s.c). The concurrent administration of D1 and D2 receptor antagonists had a synergistic effect. These results suggest that tolerance to nicotine is mediated through dopaminergic system, and dopamine D2 receptor appears to have a measure role in development of nicotine induced tolerance.

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**RP-6**

**REPEATED IV NICOTINE IN MALE AND FEMALE RATS: BEHAVIORAL SENSITIZATION AND DOPAMINE D3 RECEPTORS IN NUCLEUS ACCUMBENS**

Rosemarie M. Booze, Ph.D.*, Klark R. Bennett, Ulla Hasselrot, M.S., Guanghan Wu, M.D., Marian Welch, B.S., Charles F. McTutus, Ph.D., University of Kentucky

Repeated administration of stimulants is known to result in behavioral sensitization for male animals. We investigated whether behavioral sensitization occurred in response to repeated IV nicotine administration, if there was a sex difference in nicotine behavioral sensitization, and whether sex differences in dopamine receptors were present. Sprague-Dawley rats (male and female, n=16) were surgically implanted with an intravenous access port and habituated to 60 cm diameter IR activity chambers for three days. Subsequently, animals received 50 ug/kg/ml IV nicotine 1/day for 21 days, delivered as a bolus injection. Observational time sampling of behavior was performed by an observer blind to treatment condition on days 1 and 21. On the 21st day the animals were euthanized and their brains were removed for subsequent receptor autoradiographic analysis. The IV model of nicotine administration in unanesthetized, freely moving rats, failed to produce any evidence of sex differences in rearing behavior after acute injection of nicotine (day 1). There was a striking sensitization of rearing on day 21, and also a pronounced sex difference in sensitization: the females displayed a 230% increase in rearing on day 21, relative to day 1. Autoradiographic analyses indicated that males increased dopamine D3 receptors in the nucleus accumbens relative to females, and moreover, that this effect was most pronounced in the shell region of nucleus accumbens. In sum, the IV model of nicotine administration demonstrated sex differences in rearing behavior after acute injection of nicotine (day 1), but only in females. Furthermore, males increased dopamine D3 receptors in the nucleus accumbens relative to females.

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**RP-7**

**THE INFLUENCE OF DAT AND DRD4 ON SMOKING STATUS: RESULTS FROM THE SMOKERS AND NON-SMOKERS STUDY (SANS)**


The Smokers and Non-Smokers (SANS) study was designed to investigate associations between smoking status and the dopamine transporter gene (DAT SLC6A3). As part of our analyses we investigated the effect of including the dopamine receptor gene (DRD4), which has a variable number of tandem repeats that varies from 2-10. Researchers often categorize individuals as either S-genotype (homozygous for short alleles, <6 repeats) or L-genotype (heterozygous for short and long alleles, >5 repeats). Previous research found that individuals with the L-allele are at an increased risk of smoking, while other work suggests that DRD4 may be especially relevant to self-medicating smoking. The L-allele has been shown to alter receptor function, to blunt intracellural response to dopamine, and is common in individuals characterized as novelty seekers. A multivariate regression model was developed using orthogonal coding to identify epistatic interaction between DAT and DRD4. A full model in which the phenotype is a function of main effects and interactions, and a non-interaction model with only the main effects were compared. Results suggest a main effect only for DAT but not for DRD4, and no interaction between DAT and DRD4 by smoking status.

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**RP-8**

**DOPAMINE RECEPTOR DRD2 A1 ALLELE GENOTYPE EXPERIENCES GREATER EEG SLOWING ACROSS 31 DAYS OF SMOKING ABSTINENCE**

David G. Gilbert, Ph.D.*, F. Joseph McClernon, Ph.D., Jodi Huggenvik, Ph.D., Norka E. Rabinovich, B.S., Nazeih Botros, Ph.D., Greg Asgaard, B.S., and Yantao Zuo, M.A., Southern Illinois University at Carbondale

The effects of DRD2 dopamine receptor genotype on EEG activation were assessed at days 3, 10, 17, and 31 of smoking abstinence. Female smokers (n = 96) were randomly assigned to a quit smoking group or a control group of delayed quitters. Biochemical confirmation of abstinence was obtained. Large financial incentives minimized study dropout. Individuals who had at least one DRD2 A1 Allele (A1 carriers) exhibited greater EEG slowing subsequent to quitting than did non-carriers (homozygous A2A2 individuals). This group difference in slowing was maintained across the 31 days of abstinence. The results are consistent with studies and theories suggesting that genetic differences in dopaminergic function modulate responses to nicotine and the vulnerability to smoking dependence.

Supported by NIDA grant # DA 07572.

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**RP-9**

**DOPAMINE TRANSPORT GENOTYPE AS A RISK FACTOR FOR OBESITY IN SMOKERS**

Leonard H. Epstein, Ph.D., Jodie L. Jaroni, M.A.*, Rocco A. Paluch, M.A., John J. Leddy, M.D., Holly E. Vahue, B.S., Larry Hawk, Ph.D., University at Buffalo; Paul Wileyto, Ph.D., Caryl Lerman, Ph.D., University of Pennsylvania; Peter G. Shields, M.D., Georgetown University

This study was designed to test whether two polymorphisms related to dopamine function, dopamine transport (DAT) and D2 dopamine receptor (DRD2) genotypes, were related to obesity (BMI>30) in a large cohort of smokers (N=505) participating in a smoking cessation trial. The odds ratio of obesity in blacks with the 10/10 DAT genotype were 4.5 times in comparison to blacks with 9/9 or 9/10 DAT genotypes. There was no association for non-Hispanic whites with the DAT 10/10 genotype. Polymorphisms of the DRD2 genotype were not related to obesity in smokers. The odds ratio of being obese decreased by 2.8% for every ten cigarettes smoked in blacks. There were no genotype associations for overweight status (BMI>25). These results suggest that particular variants of the dopamine transporter gene may be related to obesity in black smokers. Possible mechanisms responsible for the association between dopamine transport and obesity in black smokers is discussed.

This research was conducted at the State University of New York at Buffalo, Georgetown University, and the University of Pennsylvania. Supported by Grant No. R01 CA63562 and R50 a Transdisciplinary Tobacco Use Research Center Grant from the National Cancer Institute to Dr. Caryl Lerman.

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**RP-10**

**NICOTINE AND SMOKING INCREASE THE ALCOHOL-METABOLIZING ENZYME CYP2E1 IN RAT, MONKEY AND HUMAN BRAINS**

Sharon L. Miksys*, Ph.D., Lisa A. Howard, B.Sc., Rachel F. Tyndale, Ph.D., CAMH and University of Toronto, Deborah C. Mash, M.D., University of Miami

Nicotine and ethanol are commonly co-used drugs; 80-95% of alcoholics smoke and smokers consume more alcohol than non-smokers. Cytochrome P450 (CYP) 2E1 metabolizes ethanol and tobacco-derived procarcinogens. It also metabolizes drugs such as isoniazid and acetaldehyde, generating toxic oxygen-derived free radicals. We hypothesized that nicotine could induce brain CYP2E1 in a region- and cell-specific manner. Rats were treated with saline or 1.0mg nicotine/kg s.c. daily for 7 days, and brains were assayed for CYP2E1 by immunoblotting and immunocytochemistry. Nicotine induced CYP2E1 in rat cerebellum (2.5x), olfactory tubercle (3x), olfactory bulbs (2.5x), frontal cortex (3x) and brain stem (6x), but not in hippocampus. The induction was restricted to specific cell types in each region. African green monkeys were treated with saline or 0.3mg nicotine/kg s.c. twice daily for three weeks. There was stronger CYP2E1 staining in Purkinje cells and their processes in cerebellum of nicotine-treated animals. Three brain regions (frontal cortex, hippocampus and cerebellum) from 11 humans (non-smokers and smokers) were assayed for CYP2E1 by immunocytochemistry. There was stronger staining in smokers in pyramidal neurons and glial cells in frontal cortex, as well as in granule cells and Purkinje cells in cerebellum. These data suggest that nicotine and smoking could increase ethanol metabolism by CYP2E1 in the brain, and so contribute to ethanol tolerance. More importantly, smokers may be more susceptible to toxicities in the CNS associated with activation of tobacco-derived carcinogens and increased CYP2E1-related oxidative stress.

Supported by CIHR grant MT-1473.

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**RP-11**

**TOBACCO AND ALCOHOL USE IN TWO TREATMENT SETTINGS**

Tripathi, B.M.; Berry, N.; Lal, R.

There is a complex inter-relationship between tobacco and alcohol use. Though tobacco and alcohol use is common in the community, treatment needs of persons using tobacco and alcohol are often not addressed in many treatment settings. Pattern of tobacco and alcohol use was examined in alcohol dependent patients attending a Drug and Alcohol Dependence Treatment Clinic and chronic smokers attending a Respiratory Diseases Clinic in India. Majority of alcohol dependent patient (96%) was smoking tobacco, consumed more tobacco and was more heavily dependent on tobacco than the chronic smokers. Smokeless tobacco was used by 20% patients. Only a few had made attempts to quit smoking during past 12 months. Among chronic smokers, 40% were currently using alcohol and 14% fulfilled criteria for Alcohol Dependence. Tobacco use has preceded alcohol use in both the groups. There was modest correlation between dependence measures of tobacco and alcohol in alcohol dependent persons.

Tobacco use is not only an issue for chronic smokers but emerges as major health problem in alcohol dependent patients. Thus there is a need to incorporate tobacco cessation measures in the alcohol treatment programmes. Similarly tobacco cessation programmes need to address the alcohol use among tobacco users. Smokeless tobacco use is common in India but there are no reliable measures for its assessment.

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**RP-12** ESCAPE FROM NICOTINIA: A SMOKING-PREVENTION COMPUTER GAME FOR GIRLS  
Anna M. McDaniel, D.N.S., R.N.*, Norman K. Legge, Renee Stratton, B.S., Indiana University; and Michelle Hargest, Girls, Incorporated

The purpose of this project was to develop and evaluate a new tool to prevent smoking initiation among girls using interactive computer gaming technology. Computer games are potentially useful for smoking prevention because information can be presented in an innovative, engaging manner that is familiar to children and adolescents. The game was designed specifically for girls to increase awareness of peer pressure and media manipulation that promote desirable social images associated with smoking and to enhance development of resistive skills to counteract social forces that encourage tobacco use. Anti-smoking information, such as the health effects of smoking, the negative impact of cigarettes on women, social and economic consequences of smoking are presented as part of the game strategy.

A non-probability sample (n=34) of girls age 8-12 who regularly attended a drop-in after-school program in two inner-city community centers were recruited to test the game. After obtaining parental consent to participate, girls completed a pre-test to assess attitudes and beliefs towards smoking. Following the four-week trial period, 32 girls completed the instrument a second time as well as a brief satisfaction survey.

Overall, anti-smoking attitudes and beliefs of the participants were significantly stronger following game play (p=.05). Knowledge of the consequences of smoking as well as perceptions of smoking norms also improved significantly. Satisfaction with the game was high. Seventy-seven percent of participants agreed that the game was fun to play and that “playing computer games is a good way to learn about tobacco.”

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**Supported by the Indiana Commission for Women and Office of Women’s Health, Indiana State Department of Health.**

**RP-13** FACTORS MEDIATING TEEN SMOKING PREVENTION: TEACHER KNOWLEDGE, BELIEFS, AND BEHAVIOR CONCERNING TOBACCO USE  
Leslie A. Robinson, Ph.D., Cassie B. Cummings, M.A.*, University of Memphis Center for Community Health

Though hundreds of studies have assessed adolescents’ attitudes toward tobacco, virtually no research has investigated teachers’ attitudes toward adolescent smoking. In the current study, tobacco-related attitudes, knowledge, and practices were assessed in teachers participating in a large-scale school-based smoking prevention project. On average, only 65.5% of the knowledge items were answered correctly by the teachers. For instance, all of the teachers reported that smoking reduced body weight, and 99% reported that smoking improved concentration. In addition, teachers reported that tobacco prevention is rarely included in school-wide prevention programs or regular classroom instruction. Furthermore, the tobacco-related material that teachers do teach is generally ineffective and outdated. The current study shows that teachers are in need of instruction so that they can become effective public health educators.

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**Supported by the Indiana Commission for Women and Office of Women’s Health, Indiana State Department of Health.**

**RP-14** CONCORDANCE OF PARENT AND ADOLESCENT REPORTS OF ANTI-SMOKING PARENTING  
Molly K. Middlecamp, M.A.*, Robin J. Mermelstein, Ph.D., and Brian Flay, D.Phil., University of Illinois—Chicago

Parental practices play an important role in the onset and escalation of youth smoking. Many investigations, however, have relied on reports from one family member when drawing conclusions. Given findings suggesting little correspondence between parental and adolescent reports of general family factors, we need to better understand the similarity in parent and adolescent perceptions of parental behaviors related to smoking. Additionally, examining whether parent and adolescent reports are differentially related to adolescent smoking is important. Participants were 407 parent-adolescent dyads. Adolescents were 8th and 10th graders (56% 8th graders, 55% female) recruited based on smoking history. Susceptible youth (n=146) had never smoked but indicated high susceptibility, recent triers (n=124) smoked within the past 90 days but fewer than 20 in their lifetime, and irregular smokers (n=137) had smoked fewer than 100 lifetime cigarettes. Participants completed measures of the family environment, parental messages, and smoking-related attitudes. Parents were more positive in their family descriptions (e.g., reporting more positive relationships) than were adolescents. Correlations between parent and adolescent reports were strongest with parental monitoring, r(407)=.45, p<.01, and family environment ratings, r(401)=.36, p<.01, and lowest between parent and child attitudes. While both parent and adolescent reports of the family environment and monitoring were significantly related to adolescent smoking, only adolescents’ smoking-related attitudes and beliefs about parental reactions to their smoking were related to adolescent smoking. Results suggest that the utility of using one respondent’s report varies with the domain examined.

