

## PAPER SESSIONS

### PA1-2

#### EFFECT OF THE IRISH SMOKEFREE LEGISLATION ON SMOKING BEHAVIOUR AMONG BAR WORKERS

Bernie J. Mullally, M.A.<sup>1</sup>, Birgit A. Greiner, Ph.D.<sup>1</sup>, Ivan J. Perry, Ph.D.<sup>1</sup>, Shane P. Allwright, Ph.D.<sup>\*2</sup>, and Gillian M. Paul, M.Sc.<sup>2</sup>; <sup>1</sup>National University of Ireland, Cork; <sup>2</sup>Trinity College Dublin

**Background:** On March 29 2004, the Republic of Ireland became the first EU country to introduce a nationwide ban on workplace smoking. While the focus of this measure was to protect worker health by reducing exposure to secondhand smoke, other effects such as reduced smoking prevalence and consumption were likely.

**Objectives:** To assess smoking prevalence in a random sample of bar workers and to compare changes in smoking behaviour in bar workers with changes in an equivalent age and occupational sub-sample of the general public after implementation of the smokefree legislation.

**Methods:** A random sample of bar workers from Cork City was surveyed before (n=129) and after (n=107; 82.9% follow-up rate) implementation of the smokefree legislation. Self-report and combined self-report and cotinine concentration were used to determine smoking status before and one year after the legislation. A cross-sectional random telephone survey of the general population was conducted before and one year after the smokefree legislation. There were 1,240 pre- and 1,221 post-ban