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**RP-15** THE INFLUENCE OF PARENTAL DISAPPROVAL ON ADOLESCENT SMOKING  
Won S. Choi, Ph.D.*, Harsohena K. Ahluwalia, M.D., Jasjit S. Ahluwalia, M.D., M.P.H., M.S., Kevin S. McCarter, Ph.D., University of Kansas School of Medicine

Although the influence of peer and parental smoking is well established, other aspects of family influence besides social modeling have received less attention. In this study, we evaluate the influence of parental disapproval on adolescent smoking. Healthy adolescents (n=264, age range=10-19 years, 65% female, 56% African American) completed surveys in an urban clinic that assessed demographic information, smoking status, perceived school performance, parental disapproval of smoking, and home smoking restrictions. Parental attitude toward smoking was defined as “Very upset” or “Not upset/no reaction.” Home smoking restrictions were categorized into two levels, “No restrictions” and “Some restrictions.”

The overall smoking prevalence (smoked in the past 30 days) was 11.9%. Smoking prevalence was higher in females (15.0%) than males (5.6%) and among whites (14.8%) compared to African-Americans (9.6%). Smoking rates were much lower among adolescents who perceived that their parents would be “Very upset” (8.0%) compared to those who believed that their parents would not be too upset (37.1%).

Multivariable analyses adjusting for demographics, perceived school performance, parental disapproval of smoking, and home smoking restrictions showed that parental disapproval of smoking (Odds Ratio=5.8, 95% confidence interval (2.3 - 14.7)) was a much stronger predictor of current smoking than having home smoking restrictions.

These findings contrast with the wide-spread notion that parents have modest influence on adolescent smoking. Interventions that enhance parental disapproval of their adolescents’ smoking could reduce an adolescent’s risk of smoking.

**Conducted at Children’s Mercy Adolescent Clinic, Kansas City, MO. Supported by intramural funds.**

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ARE ADOLESCENT SMOKERS ACTIVE INITIATORS?

Yvonne M. Hunt, M.A.*, Molly K. Middlecamp, M.A., Robin Mermelstein, Ph.D., and Brian Flay, D.Phil., University of Illinois at Chicago

While some early smokers may be the passive recipients of peer pressures, it is also likely that others actively pursue smoking opportunities. This study examined how adolescents differ in their active pursuit of smoking by comparing the prevalence and correlates of “active initiation” behaviors among adolescents who were in the susceptible, experimental, and regular stages of smoking. Participants were 134 8th and 10th graders (55% female). Susceptible youth (n = 50) had never smoked, but indicated a likelihood of smoking. Experimenters (n = 55) had smoked < 100 cigarettes. Regular smokers (n = 28) had smoked > 100 cigarettes. The “active initiation” measure was comprised of 9 dichotomously-coded items, including ever asking to try a cigarette, tempting others, or practicing smoking. Other measures were sensation seeking, age of first try, and self-identity as a smoker. Active initiation varied by stage, F(2, 130) = 78.1, p < .001: Regular smokers showed the highest levels (M = 5.1), followed by experimenters (M = 2.7) and susceptibles (M = .98). Frequent attempts were made to “recruit” others, even by experimenters. Higher levels of active initiation were correlated with age of first try (r=.49, p<.001), sensation seeking (r=.23, p<.01), and self-identification as a “smoker” (r=.51, p<.01). Clearly, adolescents who are “experimenting” with smoking often take an active role in their pursuit of smoking. These results suggest that prevention programs should incorporate strategies that address identity issues and smoking’s appeal along with refusal skills.

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RECRUITING ADOLESCENT CIGARETTE SMOKERS FOR BIOBEHAVIORAL RESEARCH

Wood, T., Ph.D., Wevers, M.E., Ph.D., Groner, J., M.D., and Ahijeyvych, K.L., Ph.D.

Cigarette smoking is prevalent among adolescents, yet very little is known about nicotine dependence in youth. The knowledge gap may be partly due to the problems inherent in conducting research in this vulnerable population. Recruiting adolescents who are involved in high-risk behaviors, obtaining parental consent, data collection, and privacy are frequently cited issues affecting recruitment and enrollment. Sample. Fifty adolescent smokers (13-18 years) were enrolled over a 9-month period for a study to explicate tobacco smoke constituent exposure in youth. Mean age was 16.34 yrs, SD 1.42, and one-half were female. Protocol. A 2-hour time commitment was required to complete the protocol. Parental consent and youth assent were obtained. Baseline plasma samples for cotinine concentration were collected. Questionnaires were used to obtain self-report data. Carbon monoxide in expired air and plasma nicotine samples via an indwelling venous catheter were obtained pre- and post-cigarette smoking. A $40 gift certificate was provided as incentive for participation, as well as age-specific smoking cessation educational materials. Recruitment. Subjects were initially recruited from a previous school-based study. Other recruitment strategies were the “snowball” technique, group recruitment sessions and face-to-face recruitment meetings with the investigator in schools. Both rural and urban schools were included. Results. Data collection sites in the participant’s home school setting were more effective than collecting data in the university clinical research center. Personal contact with the study’s investigator resulted in 64% of the sample, while snowball technique and recruiting from previous studies each contributed 16% of the study’s participants. It is possible to obtain biological data regarding cigarette smoking in adolescents.

Funding Source: NINR F31NR07460: General Clinical Research Center M01 RR00034.

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INFLUENCE OF TOBACCO USE AND GENDER ON PAINTOLERANCE IN ADOLESCENTS

Suchitra Krishnan-Sarin, Ph.D.*, Dana Cavallo, M.S., Cheryl Pearson, B.S., Tricia Dahl, B.S., Elaine Lavelle, M.S., Ran Wu, M.S., Sherry McKee, Ph.D., Tony P. George, M.D., Yale University School of Medicine

Adolescent tobacco use is a problem of epidemic proportions and understanding factors that mediate maintenance of smoking in adolescents is an important step towards developing better treatment options. It has been proposed that the avoidance of negative states like pain and anxiety may play a significant role in maintaining smoking behavior. This study will present a preliminary evaluation of pain tolerance in adolescent smokers and nonsmokers. Fifty-nine subjects, 34 nonsmokers and 25 smokers, participated in two separate sessions at the Children’s Clinical Research Center (CCRC) of Yale-New Haven Hospital. Smokers continued to smoke prior to the first outpatient nonabstinence session, but were abstinent from cigarettes for 42 hours prior to the second inpatient abstinence session. Pain tolerance was evaluated in both sessions using the cold-pressor task, in which subjects were asked to place their dominant hand in a bucket of cold water (0-3°C) for a period of 90 sec. They were told that they could remove their hand from the water when they could no longer endure the pain (pain tolerance). A preliminary analysis of the pain tolerance data indicates a significant main effect of smoking status [F(1,55)=7.26, p<0.01], a significant smoking*sex interaction [F(1,55)=10.94, p<0.01], and a significant main effect of time [F(1,55)=5.94, p<0.05]. Post hoc analyses indicate that female smokers had significantly lower levels of pain tolerance during both the nonabstinence and abstinence sessions when compared with female nonsmokers (p<0.001), male smokers (p<0.01), and male nonsmokers (p<0.001). These findings suggest that smoking status and gender moderate alterations in pain tolerance in adolescents with limited smoking experience.

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The escalation of smoking in adolescent females has become increasingly problematic. The extent to which genetic factors and personality contribute jointly to transitions in cigarette smoking [never (NS), regular/non-heavy smoking (RS), regular/nicotine-dependent (ND)] in young women has not been systematically examined using a genetically informative design. We tested the extent to which Extraversion (E), Neuroticism (N), Social-Conformity/Lie-scale (L), Novelty-Seeking (NS), Aggression, and Alienation would mediate familial influences on smoking. Data from interview and a mailed-questionnaire-survey conducted in 1995-1997 of 1856 female like-sex twin pairs born 1975-1983 were analyzed using logistic-regression. High (>75th percentile) levels of: E (ORs=1.81,1.61), N (ORs=1.73,1.87), L (ORs=1.38,1.82), and NS (ORs=2.00,2.51) increased risk for both RS and ND respectively. Low-levels (<25th percentile) of E, N, L, and NS on the other hand appeared to protect against development of RS and ND. However, after controlling for these personality variables, evidence for an important role of genetic influences (p<0.01) on smoking-behavior remained. Of note, in these young women neither aggression nor alienation played a role in the development of RS and/or ND.

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### RP-21

**A MEASURE OF NICOTINE DEPENDENCE IN AN ADOLESCENT POPULATION**

James N Nonnemaker, Ph.D.*, Paul Mowerey, M.S., Matthew Farrelly, Ph.D., Christian Nimisch, M.A., RTI International; Lyndon Haviland, D.Phil., and Cheryl Heaton, D.Phil., American Legacy Foundation

The purpose of this study was to assess the measurement properties of a scale for measuring nicotine dependence in an adolescent population. A linear additive scale was formed from the following items: (1) “Do you think you would be able to quit smoking if you wanted to”, (2) “How soon after you wake up do you usually smoke your first cigarette”, (3) “If you are sick with a bad cold or sore throat, do you smoke cigarettes?”, (4) “When I go without a smoke for a few hours, I experience craving”, (5) “I sometimes have strong cravings where it feels like I’m in the grip of a force that I can’t control”, and (6) self-reported number of days smoked in the past 30 days. An exploratory factor analysis indicated that the items formed a single scale. The reliability of the scale was assessed by estimating Cronbach’s alpha for the six scale items. The estimated alpha reliability was .85. The scale’s validity was assessed by estimating the correlation between the scale and measures of smoking and quitting behaviors. As hypothesized, the scale was positively correlated with lifetime number of cigarettes smoked (.55), cigarettes smoked per day on days smoked (.68), and the number of quit attempts (.11) and negatively correlated with the length of the quit attempt (.21). In future work we plan to correlate the scale with cotinine levels to further establish the validity of the scale.

*This study has been supported by the American Legacy Foundation.*

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### RP-22

**BIOBEHAVIORAL ASPECTS OF ADOLESCENT NICOTINE DEPENDENCE**

Wood, T., Ph.D., Wewers, M.E., Ph.D., Groner, J., M.D., and Ahijevych, K.L., Ph.D.

Adolescent smoking prevalence of 29.5% (12th graders) is a major health concern. Few adolescent studies include biomarkers of smoke constituent exposure and nicotine dependence. Aims. 1) Characterize smoke constituent exposure and smoking topography in adolescent smokers. 2) Identify gender differences in smoke constituent exposure. 3) Examine relationships among biological markers of nicotine dependence (nicotine boost, carbon monoxide [CO] boost and cotinine levels) with self-report measures (modified Fagerstrom Tolerance Questionnaire [mFTQ] and the Horn-Russell [HR] motivations for smoking scale). A sample of 50 adolescents, 13 to 18 years old, were recruited, with 50% being female. CO in expired air, plasma nicotine levels pre and post cigarette, and cotinine (major nicotine metabolite) were measured in addition to smoking topography, the unique way an individual puffs a cigarette. Average age of participants was 16.34 yrs ± 1.42 and 82% smoked 1-15 cigarettes per day. Average CO boost, pre to post cigarette was 7.24 ppm ± 3.62 and baseline cotinine level averaged 224.00 ng/ml ± 169.58. Nicotine boost averaged 31.55 ng/ml ± 30.27. The average number of puffs per cigarette was 14.2 ± 6.2. Males had significantly higher total puff volumes than females, but similar smoke constituent exposure. mFTQ scores were significantly correlated with CO boost (r = .48, p = .0005), cotinine (r = .42, p = .003), nicotine boost (r = .36, p = .01), tension reduction, pleasure/relaxation and stimulation subscales of the HR measure. Results indicate adolescent males and females had significant smoke constituent exposure and nicotine dependence. It is essential for clinicians to include nicotine replacement and strategies focused on tension reduction and relaxation in smoking cessation interventions for youth.

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### RP-23

**CHARACTERISTICS ASSOCIATED WITH SMOKING IN SPANIARDS ADOLESCENTS**

Carlos Cortijo*, F. Javier Ayesta, Fac. Medicine, Univ. Cantabria, Santander, Spain

3856 students (between 13 and 18 years old) were asked to fill a questionnaire which included 120 items about their smoking habits, smoking perceptions and beliefs, and about some other personal characteristics. Students were divided in three groups according to their age: 13-14, 15-16, and 17-18 years old. RESULTS: 1) Smoking prevalence was higher in girls than in boys, both in the 15-16 year old (39% vs. 28%, p<0.0001) and in the 17-18 year old (53% vs. 39%, p<0.0001) groups. 2) Body mass index were similar in smokers and non-smokers, both in boys and girls in all age groups; nevertheless smokers considered they had to loose more weight than smokers (p<0.01 in girls and p<0.02 in boys as a whole). 3) Except in the 15-16 year old group of boys, smokers consumed more caffeine beverages (p values between <0.02 and <0.0001). 4) In both sexes and in all groups, smokers consumed more alcohol beverages than non-smokers (p<0.0001 in all cases); alcohol consumption increase with age. 5) In both sexes and in all groups, smokers had more pocket money than non-smokers (p values between <0.04 and <0.0001). 6) In both sexes and in all groups, smokers failed their exams in more subjects than non-smokers (p values between <0.003 and <0.0001) and, as a whole, had less expectations about going to university (p<0.01). 7) All students, either smokers or non-smokers, overvalued the number of adult smokers (between 62 and 71% in all groups; real figure 37%), of teen smokers (47-63% in boys, 53-70% in girls), and of teachers smokers (45-57%); nevertheless, non-smokers perceptions of the percentage of smokers were lower than those of smokers.

*CONCLUSIONS:* 1) As in other occidentals counties, nowadays girls smoke more than boys. 2) In teenagers, there are clear differences between smokers and non-smokers.

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RP-24  PREDICTORS OF NICOTINE DEPENDENCE LEVELS IN ADOLESCENT SMOKERS

Lorna Hessinger, B.A.*, Tracy O’Leary, Ph.D., Suzanne Colby, Ph.D., Anthony Spirito, Ph.D., Damaris Rohsenow, Ph.D., and Peter Monti, Ph.D., Brown University

Because research has shown that adolescent smokers can be addicted to nicotine (Colby et al., 2000), it is important to understand factors that may predict severity of dependence. We examined nicotine dependence levels in adolescents as measured by scores on the Nicotine Dependence Questionnaire (NDQ; Cohen et al., 2000), an assessment that utilizes DSM-IV criteria for measuring nicotine dependence. Adolescent daily smokers (n = 126, mean age = 16.3 years) indicated whether they had experienced various dependence criteria on a scale from 1 (does not apply) to 5 (most of the time) on the NDQ. Teen demographics were entered in step 1 of a multiple regression to predict NDQ total scores. Step 2 included smoking variables; and step 3 included desire and confidence in quitting, number of quit attempts, number of cessation methods used, and frequency around other smokers. R for regression was not significant in step 1. The second step was significant (R = .03) with R square change significant (p = .006); greater number of cigarettes smoked daily predicted higher NDQ scores. Step 3 was also significant (R < .001) with R square change significant (p < .001). Lower confidence in quitting smoking and more cessation methods endorsed contributed significantly to the model. Consistent with previous research concerning nicotine dependence in both adolescents (Prokhorov et al., 2001; Rojas et al., 1998) and adults (Jarvis et al., 1989), results also underscore the impact of confidence levels on nicotine dependence for adolescents.

This study was supported by NIDA Grant R01—DA 11204.

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RP-25  TRAJECTORIES OF TOBACCO DEPENDENCE IN COLLEGE AND BEYOND: EVIDENCE FROM AN 11-YEAR LONGITUDINAL STUDY

Thomas M. Piasecki, Ph.D.*, Kristina M. Jackson, Ph.D., and Kenneth J. Sher, Ph.D., University of Missouri—Columbia

Relatively little is known about the developmental trajectories of tobacco dependency (TD) in the college years and beyond. We used latent class analysis (LCA) to explore TD trajectories in a prospective study (N=385; 46% male) examining the risk of family history of alcoholism on a range of psychosocial outcomes. Subjects were college freshman at baseline, and have participated in 6 assessments (years 1,2,3,4,7,11) spanning 11 years. At each assessment, past-year TD was assessed using structured interviews. LCA analyses suggested 4 distinct TD trajectories could be recovered: Nondiagnosers (82%) had uniformly low probabilities of TD diagnosis at all waves, Chronic Diagnosers (7%) tended to have TD at all waves, Late Onset Diagnosers (6%) had low probabilities of TD at years 1 and 2, but high probabilities over years 4-11, and Developmentally Limited Diagnosers (5%) had moderate probabilities of TD over the first few waves but showed decreasing likelihood of TD over succeeding waves. Supplementary analyses showed omnibus differences across groups on numerous variables, including family histories of alcoholism and TD, childhood life events, depression, and personality. These differences were most pronounced between Nondiagnosers and groups in which members diagnosed at least once. The findings suggest that TD is not “all-or-nothing” in early adulthood, but stable person factors do not strongly discriminate between groups with non-zero TD risk. The findings encourage finer-grained research into time-varying factors that may set the stage for TD transitions.

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RP-26  PROSPECTIVE PREDICTION OF THREE TRANSITIONS IN CIGARETTE SMOKING

Brian P. Flaherty, M.S.*, The Pennsylvania State University; Gary A. Giovino, Ph.D., M.S., Roswell Park Cancer Institute

Three transitions in cigarette smoking are examined in data from the Teenage Attitudes and Practices Survey, a nationally representative sample of non-institutionalized U.S. youth.

Five variables are used to predict these transitions: 1) never smoked to any smoking, 2) never smoked to smoked 100 or more cigarettes, and 3) smoked less than 100 to smoking 100 or more cigarettes. The predictors include school performance, church attendance, any truancy, number of nights out per week for fun, and number of days home alone per week. Logistic regression was used to examine the transitions. Along with the predictors of interest, these models also include several demographic variables.

A consistent main effect for school performance is present. Poorer school performance is predictive of higher transition probabilities. Any truancy, while a rare event, has a strong relation to the transition from never having smoked to smoking 100 or more cigarettes. The typical number of days home alone per week is predictive of the latter two transitions. When predicting the transition from never having smoked to smoking 100 or more cigarettes, an interaction between this item and gender is statistically significant. As the number of days home alone increases, the model predicts increasing transition probabilities for females and decreasing transition probabilities for males. There is also a statistically significant interaction between a Black/White coding variable and the number of days home alone in the model for the transition from not yet having smoked 100 cigarettes to smoking 100 or more cigarettes. As the number of days home alone increases, this model predicts slightly increasing transition probabilities for White respondents, but sharply declining transition probabilities for Black respondents. Explanations for these findings are explored.

This work was supported by the Research Network on the Etiology of Tobacco Dependence.

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RP-27  MOTIVATIONAL INTERVIEWING FOR ADOLESCENT SMOKERS: PRELIMINARY RESULTS FROM A RANDOMIZED CLINICAL TRIAL

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If smoking rates among children and teens continue, tobacco will kill 250 million of today’s youth (Warren et al., 2000). We examined the relative efficacy of a brief motivational interview (MI) versus standard care (SC) for adolescent daily smokers. Adolescents recruited from medical settings, schools, and the community were randomly assigned to either MI or SC after completing assessment. Preliminary results are available for 95 teens who have completed 3-month follow-up. Consistent with our prior research (Colby et al., 1998), teens in both conditions significantly decreased number of cigarettes smoked/day at follow-up [F (1, 95) = 9.81, p = .002]. Multiple regression analyses, using mean number of cigarettes smoked/day at follow-up as the DV, revealed a significant negative interaction of baseline cigarette use with intervention. To elucidate this interaction, we trichotomized baseline smoking into smoking 5 or less cigarettes/day; smoked 6-10 cigarettes/day; or smoked 11 or more cigarettes/day. Chi-square analyses were conducted for each intervention to examine changes in category frequencies from baseline to follow-up. Among teens who smoked 5 or less cigarettes/day at baseline, 23% in SC versus none in MI had increased smoking by follow-up. For those who smoked 6-10 cigarettes/day at baseline, 14.3% in SC had decreased smoking at follow-up, compared to 41.2% in MI. For heavier smokers (11 or more cigarettes/day at baseline), 13.3% in SC decreased use versus 33.3% in MI. Results highlight the benefits of MI and the need for more intensive interventions for heavier smoking adolescents.

This study was supported by NIDA Grant R01—DA 11204.

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REVISITING SMOKING MOTIVES IN ADOLESCENCE: THE SMOKING MOTIVES SCALE

Denise Williams, Ph.D.

Early onset of cigarette smoking remains a significant public health problem. The acquisition and maintenance of smoking in adolescence is widely seen as a progression from sporadic, socially motivated smoking to regular smoking motivated primarily by nicotine dependence. A better understanding of motives in different phases of the process is crucial to the development of more successful cessation interventions for adolescents.

Current assessments of nicotine dependence targeting adults may not be as valid for adolescent smokers. Such measures usually prioritize nicotine dependence rather than multiple motives for smoking. A new instrument, the “Smoking Motives Scale” (SMS), was developed to assess three hypothetical dimensions of motives: (1) social, (2) affect management, and (3) physical dependence on nicotine.

Comparisons were made between the performance of the SMS and the Fagerstrom Test for Nicotine Dependence (FTND). The SMS yielded a higher overall alpha than the FTND (SMS alpha = .9002, FTND alpha = .8257). This result was strengthened by the fact that the SMS does not include cigarette consumption.

Construct validity was also tested in comparative analyses of variance explained (R2) in a group of nicotine dependence validation variables by the SMS and the FTND. The SMS Physical Dependence factor explained more variance in every external validation variable than the FTND.

Confirmation of these findings and further development of the SMS requires larger and more ethnically and geographically diverse populations, as well as a wider range of ages.

TOBACCO CRAVING AND PERFORMANCE IN ADOLESCENTS DURING NICOTINE DEPENDENCE TREATMENT

Richard C. Taylor, M.A.*, Stephen J. Heishman, Ph.D., Eric T. Moocolan, M.D., National Institute on Drug Abuse, Intramural Research Program and Edward G. Singleton, Ph.D., University of Baltimore

Few studies have investigated the relationship between tobacco craving and cognitive performance among adolescent smokers. We collected craving and performance data from teenagers enrolled in an outpatient tobacco dependence treatment program. Research volunteers (n=46) were 15.4 ± 1.3 years old, had smoked for 3.2 ± 1.5 years, and currently smoked 16.1 ± 5.1 cigarettes per day. Self-reported tobacco craving was recorded prior to their quit day using the Questionnaire on Smoking Urges (QSU-Brief) and the Minnesota Nicotine Withdrawal Scale (MNWS). Participants were also trained on a divided attention task that measures visual attention, visual scanning, and decision making. After the training session, baseline pre-treatment performance data were recorded. The Factor 2 subscale score of the QSU-Brief, which measures anticipation of relief from negative affect and an urgent desire to smoke, was positively correlated with response times on the divided attention task, indicating that higher craving was associated with slowed responding. The single item “craving for cigarettes” from the MNWS, however, was negatively correlated with response times on the same divided attention task, such that increased craving was associated with faster responding. This inconsistent correlational problem between tobacco craving and a measure of cognitive performance suggests that multiple measures of craving (i.e., single items and multi-factorial questionnaires) should be assessed in all craving studies. Further testing will reveal whether this inconsistency might be specific to adolescent smokers.

Sponsored by NIDA Intramural Research Program.

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CONTINGENCY MANAGEMENT FOR ADOLESCENT SMOKING: A PILOT STUDY

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Contingency management (CM) is an empirically supported treatment for adult substance users. However, few studies have assessed CM for adolescents. In this pilot study, we examined the feasibility and effectiveness of CM in decreasing adolescent smoking. Using a within-participant design, CM (7 days) was compared to noncontingent reinforcement (NR; 7 days). Carbon monoxide (CO) samples were collected twice daily during each phase, in which $70 could be earned. During CM, CO samples indicating abstinence (less than or equal to 5 ppm) were monetarily reinforced; all samples were reinforced during NR. Two CM schedules were tested: (1) an escalating schedule with increasing rewards for consecutive abstinent readings; (2) a schedule preceded by a reduction phase that reinforced CO decreases from baseline. Feasibility and trends in dependent measures were emphasized in the pilot study. Participants were 6 daily smokers between the ages of 14-18 (M = 16.2, SD = 1.0), with screening CO readings of at least 10 ppm (M = 15.2, SD = 4.4). The protocol was well accepted: participants completed 94% of NR readings and 85% of CM readings. Average CO was 10.4 (SD = 5.2) during CM and 14.0 (SD = 6.5) during NR (ES = .32), 23% of CM samples indicated abstinence, compared to 8% of NR samples. CM with reduced improvement show rates and CO levels. These results suggest that CM is feasible with adolescents. Larger scale studies with longer CM periods are warranted.

This study was supported by NIDA grant # R01 DA11204.

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RP-32  SUSTAINED RELEASE BUPROPION IN THE TREATMENT OF NICOTINE ADDICTION AMONG TEENAGE SMOKERS

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OBJECTIVES: This study compared the safety and efficacy of bupropion with placebo in teenage smokers.

METHODS: Teenagers aged 14 to 19 years were recruited from the community to participate in this 52 week, randomized, double-blind, placebo-controlled trial. Following a titration phase, participants received either bupropion sustained release tablets (Wellbutrin SR) 150 mg twice daily or matching placebo and attended behavioral modification sessions throughout the study. Primary endpoints were the cessation of smoking at week 8 with continued abstinence through week 12 as determined by interview and weekly exhaled carbon monoxide levels.

RESULTS: Seventeen subjects (10 male, 7 female) were randomized to active drug or placebo. Nine subjects (16.7 years +/- 1.1 years; 72 kg +/- 10 kg) received placebo, while 8 (16.2 years +/- 1.4 years; 64 kg +/- 17 kg) received bupropion. At week seven, 77.8% of placebo subjects remained in study compared to 50% of bupropion users. (p<0.05) Abstinence from smoking at week 8 was 33.3% and 37.5% for the placebo and bupropion groups, respectively. (p>0.08) Continued abstinence through week 12 declined to 22.2% among placebo users, remaining constant for the bupropion group. One subject in the bupropion group withdrew from the study due to an adverse event compared to none of the placebo users.

CONCLUSIONS: Teenage smokers placed on sustained release bupropion who progressed to week 7 were 1.7 times more likely to be smoke-free at week 12 than placebo users.

Grant support provided by GlaxoWelcome.

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RP-33  NICOTINE REPLACEMENT IN SCHOOL-BASED CESSATION

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University of Southern California (USC) and the Humboldt County Office of Education (HCOE) are jointly conducting a study that would provide a test of the effectiveness of nicotine replacement therapy in the context of a school-based tobacco cessation program. This participatory research study is utilizing the Project EX curriculum, a USC research-validated behavioral component. The Project EX program consists of a repertoire of theoretically and empirically derived motivational strategies presented during ten one-hour sessions. An over-the-counter nicotine gum or herbal gum is randomly assigned to the subjects.

The California Tobacco-Related Disease Research Program and the California Department of Education jointly fund this study under the School-Academic Research Award (SARA) mechanism, with the intent to stimulate and support collaborations between schools and academic investigators in the performance of scientific research into tobacco control issues. In addition to researchers from USC and HCOE working in partnership, high school staff nurses and health educators actively participate in conduct of the study.

The study will be conducting cessation clinics through the school year and into the 2002-2003 school year. Student subjects are recruited from comprehensive, continuation and community high schools throughout Humboldt County, California.

Elements of this study are presented, along with the barriers and successes that the research team has encountered during the implementation of this participatory research.

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RP-34  RECRUITING COLLEGE SMOKERS TO A WEB-BASED SMOKING CESSATION RESOURCE

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BACKGROUND: The goal of this study was to examine the feasibility of using the Internet to identify and recruit college smokers to visit a smoking cessation web site.

METHODS: During the November of 2001, a screening health survey was administered via the Internet to 10,000 randomly selected undergraduate college students. Students who indicated any cigarette use in the prior 30 days were randomly divided into three groups. Group 1 received no follow-up contacts. Group 2 received follow-up emails inviting them to visit Breathe.com (a smoking cessation web site operated by HealthMedia, Inc.). Group 3 received follow-up emails offering them $10 to visit.

RESULTS: Response rate to the health survey was 27% (2733/10,000), 56% and 28% reported using cigarettes in the last 30 days (777/2373). In Group 2, 12% (31/259) of smokers who received the invitation email visited our site. In Group 3 ($10 incentive), 47% (123/259) of smokers who received the email visited the site. Neither gender, age, class (fresh-senior), nor number of days smoking/past 30 days was related to the likelihood of making a visit to the site. Of those who visited the Breathe.com site 83% completed an additional 65-item questionnaire to produce an 11-page individually tailored stop smoking plan. In terms of viewing their tailored stop smoking guide, 80% viewed the first page, 52% viewed through the 5th page, and 36% viewed all 11 pages. 4-month follow-up of smoking status is pending.

CONCLUSIONS: In this study, we demonstrated the feasibility of identifying a large number of college cigarette smokers via the Internet. Simple invitations to visit a stop smoking site results in relatively low participation. Offering a small financial incentive markedly increases to use of web-based smoking cessation resources by a broad range of college smokers.

This study was funded by the Department of Internal Medicine University of Minnesota.

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RP-35  PREFERENCE FOR INTERNET OR PHONE SURVEY: PARTICIPATION RESPONSE RATES FROM THE SMOKERS AND NON-SMOKERS (SANS) RESEARCH PROJECT

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The Smokers and Non-Smokers (SANS) study was designed to investigate associations between smoking status and the dopamine transporter gene (DAT SLC6A3). As a supplement to the larger SANS project, a sub-sample of those contacted by telephone was offered the option to complete the questionnaire via the Internet, or continue the survey on the telephone. The purpose of this study was to investigate the feasibility of using an Internet survey response option in a research study involving recruitment of smokers through random digit dialing. Of 1,997 telephone numbers in the sample, 305 agreed to participate in the survey. Ninety percent preferred a telephone interview—only ten percent preferred the Internet. Two of the 31 respondents who agreed to participate via the Internet actually completed the survey. No significant differences in age, ethnicity, or education were found between those who claimed they wanted to complete the survey via the Internet and those completing the survey via telephone. The low rate of interest in using the Internet in this study is discussed. A better understanding of the reasons why people choose to participate in Internet surveys is needed so that the issue of non-response can be further investigated.

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This study examined the relationship between smoking and “optimism bias” (perception of being less vulnerable to adverse health events than would be the typical smoker). Student volunteers (n=201; mean age=24 years; 66% female; 61% Caucasian, 22% Hispanic, 10% African American, 7% Other Ethnicity) from 10 Houston-area community colleges completed a survey including smoking status, demographics, health assessments, and smoking behavior and attitudes. Smokers rated their overall health compared to other smokers and compared to nonsmokers of the same age. Based on these assessments, we categorized smokers as optimists (73%), realists (20%), pessimists (5%), or undetermined (3%). Group differences were tested using analysis of variance and the chi-square test. Logistic regression identified variables most strongly associated with an optimistic versus realistic assessment. No significant group differences were found for demographics or chronic respiratory disease. Measures of perceived health vulnerability, reported respiratory symptoms, and exercise frequency were significantly more favorable for optimists than for the other groups. Compared to the other groups, optimists reported smoking for fewer years, smoking fewer cigarettes daily, and experiencing lower levels of nicotine dependence, smoking temptations, and withdrawal symptoms. Number of quit attempts did not differ by groups. Optimists reported that quitting would benefit health to a lesser degree than reported by realists and were less likely to report that smoking had affected personal health. Regression techniques identified respiratory symptom scores and perception that smoking had affected health together as most strongly associated with comparative health assessments. This study demonstrates strong optimism bias among community college students and identifies factors associated with optimism. Our data support views that perceived vulnerability is negatively associated with optimistic bias and that health assessments may be based on perceived controllability of addiction or other unrelated healthful behaviors. Cross-sectional data have limitations; therefore, understanding the nature of identified associations requires additional investigation.

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A significant main effect of group on puff duration was reported with smokers taking the 11.5-hour trial. Maximal increases in nicotine were 18.9 (7.8), 53.0 (17.6) and the 4, 8 and 12 mg nicotine groups by 51.4 (42.4), 79.2 (66.1) and 140.0 (69.9) ng/ml. Nicotine peaked 1-2 hours post-dosing. Cotinine levels also rose above baseline in induction, once every 90 minutes. Plasma levels of nicotine and cotinine increased over double blind, dose-ranging Phase III trial. Single and repeated nicotine administrations with The Straw(TM) were generally well tolerated. No serious or unexpected adverse events were reported. Reports of gastrointestinal distress and lightheadedness were consistent with other nicotine replacement therapies.

Smokers received a single dose of nicotine in The Straw(TM) following overnight abstinence from smoking. Plasma levels of nicotine increased above baseline by 5.6 (1.7), 18.9 (7.7), and 19.5 (4.4) ng/ml (mean, SD) for the 4, 8 and 12 mg groups. Nicotine peaked 1-2 hours post dosing. Cotinine levels also rose above baseline in the 4, 8 and 12 mg nicotine groups by 51.4 (42.4), 79.2 (66.1) and 140.0 (69.9) ng/ml.

The same subjects returned one week later and received 8 doses of study medication, once every 90 minutes. Plasma levels of nicotine and cotinine increased over the 11.5 hour trial. Maximal increases in nicotine were 18.9 (7.8), 53.0 (17.6) and 49.2 (13.8) ng/ml in the 4, 8 and 12 mg groups. Cotinine levels increased by 273.3 (51.9), 587.7 (30.2) and 730.1 (161.4) ng/ml. This study demonstrates that oral light headedness were consistent with other nicotine replacement therapies.

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THE ACUTE EFFECTS OF LOW DOSE NALTREXONE ON AD LIB SMOKING IN NORMAL HEAVY SMOKERS AND CHIPPERS

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The potential of the opiate antagonist naltrexone as a pharmacotherapy for smoking cessation has been investigated with mixed results. This study investigates the acute effects of low doses of naltrexone on ad lib smoking. The twenty-nine subjects included heavy smokers (>15 cigarettes per day, n= 19) and chippers (< 6 per day, n= 10). In a double-blind, repeated measures design, subjects participated in three 12-hour sessions during which they were given either placebo, naltrexone 50 mg, or naltrexone 100 mg. Subjects were exposed to all three drug conditions in random order. Subjects smoked ad lib. Dependent variables included: measures of smoking topography, questionnaire measures of urge to smoke, and expired CO and serum cotinine and nicotine. Preliminary results indicated a main effect of time and dose. There were no significant interactions or differences between groups. There was significant quadratic trend for dose. Subjects smoked fewer cigarettes with 50 mg naltrexone than with placebo (p = .002). Although not significant, subjects also smoked fewer cigarettes with 100 mg naltrexone than placebo. A significant main effect of group on inter puff interval was reported where smokers showed significantly longer inter puff interval (p < .001). A significant linear trend towards interaction for inter-puff interval with smokers having a longer inter puff interval (p=.08, eta2=.15). A significant main effect of group on puff duration was reported with smokers taking longer puffs than chippers (p <.001). Craving results are pending.

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HYPPOAROUSED ATTENTION AND RISK FOR SMOKING IN ADULT OFFSPRING OF PARENTS WHO SMOKE


The acute administration of nicotine to nonsmokers disrupts information processing by producing hyperarousal of attention mechanisms and a reduced ability to gate and scan relevant information. In chronic smokers, however, nicotine appears to assist information processing by compensating for hypoarousal attention operations present when these persons are not smoking. Rather than simply the result of acquired pharmacological tolerance associated with prolonged nicotine exposure, the nicotine attention enhancement effect experienced by chronic smokers may be related to the use of tobacco by their biologic parents. A few recent reports propose that the offspring of families with a smoking history (FSH) show hypoarousal attention operations before they ever encounter tobacco products. The present study tested this proposal.

Forty-eight healthy nonsmoking adults were matched on relevant cognitive, neurological and psychological criteria. Twenty-four participants, termed Family Smoking History Positive (FSH+), came from families in which the biological parents and one relative smoked. The second group of 24 participants was from families with no history of tobacco use (FSH-). Attention operations were evaluated using the startle eye-blink electromyographic EMG) response recorded during a standard acoustic startling task.

Compared to FSH+ persons, FSH+ persons displayed startle EMG responses to all stimuli that were significantly lower and occurred significantly slower. These effects were robust and consistent. The results conform to studies of persons with attention deficit disorders and support the hypothesis that FSH+ persons have a hypoarousal attention system. These persons may use smoking to stimulate and normalize their attention operations.

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PSYCHOMETRIC PROPERTIES OF A BRIEF SMOKE-CONSEQUENCES QUESTIONNAIRE FOR ADULTS (SCQ-A) IN AFRICAN-AMERICAN SMOKERS

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Smoking expectancies have been found to be important in understanding motivation for cigarette smoking as well as difficulties in quitting. Brandon and colleagues have developed the Smoking Consequences Questionnaire to assess smoking expectancies and have examined its factor structure and other psychometric properties among college students and adult smokers. This study examined the psychometric properties of a brief (30-item) version of the 80-item Smoking Consequences Questionnaire-Adult Version (SCQ-A) that was developed and piloted among a sample of African-American adult smokers. The brief SCQ-A items were selected from each of 9 subscales of the SCQ-A based on high factor loadings reported by Copeland, Brandon, and Quick (1995). The instrument was administered to 484 volunteer smokers (62% male, mean age = 41) who were recruited at an inner-city medical clinic. Maximum likelihood factor extraction with a varimax rotation specifying 9 factors replicated the 9 factors of the original SCQ-A. The items showed no significant cross loadings with other factors, and the internal consistency of each subscale was adequate (alphas ranged from 0.70 - 0.90). Correlations between the factors and other variables provided evidence of convergent and discriminant validity. The brief SCQ-A thus appears to be a valid and reliable measure for examining smoking expectancies among African-American smokers, and can be useful when survey length is a concern.

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RP-44  ACCURACY OF SELF-REPORT OF SMOKING

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INTRODUCTION: Smoking research studies often ask subjects about their smoking rate at different times and via different methods. The goal of this study was to determine the relationship between smoking rate assessed on the telephone, at intake and through the use of smoking diaries.

METHODS: Subjects (n=120) were asked at phone screening “How many cigarettes do you smoke per day?” Eligible subjects attended an orientation visit one week later where a smoking history intake was completed. The intake again asked, “How many cigarettes do you smoke per day?” Subjects then smoked ad lib and kept a one-week daily diary of cigarettes smoked. Self-reported rates on the phone screening and smoking history intake were compared to the actual number of cigarettes recorded on the daily diary.

RESULTS: The mean number of cigarettes smoked per day reported on the phone screening was 26.2 (±7.3); smoking history intake 27.3 (±8.7); and daily diaries 23.8 (±6.25). The phone screening and the smoking history intake form were highly correlated (r=.795; p<.0001). The daily diaries were also significantly correlated with the phone screening questionnaire (r=.69; p<.0001) and with the smoking history intake form (r=.72; p<.0001). On the other hand, a paired t-test showed a significant difference between the diary with the phone screening and the smoking intake (p<.0001) as well as between the phone screening and the intake (p=.036).

CONCLUSIONS: Subjects’ perceptions of their smoking rate may be slightly exaggerated. An alternative explanation may be that keeping daily diaries may have impacted smoking behavior or subjects are not as rigorous in keeping daily records.

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RP-45  ELECTRONIC DIARY METHODS FOR ASSESSING SMOKING: COMPLIANCE AND VALIDITY

Saul Shiffman, Ph.D., and Jean Paty, Ph.D., University of Pittsburgh and Invivodata, Inc.

To avoid problems with recall, new methods of collecting smoking data gather detailed, real-time recordings using Electronic Diaries (ED). The value of such data depends on subjects’ compliance in recording each cigarette and responding to ‘beeps’ signaling randomly-timed assessments of non-smoking situations. We summarize compliance among 304 smokers (M=27 cigarettes/day) who recorded ad lib smoking on ED, recalled daily smoking using Time-Line Follow-Back (TLFB), and provided CO and cotinine samples. TLFB entries for smoking rate showed substantial digit bias (46% of daily totals were rounded by 10); ED estimates showed none. TLFB estimates averaged 2.5 cigarettes/day higher than ED cigarette counts, but on 34% of days, ED counts exceeded recalled TLFB estimates. ED smoking frequency correlated highly with TLFB estimates (r=0.84), and correlated with CO and cotinine levels at least as well as TLFB did. In multivariate models, ED smoking rate accounted for significant incremental variance in CO and cotinine when TLFB estimates were covaried; the converse was not true. When ‘beeped’ at random, subjects responded within 2 minutes to 91% of randomly-issued prompts. Although subjects could suspend signaling for naps or uninterruptible activities, they used these features sparingly, averaging a total of less than 1 hour a day. Along with other data on compliance and reactivity, the results suggest that high compliance with intensive real-time data collection is attainable, that smoking data collected in real time are accurate. Real-time methods hold promise for improved validity in assessment of smoking and other behaviors.

Supported by National Institute on Drug Abuse grant #DA06804. The authors are co-founders of invivodata, Inc., which provides electronic diary methods for clinical research.

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RP-46  COMMON FACTORS ACROSS ACUTE SUBJECTIVE EFFECTS OF NICOTINE

Kenneth A. Perkins, Ph.D., D. and Jean Paty, Ph.D., University of Pittsburgh.

Nicoine intake acutely induces many different subjective, physiological, and behavioral effects. Some of these effects may cluster together, reflecting common underlying mechanisms (e.g. catecholamine release). In this study of 94 smokers, exsmokers, and nonsmokers, we conducted factor analyses of responses to a battery of measures following acute nicotine nasal spray administration. Measures included 15 subjective mood items (visual-analog scales, POMS), 4 cardiovascular measures (HR, SBP, DBP, finger temp), and 4 performance tasks (hand steadiness, fingertapping speed, memory recognition, rapid information processing). The goal was to identify homogeneous clusters among these diverse effects of nicotine. A subject’s response to each measure was determined by the slope of his or her dose-response curve (0, 10, 20 ug/kg). Results of initial analyses including all measures revealed factor structures that were unstable (i.e. large shifts in factor loadings following small rotation changes or elimination of single measures) and inconsistent between smokers and nonsmokers. In particular, cardiovascular and performance measures did not load consistently onto factors. Repeating analyses with only the subjective measures produced more stable factors that were consistent between smokers and nonsmokers. These 5 factors were labeled “Head Rush” (e.g., head rush, buzzed, light-headed), “Positive Affect” (comfortable, satisfied), “Negative Affect” (anger, depression, tension), “Fatigued” (tired, sedated), and “Energized” (stimulated, vigor). These findings suggest that acute subjective responses to nicotine can be captured by a few common factors, simplifying this assessment, and may provide potential directions for exploring mechanisms responsible for these effects.

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RP-47  RELIABILITY OF ACUTE SUBJECTIVE AND CARDIOVASCULAR EFFECTS OF NICOTINE

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As widely shown, nicotine has distinct acute subjective and cardiovascular effects. However, seldom addressed is the reliability of these effects, which typically are obtained in only one session. If unreliable, then single assessments of nicotine effects are inadequate to characterize individual differences in nicotine sensitivity, a topic of growing interest. We examined the reliability of subjective and cardiovascular responses to nicotine by nasal spray in male and female smokers (n=22) across days. In each of 4 sessions following overnight smoking abstinence, subjects were administered nicotine (20 ug/kg) and placebo nasal sprays, with 20 mins between sprays. Order of sprays was counter-balanced between subjects, and the same order was used across days within subjects, who were blind to the contents of the spray prior to each administration. Subjective (visual analog scale items, POMS) and cardiovascular (HR, BP) measures were obtained following each spray. Intraclass correlations (IC) were calculated for the difference between nicotine and placebo (to assess response to nicotine per se) across days to determine reliability of these responses. Results showed that 4 of the 7 VAS items had significant IC’s, such as head rush (IC=0.81, p<.001), stimulated (IC=0.88, p<.001), and decreased urge to smoke (IC=0.42, p<.05), as did 5 of 8 POMS items, such as Vigor (IC=0.43, p<.05) and Arousal (IC=0.46, p<.05). HR (IC=0.47, p<.05), SBP (IC=0.71, p<.001), and DBP (IC=0.75, p<.001) were also reliable. These results indicate that single assessments of most of nicotine’s subjective and cardiovascular effects are reliable. Thus, between-subject variation in these effects may reflect stable characteristic (i.e. trait) differences that can be associated with individual difference factors (e.g. genetics) to better understand mechanisms responsible for sensitivity to nicotine. Supported by NIDA grants DA05807 and DA08578.

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THE EFFECT OF NICOTINE ADMINISTRATION AND DEPRIVATION ON EMOTIONAL REACTIVITY IN SMOKERS

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The experience of negative affect (e.g., depression, dysphoria) is an important predictor of smoking prevalence, relapse after treatment, and severity of nicotine withdrawal. However, emotional assessments used in smoking research have typically been retrospective and cannot capture the more subtle moment-to-moment affect changes that may be related to nicotine administration or short-term deprivation. The acoustically elicited eyeblink startle response, on the other hand, is immediate and highly sensitive to the presence of ambient emotional cues. Numerous studies of emotion have found startle responses are augmented in the presence of negative affective stimuli and attenuated in the presence of positive stimuli. As such, the startle paradigm may provide an assessment of the activation of appetitive or aversive processes. Smokers (n=43) completed four laboratory sessions during which they viewed a series of positive, negative, and neutral pictures while startle eyeblinks were measured. In each session participants were either nicotine deprived for 12 hours (or non-deprived) and received either 1 mg of nasal nicotine (or placebo) before startle assessment. A deprivation status X nasal spray type X picture interaction was found, (F=3.42 (8,42), p<.01). Analysis of this interaction showed that nicotine attenuated startle responding to both positive and negative stimuli while smokers were in the deprived conditions. In contrast, deprived smokers showed no startle attenuation while viewing neutral pictures. These results suggest that nicotine may help smokers regulate mood by enhancing appetitive responding to positive stimuli and reducing aversive responding to negative stimuli.

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CORRESPONDING AUTHOR: Brian L. Carter.

IMAGING HUMAN NICOTINIC RECEPTORS

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Nicotine, an active component of tobacco, acts at the alpha4beta2 subtype of nicotinic acetylcholine receptors (nAChRs). Until very recently, suitable ligands for imaging nAChRs in humans were lacking. As we acquired favorable preclinical data, the focus of the current study is to determine if 2-[F-18]fluoro-3-[2(S)-2-azetidinylmethoxy]pyridine (2-[F-18]FA) could be used to image nAChRs in human brain with positron emission tomography (PET) within radiation dosimetry limits. We acquired PET scans from healthy non-smoking volunteers over 7 h after i.v. administration of 2-[F-18]FA (0.043 mCi/kg; <10 pmol/kg; in sterile and apyrogenic saline solution; radiochemical purity > 98%; sp. act. 5000-20000 Ci/mmol at injection time). By measuring radioactivity in voided urine for 24 h post-injection, we confirmed our expectations that 2-[F-18]FA would be excreted in the urine and that the bladder wall would receive the greatest radiation dose. More than 90% of radioactivity was eliminated via the urine (effective half-life ca. 4 h). Using MRIDOSE 3.1, we estimated the effective equivalent dose to the urinary bladder wall (2.4-h void interval) was ca. 0.7 rem/CI. The results also revealed that the total radioactivity accumulated in human brain, was ca. 2.5% of injected dose, sufficient for visualizing nAChRs up to 5 h after injection. Consistent with the nAChRs distribution pattern in human brain, accumulated radioactivity was greatest in the thalamus and superior colliculus; intermediate in the cerebellum and cortex; and least in white matter. These results are promising and suggest that PET imaging of nAChRs in human brain with 2-[F-18]FA is feasible.

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REACTIVITY TO SMOKING RELATED CUES IN DEPRIVED AND NON-DEPRIVED SMOKERS: PRELIMINARY EVIDENCE FROM AN EVENT-RELATED fMRI STUDY

F. Joseph McClernon, Daniel McCarthy, Ryan Kazanciyi, Agnes Grochowska, Jennifer Green, Jedd E. Rose, Gregory McCarthy

Reactivity to drug cues is a key feature of addiction though the neuroanatomical basis of this phenomenon is not well characterized. Three (n=3) dependent smokers completed two scanning sessions: one following 12-hour abstinence from cigarette smoking and one after regular smoking. The order of sessions was randomly assigned. On each day, participants were scanned with a 1.5 T GE Signa scanner using BOLD contrast while they viewed smoking-related and neutral images on a monitor. Across sessions and stimulus types, picture viewing resulted in activation in the interparietal sulcus, inferior frontal gyrus, and fusiform gyrus. At prefrontal and cingulate cortex, a trend toward a greater hemodynamic response was observed in response to smoking cues relative to neutral cues, but only in the deprived condition. An opposite pattern was found during deprivation in the thalamus where neutral cues resulted in a greater hemodynamic response relative to smoking cues. These preliminary results suggest an important role for limbic regions in mediating responsess to drug related cues during deprivation.

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REACTIVITY TO SMOKING RELATED CUES IN DEPRIVED AND NON-DEPRIVED SMOKERS: PRELIMINARY EVIDENCE FROM AN EVENT-RELATED fMRI STUDY

Vesta Brue, M.B.A.; Harry Lando, Ph.D.; Jeff Hendrickson, Ph.D.

LIFETECHniques, Inc. investigated the feasibility of a smoking reduction program utilizing SmokeSignals™, computerized devices that time-stamp cigarettes smoked and deliver a tailored reduction regimen. Of 47 initial participants, 14 had partially missing data and were excluded from analysis. 33 smokers followed protocols flawlessly, recording all cigarettes. Demographics were 18 females, 15 males, average age =43, average years smoking =25) who agreed to reduce smoking by 50% for 4 weeks, with encouragement to then proceed toward cessation. After a 7-day baseline period of device-monitored ad-lib smoking, participants received 28-day reduction schedules, personalized from baseline data and delivered by the device. The schedule called for 25% reduction the first week, another 25% the second week, and maintenance at 50% of baseline for Weeks 3-4. Cigarette allotments varied by discrete day of the week, calculated from baseline real-time monitored data on consumption and smoking times. Results were very encouraging. An observed 82.5% of the treatment program completers achieved targeted reductions of at least 50%. Average cigarette consumption declined from 25.2 cigarettes per day at baseline to 10.9 cigarettes post-treatment, a mean decrease of 76.7%. Furthermore, mean cotinine values decreased by 28%, indicating reductions in exposure had indeed occurred. Increases in self-efficacy and success in moving reticent smokers along stages of change were observed. Also quite encouraging was the finding that 23 of the 33 participants with complete data chose to continue protocols toward total abstinence and that 16 of these subjects demonstrated 24-hour point-prevalence cessation. The findings support the efficacy of utilizing harm reduction technology for cessation-resistant smokers.

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SMOKING REDUCTION: EFFECT ON BIOMARKERS OF TOXICITY AND EXPOSURE

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Smoking reduction is a potential treatment method for smokers who are not willing or able to quit. This study examines the effects of reducing cigarette smoking on 8 biomarkers of toxicity: carbon monoxide (CO), hemoglobin, white blood cell (WBC) count, low-density lipoproteins (LDL), high-density lipoproteins (HDL), blood pressure, heart rate and metabolites of the tobacco-specific lung carcinogen 4-(methyltritosamino)-1-(3-pyridyl)-1-butanol (NNK). The data from 10 male subjects and 10 female subjects have been analyzed at this time. Treatment consisted of subjects reducing cigarette smoking by 25%, 50% and 75% in two-week incremental periods. Subjects supplemented their cigarette use with 4 mg nicotine gum (Nicorette) to help alleviate withdrawal symptoms during the reduction process. Data collection occurred at the end of week 4 (50% reduction), week 6 (75% reduction) and at two follow up visits (weeks 8 and 12). Subjects smoked an average of 25.74 (SD=5.19) cigarettes per day (CPD) during baseline conditions and these values decreased to 11.8 (SD=2.43) CPD at week 4 and 7.34 (SD=3.02) CPD at week 6. CO levels decreased from 19.55 ppm (SD=10.13) at baseline to 10.75 ppm (SD=4.29) and 7.34 ppm (SD=3.02) at week 4 and 6 respectively. No significant effects were observed on hemoglobin, diastolic blood pressure, heart rate, LDL, HDL or NNK metabolite levels (NNK metabolite levels were determined in a total of 35 subjects). WBC count and systolic blood pressure were slightly decreased but only at week 6. Smoking reduction may reduce risk factors for coronary artery disease with the decrease in CO levels and WBC count.

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URINARY EXCRETION OF NICOTINE METABOLITES AND 4-(METHYLNITROSAMINO)-1-(3-PYRIDYL)-1-BUTANONE (NNK) METABOLITES BY SMOKERS FOLLOWING REDUCTION OF CIGARETTE CONSUMPTION

Sharon E. Murphy, Carrie Link, Jeannette Zingelger, Joni Jensen, Dorothy K. Hatuskami, London Losey, Steven G. Carmella and Stephen S. Hecht, University of Minnesota Cancer Center and Transdisciplinary Tobacco Use Research Center

Cessation of tobacco use is the best way to prevent tobacco-related cancers. For smokers unwilling or unable to quit, a potential alternate means to reduce risk is to decrease tobacco consumption. We investigated the effect of reducing cigarette consumption on the level of urinary nicotine metabolites and 4-(methyltritosamino)-1-(3-pyridyl)-1-butanol (NNAL) and its glucuronides (NNAL-Gluc), the major urinary metabolites of the tobacco-specific carcinogen, NNK. Urine samples were collected at baseline, 4, 6, and 8 weeks of a smoking reduction program. Some individuals used nicotine gum to aid in reduction. To date, samples from 43 subjects have been analyzed for nicotine metabolites and 35 for NNAL and NNAL-Gluc. Twenty four individuals successfully reduced their cigarette consumption by 65% or more at week 6 and maintained reduction through week 8 [25.6 ± 5.77cpd (mean ± SD) at baseline, 6.7 ± 4.65cpd at week 6]. Seventeen individuals reduced smoking between 45 and 65% at weeks 8 and 6 [23.5 ± 3.9cpd at baseline, 7.2 ± 2.6cpd at week 6]. Urinary cotinine and trans-3’-hydroxycotinine levels did not decrease significantly at weeks 6 or 8 in either group. The average percent reduction of urinary NNAL and NNAL-Gluc was also not significantly reduced. In individuals who reported little or no nicotine gum use, the sum of cotinine, trans-3’-hydroxycotinine and their glucuronides excreted per cigarette was significantly increased [181 ± 426 ng/ml at baseline, 1697 ± 2177 ng/ml at 6 weeks (p=0.04)]. These data suggest that when reducing the number of cigarettes smoked these individuals increased both the amount of nicotine and NNK consumed per cigarette. However, reduction of NNAL and NNAL-Gluc was observed in some individuals.

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**RP-56**

**DETERMINATION OF NICOTINE AND ITS METABOLITES IN URINE BY HPLC AFTER DETBA DERIVATIZATION**

Georg Schepers, Ph.D.*, Demetrios Demetriou, M.Sc., INBIFO Institut fuer biologische Forschung GmbH

A method for the simultaneous determination of nicotine and 9 of its metabolites, i.e., cotinine, 3'-hydroxycotinine, 5'-hydroxycotinine, nicotine-N'-oxide, norcotinine, nornicotine, 4-(3-pyridyl)-4-hydroxybutyric acid, 4-(3-pyridyl)-4-oxybutyric acid, and 3-pyridylacetic acid, in human urine is described. The phase-2 metabolites nicotine-N-glucuronide, cotinine-N-glucuronide, and 3'-hydroxy-O-glucuronide are determined in a 2nd chromatographic run after treatment of the urine sample with β-glucuronidase, cotinine-N-glucuronide, and 3'-hydroxy-O-glucuronide and calculation of the difference between the free and total analytes. Approximately 97% of the known metabolites excreted in human urine can be determined.

The method requires no clean-up of the urine samples, e.g., by extraction, and is based on our method for HPLC analysis after DETBA derivatization [Rustemeier et al., J. Chromatogr. 613, 95-103, (1993)]. Modification of derivatization conditions, solvent composition, pH, flow, and detection wavelengths has resulted in significant improvements in the method. Derivatization and chromatography are fully automated and the chromatography is performed within 13.5 min.

The method was used for biomonitoring of the nicotine uptake and the determining of the relative distribution pattern of nicotine and its metabolites in urine of smokers.

INBIFO is a Philip Morris research laboratory.

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**RP-57**

**USE OF NICOTINE AND NNK METABOLITES TO ASSESS EXPOSURE TO CIGARETTE SMOKE CONSTITUENTS: PILOT STUDY RESULTS**

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This pilot study was conducted to aid in the development of the experimental design for a study of exposure of adult smokers in the U.S. to selected cigarette smoke constituents. The study included 69 adult smokers of any brand of 3.0 – 6.9 mg tar yield (FTC method) manufactured cigarettes and 66 non-smokers. For assessment of exposure levels of nicotine, its metabolites, cotinine, trans-3'-hydroxycotinine, nicotine-N-glucuronides, cotinine-N-glucuronides, and trans-3'-hydroxycotinine-O-glucuronide were measured in 24-hr urine samples on 3 occasions. 4-(methylnitrosamo)-1-(3-pyridyl)-1-butane (NNK) metabolites 4-(methylnitrosamo)-1-(3-pyridyl)-1-butanol (NNAL) and 4-(methylnitrosamo)-1-(3-pyridyl)-1-butanol glucuronide (NNAL-glucuronide) were measured in the same urine samples.

Results from the study will be presented, including smoker/non-smoker intake ratios and intra/inter-individual variation.

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**RP-58**

**PREFERENCE FOR ASSISTED QUITTING AMONG SMOKERS LIKELY TO QUIT**


Public Health Service guidelines direct that all smokers should be encouraged to use smoking cessation treatment, such as nicotine replacement therapy. Yet, most quit attempts are still undertaken without assistance. We analyzed characteristics of smokers who prefer assisted quitting. Twenty national surveys (n=500 each, total N=10,000) were conducted by random-digit-dialing between September 1999 and July 2001. Among smokers who indicated they were very or somewhat likely to quit smoking in the next year (51.2% to 58.5% of survey respondents), 56.5% preferred assisted quitting. Data on demographic characteristics, smoking history, past use of smoking cessation products, and method and timing of next quit attempt were cross-tabulated with interest in assisted quitting. Assisted quitting was more often selected by heavier smokers (>20 cigarettes/day: 63.8% v. 53.1%, p<0.0001), those with more prior quit attempts (59.6% v. 55.8% v. 50.4%, for 3 or more, 1-2, or 0 quit attempts, respectively; p<0.0001), higher incomes ($30,000: 61.4% v. 49.7%, p<0.0001), and greater education (H.S.: 60.2% v. 52.3%, p<0.0001). Smokers who had previously used NRT were more likely to opt for assisted quitting (69.5% v. 48.6%, p<0.0001). Smokers aged 30-59 were more likely to select assistance (61.3%) than younger (18-29: 47.4%) or older (>60: 47.6%) smokers (p<0.0001). Each of these factors remained associated with quit method preference in a multivariate logistic regression.

The surveys were designed and conducted by GlaxoSmithKline Consumer Healthcare (for which the authors work or consult) and fielded by Hickman Brown Research. Dr. Shiftman has an interest in a company that develops smoking cessation medications.

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**RP-59**

**POPULATION TRENDS IN SMOKING CESSATION AND CORRELATIONS TO PHARMACOTHERAPY UTILIZATION: RESULTS FROM THE CURRENT POPULATION SURVEY**

Joe Gitchell*, Michael Di Marino, Jeffrey Rohay, Saul Shiffman; Pinney Associates

Since nicotine replacement therapy (NRT) medications were switched to OTC status in 1996, their sales and utilization have increased substantially. However, absent national survey data on the association between NRT use and quitting, some have wondered about the impact of OTC availability on public health. To address the issue, we compared national incidence of quitting during three periods differing in NRT availability: the introduction of prescription patches (1993), when prescription NRT sales were at steady state (1996), and following the OTC switch (1999). We used data from the NCI Tobacco Use Supplement to the Current Population Survey for those years to analyze self-reported quitting behaviors among U.S. adults. National and state incidences of past-year quitting were calculated from current everyday smokers and past-year quitters. Quitting declined from 37.9% (95% CI: 37.2-38.6%) in 1993 to 35.6% (34.9-36.4%) in 1996, but increased significantly to 39.9% (39.1-40.6%) in 1999. Thus, quitting decreased from the introduction of nicotine patch, which was associated with a transient spike in patch use, to “steady state” availability, and then increased during the era where OTC NRT products were available. In contrast to national trends, the two states that implemented leading comprehensive tobacco control programs (Massachusetts and California) showed no change across these periods. Nationally, quitting behaviors have significantly increased during the OTC era, paralleling NRT sales data. While such ecological correlations cannot prove that OTC NRT availability increased quitting, the data are consistent with that conclusion.

**Supported by GlaxoSmithKline Consumer Healthcare, which markets NRT medications, and the authors perform consulting services on their behalf.**

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RP-60  TOBACCO-RELATED PERFORMANCE PROFILING USING HEALTH PLAN DATA

Susan Swartz, M.D.*, Timothy Cowan, M.S.P.H., Maine Medical Center; Doug Thompson, Ph.D.; Allan Leighton, University of Southern Maine

Evaluating compliance with national guidelines for tobacco treatment needs to go beyond assessment of asking about smoking and advising quitting (HEDIS measures). Health plan data may offer useful information to measure assistance with smokers.

We examine baseline measures from a randomized trial testing outreach and provider feedback to improve tobacco treatment. We audited records of adults in 50 primary care practices and obtained claims data for adult enrollees in Medicaid and a managed care organization having a provider visit July 1999 through June 2000. Practice/provider rates of prescriptions for nicotine replacement, Zyban or Wellbutrin, and diagnosis claims for tobacco use were adjusted for age and ratio of Medicaid/managed care patients. Using smoking prevalence for each practice, measured by patient telephone survey, we estimate prescription rates for smokers. Correlation tests between measures are performed.

Documentation of tobacco status ranged from 35% to 100% by provider, and 60% to 100% (mean 95%) by practice. Prescription rates by provider varied from 0% to 17% (mean 5.7%). Provider coding for tobacco use varied from 0% to 20% of adult visits. We estimate 24% of adult smokers seen by a provider have used a medication to quit smoking. Adult prescription rates, adjusted for age and insurance (profiling data), correlated with prescription rates adjusted for smoking prevalence (coefficient 0.51, p<0.001). Rates of tobacco diagnosis claims correlated with rates of prescriptions (coefficient 0.45; p<0.0001).

Providers vary in documenting and treating tobacco, but many actively prescribe tobacco medications. Claims data appears useful in assessing prescribing patterns, possibly without knowledge of smoking rates.

This study is supported by AHRQ grant # 01HS10510.

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RP-61  DO FORMER SMOKERS COST MORE THAN SMOKERS? A FOUR-YEAR RETROSPECTIVE STUDY

Paul Fishman, Elizabeth P. Merkle, Ella Thompson, Susan J. Curry

Despite extensive evidence of the negative effect of smoking on health and the benefits of cessation, much less is known about the impact of quitting smoking on health care costs. We examined the impact of quitting smoking on health care costs in a sample (N=1,112) of smokers and former smokers who were enrolled in Group Health Cooperative, a large mixed model HMO in Washington state. Health care costs among former smokers were examined for the two years preceding and following cessation and were compared to those of continuing smokers. Health care costs were estimated as a function of age, sex and smoking history. Former smokers comprised approximately half of the sample (44%). There were no differences in age (Mean=48.7 yrs.), sex (59% male), or years smoking (Mean=32) between former and continuing smokers. For former smokers, health care costs were stable in the two years preceding cessation. Health care costs increased significantly among former smokers in the first 3 months following cessation ($ 706.52 on average more than continuing smokers). However, costs among former smokers fell below the level of continuing smokers by the end of the first year post cessation. Although smoking cessation results in a transient increase in health care costs, these costs were compensated for within 2 years post quit. Costs among former smokers that enrolled in the Free and Clear program rose by a smaller amount and stabilized much quicker than did costs among former smokers that did not use the program. Thus, smoking cessation programs are likely to be a cost-effective investment for HMOs in the long term.

This study was supported by a grant from Pfizer, Inc. to the first author.

CORRESPONDING AUTHOR: Paul Fishman.

RP-62  RECRUITING LOW-INCOME SMOKERS TO PARTICIPATE IN A CLUSTER RANDOMIZED COMMUNITY-BASED TRAIL

James Butler, D.Phil., Shawn Jeffries, Ph.D., Felix A. Okah, M.D., Brian Manning, B.A., Jasjit S. Ahluwalia, M.D., University of Kansas School of Medicine

Smoking prevalence remains a challenging issue to address in low-income, minority populations who continue to have cessation rates lower than other groups of smokers. To better understand smoking in low-income populations, The Pathways to Health (PATH) project currently examines health behaviors among residents of public housing developments in the greater Kansas City metropolitan area. The study uses a cluster randomized design to explore the effectiveness of motivational interviewing (MI) counseling and nicotine gum for smoking cessation in the treatment group and MI counseling and health education materials to increase fruits and vegetable consumption in the comparison group. Other aims include gathering descriptive data on smoking, physical activity, and diet. Community acceptance and engagement has been essential in accomplishing the study’s recruitment goals. Several strategies strengthen our relationship with the housing development community. One of the strategies involves hiring community health educators to act as liaisons between the research team and the residents of the housing developments. Other strategies include conducting free health fairs at each housing development, providing study participants with monetary incentives, and the community with health information and feedback. Currently, three health fairs have been conducted with attendance rates of 12-47% of the eligible adult population and retention rates of 40-67% of eligible smokers during the 6-month intervention period. Researchers may consider incorporating similar recruitment strategies in order to overcome barriers to participation in research projects when working with underserved populations.

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RP-63  NURSE-MANAGED LAY-LED TOBACCO CESSATION INTERVENTION IN RURAL APPALACIA

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The purpose of this study was to examine the effectiveness of a tobacco cessation intervention in two rural Appalachian counties. Adult tobacco users were recruited for a 24 month intervention study. Intervention county participants (n=239) were enrolled in a cessation protocol that was delivered by a lay educator and case-managed by a health department nurse. Control county participants (n=272) were enrolled in a blood-pressure monitoring protocol that was delivered by a lay educator and case managed by a health department nurse. Sample characteristics by group were similar for age and gender. Both intervention and control group participants smoked for an average of 23 years and consumed a similar number of cigarettes/day (mean=24). Mean number of previous quit attempts was 3.0 in the intervention county and 2.2 in the control county, while TTF (min) was 27.3 and 34.3 for intervention and control counties, respectively. While cotinine-validated abstinence rates are pending analyses, self-reported rates at 12 months postenrollment indicated that 29.5% of intervention county participants were not using tobacco, as compared to 3.4% of control county participants (p<0.001). For intervention county participants who were randomly assigned to different type of NRT (n=76), abstinence rates of 21% and 39.4% were observed among patch only vs. patch + gum groups, respectively at 12 months. Preliminary results suggest that a nurse-managed lay-led approach may serve as an efficacious tobacco cessation strategy.

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The prevalence of tobacco use is far higher in lower socioeconomic status (SES) populations, and many of these people use the services of public health dental clinics. Dentists and dental hygienists, a largely untapped resource for providing advice and brief counseling to tobacco-using patients, can be effective in helping tobacco users to quit.

The purpose of this study was to adapt, enhance, and evaluate a dental office-based tobacco cessation program for use in public health settings by conducting a pilot study with tobacco-using patients in two public health dental clinics in Oregon. These patients were assigned to delayed treatment control or to receive the intervention over a 6-month period. Follow-up data will be collected at 6-weeks, and 3 and 6 months post-intervention.

In previous studies, we empirically tested our dental office-based tobacco cessation intervention and training programs in managed care and private practice settings. For this study, we adapted our previous program by: 1) including the “5 A’s” of tobacco cessation; 2) broadening the role of the dentist; 3) providing two follow-up phone calls by trained tobacco cessation counselors; 4) educating DHCWs at the clinic in the use and prescription of NRT, and; 5) teaching DHCWs brief motivational interviewing techniques.

An overview of the training program will be presented as well as challenges and successes in changing dental health care worker behaviors. In addition, enrollment, 6-week, 3-month preliminary 6-month data for tobacco-using patients will also be provided.

This study was funded by a grant from the Robert Wood Johnson Foundation, grant #038887.

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RP-68
VALIDATION OF THE NICOTINE DEPENDENCE SYNDROME SCALE (NDSS): DIFFERENCES BETWEEN AND WITHIN CHIPPERS AND HEAVY SMOKERS

Saul Schiffman, Ph.D., and Michael A. Sayette, Ph.D.

Nicotine dependence is critical to explaining smoking. Thus, sensitive and sophisticated measures of nicotine dependence are needed. The Nicotine Dependence Syndrome Scale (NDSS), developed as a multi-dimensional assessment of dependence, has been validated on adult cessation samples. We tested the ability of the NDSS to discriminate between chippers (non-dependent smokers, n=123) and heavy smokers (n=130, averaging 25 cigarettes per day). Each of the 5 subscales of the NDSS significantly discriminated the two criterion groups. The NDSS-T summary score discriminated the groups almost perfectly; the area under the ROC curve was 0.96 (AUC/ROC ranged from 0.58 to 0.95 for individual subscales). Multiple NDSS scales contributed independent variance to differentiating the groups, and the scales discriminated the groups even after FTQ scores were covaried.

We further tested the NDSS's ability to discriminate degrees of nicotine dependence within groups of chippers and relatively young regular smokers (age 25). Within each group, NDSS scores predicted exhaled CO concentrations, self-rated addiction, and difficulty abstaining, in some cases accounting for over 50% of the between-persons variance. Among chippers, NDSS scores also predicted smoking rate and number of days smoked. Thus, the NDSS demonstrated ability to discriminate criterion groups selected on dependence, and also to discriminate small differences in dependence within these relatively homogeneous groups. This suggests the NDSS may be useful for studying the early manifestations of dependence that may be part of its developmental trajectory.

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RP-69
NICOTINE ADDICTION IN HEROIN-DEPENDENT PERSONS

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412 heroin-dependent men (M-H) (293 attended in a methadone-dispensing unit –Sh+– and 119 also receiving methadone but being imprisoned –PhH+–). 108 heroin-dependent women (W-H), attending to a methadone-dispensing unit, 118 women of similar age (W-C) 124 prisoners not heroin-consumers (PRI), and 65 men of similar age (M-C), were asked to fill a questionnaire about their smoking habits, which included the tests of Russell, Fagerström, BDI and STAI; simultaneously, their expectancy CO levels were analyzed.

RESULTS: 1) Differences were found in cigarette smoking prevalence, being higher in M-H and W-H (p<0.001). 2) Significant differences were also found at the age of first cigarette consumption, being lower both in male and female heroin-dependent persons (p<0.001); a significant tendency (p<0.05) towards an earlier first consumption in younger persons was also found in all groups. 3) Between heroin-dependent males, imprisoned or not, the only difference found was in the daily number of cigarettes (Sh+ 24.2, PhH+ 20.9) which was not significant enough (p<0.1). 4) Comparing all male groups (M-H, PRI and M-C) significant differences could be found in the number of cigarettes smoked, and in Fagerström test. 5) Between female groups, nicotine dependence was higher in heroin-dependent women (6.0 vs. 4.2, p<0.001). 6) Heroin-dependent persons had much higher scores in BDI and STAI. 7) Compared to heroin-dependent men, heroin-dependent women showed higher degrees of dependence; compared to control men, control women scored higher in the sedative factor of the Russell test.

CONCLUSIONS: 1) Heroin-dependent persons show higher rates of cigarette smoking prevalence and higher scores of nicotine dependence. 2) It may be suitable to try to implement a smoking harm reduction program for those heroin-dependent people who wish it. 3) The general characteristics of nicotine addiction do not seem to be particularly affected by the (imposed or assumed) life-styles of the populations analyzed.

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RP-70
MECAMEYLAMINE/NICOTINE TREATMENT FOR SMOKING CESSATION: GENDER DIFFERENCES

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In three studies we have explored the potential of the nicotinic antagonist mecamylamine when used in combination with nicotine replacement (NRT). Because of the small sample sizes in these studies, and consequent limited statistical power, an analysis of pooled data was conducted to examine the consistency of a possible gender influence on the efficacy of mecamylamine therapy used in conjunction with NRT. Data from a total of 291 subjects who participated in the three randomized, double-blind, placebo-controlled studies of mecamylamine were compiled. A logistic regression analysis was conducted, with continuous abstinence as the dependent variable; independent variables were pre-cessation mecamylamine (mecamylamine vs. placebo), pre-cessation nicotine (21 mg vs 0 mg), gender (male vs. female) and the interactions terms for gender X mecamylamine, gender X nicotine, and nicotine X mecamylamine. The results indicated a significant gender X mecamylamine interaction (chi-square=4.01, p=.045), with women showing a larger differential enhancement of smoking abstinence in response to mecamylamine treatment than men. The overall abstinence rates for women were 44.2% for mecamylamine vs. 15.6% for no mecamylamine (chi-square=10.24, p=.001). For men the rates were 40.2% in the pre-cessation mecamylamine condition vs. 35% without mecamylamine (ns, chi-square=.33, p=.6).

Studies were supported by the National Institute on Drug Abuse and The Medical Research Service of the Department of Veterans Affairs.

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RP-71
THE BLIND SPOT IN THE NICOTINE REPLACEMENT THERAPY LITERATURE: ASSESSMENT OF THE DOUBLE-BLIND

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Clinical trials of medications often use a double-blind procedure. However, few nicotine replacement trials have carefully examined the integrity of the blind and its relationship to treatment outcome. Hughes and Krahm (1985) described statistical procedures for determining if a study blind failed (i.e., blindness failure), if blindness failure influenced outcome (i.e., blindness bias, Drug Judgment x Drug Assignment interaction), and for controlling blindness bias. In this review, 73 double-blind, placebo-controlled clinical trials of nicotine gum (NG), patch (NP), spray (NS), and inhaler (NI) in smoking cessation were identified through electronic searches and author requests. The current review sought to describe the methods assessing blindness as well as the frequency of blindness failure, blindness bias, and bias correction. First, we examined the methods of assessing study blindness including: (a) judge type (i.e., participant or experimenter); (b) rationale for judgment (e.g., side effects); and (c) confidence in judgment. Seventeen articles (NG =2, NP= 10, NS = 4, NI = 3) were found that assessed blindness integrity, showing wide variations in methodology. Ten studies reported a blindness failure (p<.05, chi-square test independence). Nine patch studies were submitted to random-effects meta-analysis showing a statistical trend toward blindness failure (p<.10). Only 3 studies with blindness failure tested for blindness bias, none finding a bias effect. Overall, blindness failure seems common, but few of the identified studies assessed for blindness bias. Standard methods of blindness assessment are needed, and the techniques of Hughes and Krahm (1985) should be applied.

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**RP-72**  
**MILESTONES IN SMOKING CESSION: A PROCESS ANALYSIS**

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To date, smoking cessation outcome research has not systematically distinguished among the different phases of cessation contributing to overall failure. Typically, studies tally abstinence at a defined time-point, without attending to the process by which outcome was achieved. In an attempt to better discriminate the process, we examined predictors of three progressive milestones, all of which lead to treatment failure: 1. Failing to achieve initial abstinence 2. Quitting but lapsing and 3. Lapsing leading to a complete relapse.

Abstinence was defined as 24 hours without smoking, a lapse was any smoking after 24 hours of abstinence, and relapse was defined as three or more consecutive days of smoking five or more cigarettes per day.

Cox proportional hazards (survival) analyses were used for the tests, on data from 260 smokers in structured cessation treatment. Predictors of failure differed by phase of abstinence. Failure to achieve initial cessation was predicted by high Fagerstrom Test of Nicotine Dependence scores (RR=0.95, CI=0.89-1.00). Among abstainers, lapsing was associated with a history of major depression (RR=1.4, CI=1.01-1.94) and nicotine dependence (RR=1.25, CI=1.05-1.48), as measured by the NDSS. Progression to relapse (after a lapse) was predicted by baseline smoking rate (RR=1.03, CI=1.01-1.05). No independent variable was a significant predictor in more than one phase. These results demonstrate that predictors of smoking abstinence vary across different phases of the quit process, which suggests that the different phases may be controlled by different processes. More research differentiating these phases of quitting is needed.

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**RP-73**  
**DAILY CHANGES IN POSITIVE SMOKING OUTCOME EXPECTANCIES: RELATIONSHIPS TO FIRST LAPSE AND RELAPSE**

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Outcome expectancies, beliefs about the contingency between behavior or events and outcomes, assume a prominent role in social-cognitive models of smoking relapse. Indeed, individual differences in positive smoking outcome expectancies (PSOE) appear to predict smoking cessation outcome. Individuals who generally expect smoking to lead to more positive outcomes (e.g., negative affect reduction) are more likely to relapse. However, more proximal changes in expectancy value should also influence behavior. In this study, we assessed the relationship between a 7-item daily measure of PSOE and smoking behavior on the following day during an attempt to quit smoking. Participants were 296 smokers who achieved 24 hours of abstinence and were randomly assigned to nicotine patch treatment or placebo.

Two thirds (65%) of participants lapsed to smoking and 8% relapsed during a 6-week self-monitoring period. In survival analyses, prior day PSOE significantly predicted lapsing on the following day, even after controlling for participants' nicotine dependence and baseline expectancies (OR = 1.21, p<.0001). Among lapsers, PSOE significantly predicted the timing of the lapse (OR = 1.13, p<.01), PSOE also predicted progression to relapse following a first lapse (OR = 1.28, p<.05), but did not predict the timing of the relapse among relapers (OR = 0.98, ns). This suggests that individual differences in post-lapse PSOE predict relapse, not daily changes. Nicotine replacement treatment did not interact with PSOE. These data support theories emphasizing the importance of dynamic changes in PSOE in smoking relapse process.

This study was conducted while the first author was at the University of Pittsburgh. Supported by NIDA grant # DA060804.

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**RP-74**  
**LATE RELAPSE IN A COMMUNITY SAMPLE**

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Relapse remains the most refractory aspect of nicotine dependence, yet little is known about the prevalence and predictors of late relapse (i.e., relapse after a period of prolonged abstinence). The few data that exist indicate that former smokers may relapse many years after they quit, but these studies generally involve noneprescriptive volunteer samples. Data on late relapse rates in population-based samples are almost nonexistent. The current study investigated the prevalence and predictors of late relapse in a nonvolunteer community-based sample from the Working Well Trial, a worksite-based cancer prevention study.

Employees at participating worksites were surveyed at baseline and 4 years later. Relapse rates over that 4-year period were examined in baseline former smokers (N=1,143). Relapse rates significantly differed as a function of the length of abstinence at baseline (p<.001): 29.8% in those reporting abstinence up to 1 year, 9.4% in those reporting abstinence 1-5 years, and 1.8% in those reporting abstinence over 5 years. Relapsers were significantly younger, more likely to live with other smokers, more likely to use smokeless tobacco, and less confident they would be nonsmokers in 12 months. However, after controlling for baseline duration of abstinence, there were no significant predictors of relapse. Late relapse rates in this community-based sample were lower than those typically obtained in clinical trials. Variables known to predict short-term relapse did not predict late relapse. The only robust predictor of late relapse was baseline duration of abstinence. Interventions to prevent late relapse will likely need to target specific high risk populations (e.g., former smokers with shorter duration of abstinence) to be effective.

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**RP-75**  
**SOCIOECONOMIC DIFFERENCES IN SMOKING CESSION—THE ROLE OF MOTIVATION AND SELF-EFFICACY**

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Socioeconomic (SES) differences in smoking prevalence are a significant cause for SES differences in health. The aim of this study is to examine what factors could explain the SES differences in smoking cessation in a population based follow-up study. Subjects, aged 15 to 64 years, were from the Finnish health behavior surveys conducted in 1989 and 1990. Respondents were contacted again in 1997 and 74% of them replied.

From 703 male smokers 22% had quit in 1997. Respectively, of 571 female smokers 19% had quit. At the baseline more educated smokers smoked less among both genders. There were no SES differences in motivation to quit in either gender. In regard to self-efficacy, 10% of less educated female smokers believed that they would be able to quit smoking, while 17% among the more educated female smokers believed so. In 1997 there were more smokers in the lower educated groups who had not tried to quit smoking compared the more educated smokers. Among females only 11% were able to quit among less educated smokers (education < 10 years) compared to 25% in the most educated group (education 13 years or more). Among male smokers, there were no differences in cessation between educational groups. After adjusting for age, amount of smoking, self-efficacy, and motivation to quit, the differences in cessation between female educational groups remained similar.

Further studies should examine how to increase self-efficacy and actual cessation attempts among lower educated female smokers.

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RP-76  MOOD DISTURBANCE AND DEPRESSION HISTORY INFLUENCES OUTCOMES IN SMOKING CESSION
Amie L. Haas, Ph.D.*, Ricardo Munoz, Ph.D., Gary Humfleet, Ph.D., Victor Reus, M.D., and Sharon M. Hall, Ph.D., University of California San Francisco

Prior research demonstrated that smokers with a history of recurrent Major Depressive Disorder (MDD) had higher rates of abstinence with CBT compared to standard treatment (Brown et al, 2001). The current study expanded this research and evaluated the relationship between MDD history, treatment modality, and self-reported mood in smokers attempting to quit. Participants were 549 smokers (53.7% female, 46.3% male), 28.23% endorsing past MDD using DSM-IV criteria, randomly assigned to CBT or Health Education (HE) treatment. Depression was categorized into three groups: MDD-, MDD+ Single Episode (MDD-S), and MDD+ Recurrent (MDD-R). Mood was assessed at baseline and end-of-treatment (EOTX) using the POMS. Continene and CO2 verified abstinence was measured at EOTX, 3-months post, and 12-months post. Generalized Estimating Equations with planned contrasts evaluated differences in abstinence and changes in mood during the cessation process. Results indicated MDD-R participants had higher rates of abstinence in CBT compared to HE (p < .05). Baseline mood predicted abstinence (p < .05) but not EOTX mood (p < .35). MDD history did not predict abstinence with mood entered in the equation, however, MDD-R smokers in CBT had higher rates of abstinence relative to the HE condition (p < .05). During the initial cessation process, MDD+ participants reported more mood disturbance relative to MDD- (p < .001), with higher levels reported by MDD-R compared to MDD-S (p < .05). The study replicated earlier results reported by Brown in post hoc analyses and expanded upon them by indicating a pathway, poor mood, via which recurrent MDD influences smoking outcomes.
This study was funded by NIDA grants DA02538 and DA07250.
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RP-77  THE INFLUENCE OF INDIVIDUAL DIFFERENCES ON ATTEMPTS TO QUIT SMOKING
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It is important to identify factors that influence success at smoking cessation. A controlled trial of a nurse-delivered cessation protocol was conducted. The purpose was to compare theoretically-designed respiratory maneuvers to the breathing exercise suggested by the American Lung Association. Smokers who wished to quit were recruited from the general population through radio, newspaper, and television announcements, and through contacts with local health organizations that refer smokers to cessation programs. Callers were given a description of the trial and were screened to determine whether their MDD met criteria for participation (smoke > 1/2 pack of cigarettes/day for > 1 year, be able to read and write English, have no severe respiratory disease that would preclude the use of respiratory maneuvers, and willing to be randomly assigned to one of the two groups). Screening interviews were conducted on 588 smokers, and 571 were eligible for participation. Of these, 211 smokers decided not to participate in the trial. Participants, compared to nonparticipants, were older (p < .01), more educated (p < .0001), had smoked longer (p < .02), and had tried to quit previously (p < .01). Of the 360 who participated, 223 completed the trial and were able to quit for at least 24 hr. Compared to those who did not quit, they had lower depression scores (p < .01), were able to hold their breath longer (p < .05), who quit had higher scores on arousal seeking measures (p < .05), and were more educated (p < .03). Results of multivariate analyses will also be presented.
Supported by NIH (NR01675).
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RP-78  SMOKING RELAPSE AFTER 9/11/01 IN A TRIAL OF MAINTENANCE PHARMACOTHERAPY
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AIM: Despite recent improvements in short-term smoking cessation rates, long-term rates remain low. A trial of maintenance pharmacotherapy to address this problem is ongoing. Following Stewart's hypotheses, stress and exposure to the drug are predicted as major triggers of relapse. In the context of the WTC disaster on 9/11, two hypothesis were tested: H1: Relapse during two weeks following 9/11 would be higher than the preceding period. H2: Relapse would be higher among partial than continuous abstainers.
SUBJECTS: 33 tobacco-abstinent individuals who entered the 4-month maintenance phase after completing an 8-week open treatment with Zyban, nicotinic patch, and counseling.
RESULTS: H1: Relapses during the 10-day period after 9/11 were markedly more frequent than during the prior 6 weeks - (40% vs 9%). H2: Of 25 continuous abstainers since beginning the maintenance phase to 9/11, 72% did not return to smoking, 12% slipped, and 16% experienced a full relapse. Of the 5 who had smoked a few cigarettes during the same period, none remained totally abstinent, 60% slipped, 40% relapsed. This difference was statistically significant (x2, df=2, 10.3, p<.01). Of note, more smokers without past MDD (n=22) remained abstinent than those without past MDD (n=8) - 68% vs. 38%. Length of time since quitting was not a factor.
COMMENT: Data from this “natural experiment” conform with the postulated influence on relapse of stress and even slight exposure to the drug. A methodological note: data analysis in this prospective study of relapse will need to account for effects from major, contemporary events.
Supported by RO1 #DA13490. Medication support from GlaxoSmithKline, Inc.
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RP-79  IMPACT OF DEPRESSION ON NICOTINE WITHDRAWAL SYMPTOMS AND EARLY RELAPSE IN SMOKERS HOSPITALIZED WITH CARDIOVASCULAR DISEASE
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Hospitalization for cardiovascular disease (CVD) represents a unique opportunity for smoking cessation. Like smoking, depression occurs frequently among CVD patients and increases mortality. In outpatient settings, depression is associated with lower smoking cessation rates. We determined the impact of depression on the smoking behavior and early relapse of smokers hospitalized with CVD.
We analyzed data on 169 smokers hospitalized with CVD who are enrolled in an ongoing double-blind, randomized controlled trial of bupropion for smoking cessation. All smokers received smoking counseling in the hospital and by telephone for follow up. Depression (Beck Depression Inventory [BDI]) and nicotine withdrawal symptoms (Hughes scale) were assessed at baseline in the hospital. Smoking status was assessed at 2 weeks post-discharge. We used linear and logistic regression to determine if depression predicted withdrawal symptoms and 2-week relapse, adjusting for sex, race, cigarettes/day, and Fagerstrom score. At baseline, 22% of smokers scored > 15 on the BDI (current depression). Depressed smokers were more likely to be female (p=0.02) and non-white (p<0.001). Depressed smokers had more withdrawal symptoms at baseline (Hughes score 10.6 vs. 7.3, adjusted p=0.005) and were less confident than non-depressed smokers they would be quit at 1 month (p=04), but depressed and non-depressed smokers did not differ on daily cigarette consumption, Fagerstrom scores, or cravings. Depressed smokers were more likely than non-depressed smokers to resume smoking 2 weeks after discharge (54% vs. 22%; adjusted OR=3.68, p<.007).
Depressed smokers hospitalized with CVD are at higher risk of early relapse to smoking, perhaps because they have more intense withdrawal symptoms and lower self-efficacy for quitting than the non-depressed smokers. It is important to identify comorbid depression in this population because they may require more intensive interventions to achieve abstinence.
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**RP-80**

**SELF-CONTROL STRENGTH DURING SMOKING CESSATION**

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Muraven and Baumeister (2000) posit that self-control is a limited and consumable resource that can be depleted. Once depleted, time and rest are required to replenish it. The implications for smoking cessation are enormous. If self-control can be depleted, then the lack of success at cessation is understandable, perhaps inevitable. This study tested two theory-driven hypotheses using data from an ecological momentary assessment study of 63 individuals who were attempting to quit smoking. Because high urge episodes are likely to utilize self-control resources, and because self-control resources need time to replenish, it was hypothesized that (1) temptations that follow high urge reports within a 4-hour time frame will be more likely to end in a lapse, and (2) will be associated with fewer coping strategies than temptations that follow low urge reports within the same time frame. Multi-level, random effects regression analyses for binary/continuous data were performed regressing smoking status (resist or lapse)# coping strategies on urge level assessed within the preceding 4 hours (N=1029 pairs of assessments). Results yielded partial support for the model. Temptation episodes occurring within 4 hours after high urge reports were more likely to end in lapses [predicted odds of lapse when prior urge=# (75th %-ile) was 69% greater than when prior urge=# (25th %-ile), p<.0001]. However, the number of coping strategies was not related to prior urge level, perhaps because coping strategies differ in the resources they require.

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**RP-82**

**ARE WOMEN LESS ABLE TO QUIT SMOKING THAN MEN? A POOLED ANALYSIS OF PUBLISHED TRIALS OF BUPROPION SR**

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Data suggest that women have less success quitting smoking than men do. Few comparisons have been made of gender differences in quitting smoking with bupropion SR (Zyban), the only non-nicotinic pharmaceutical aid for smoking cessation. To determine if there is a gender difference in quitting with Zyban, we conducted a pooled analysis of the published data from three trials reporting gender-specific quit rates for Zyban. Data from an aggregate 1163 moderate-to-heavy smokers were included in the analyses. Outcomes were assessed at week 7, and outcomes included both point-prevalence (1 study) and continuous abstinence measures (2 studies). Pooled analysis (controlling for study) showed that women generally had lower quit rates than men, regardless of treatment (OR=0.77, CI 0.66 to 0.89). However, logistic regression analyses showed no gender X treatment interaction (OR=1.02, ns). men and women benefited equally from Zyban treatment. Results suggest the need to better understand gender differences in cessation, and suggest that Zyban is an effective smoking cessation aid for women.

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**RP-83**

**RETREATMENT WITH BUPROPION SR: RESULTS FROM 12-MONTH FOLLOW-UP**

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Nicotine dependence remains a challenge for smokers who quit and later relapse. “Retreatment” studies using nicotine replacement therapy (NRT) following initial failure have been inconclusive with reported continuous abstinence rates ranging from 0% to 6% at 6 months. We previously reported a 6 month continuous abstinence rate of 12% after retreating smokers who were unsuccessful after an initial quit attempt with bupropion SR. This report extends that work by reporting follow-up abstinence rates through 12 months. This multicenter, randomized, placebo controlled trial involved 450 adult smokers who had been unable to quit or relapsed after previously taking at least a two-week course of bupropion SR. Participants averaged 15 cigarettes per day prior to enrollment and were randomized to either bupropion SR (n = 226) or placebo (n = 224) for 12 weeks of treatment and 40 weeks of follow-up. At every visit from week 4 through week 52, participants receiving bupropion SR were more likely to be abstinent than those receiving placebo. Week 52 continuous abstinence rates for those taking bupropion SR were 9% versus 2% for placebo (p<0.001); Week 52 point prevalence abstinence rates were 19% for bupropion SR versus 9% for placebo (p=0.001). No new safety issues were identified during the follow-up phase. These results suggest that patients who have previously received bupropion SR and who were unable to quit smoking or who relapsed can receive long-term benefit from retreatment with bupropion SR.

GlaxoSmithKline provided support for this study.

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Tobacco use is the most preventable cause of premature death in the United States. In spite of the significant health consequences associated with the tobacco use, 29.9% of the military Services personnel continue to smoke. The Universities of Minnesota, Missouri, and Memphis were funded in collaboration with the Services health promotion personnel to determine whether implementation of a specialized community intervention initiative will result in lower tobacco use rates among active duty personnel and TRICARE Prime beneficiaries (i.e., individuals who receive their medical care primarily from military installations). In this study, sixteen military bases will be identified, four each from the Army, Navy, Air Force and Marines. At the beginning of the study, a cohort of 150 randomly selected smokers will be identified at each installation. Follow-up at 18 months will assess smoking status for both control and experimental conditions. Participants who report continued smoking will be assessed for the knowledge of the installation smoking cessation resources, motivation to quit smoking, and the frequency of receiving smoking cessation messages from military medical personnel. This paper identifies the components of the specialized intervention program; components drawn from the recommendations of the DoD Tobacco Cessation Policy Working Group and the VHA/DoD Clinical Practice Guidelines for tobacco interventions. The major emphasis of the specialized community initiative is to create a change in the capacity of the community to deliver optimal tobacco interventions and create a community that supports being tobacco free. Finally, the challenges associated with a community level intervention for tobacco cessation will be described.

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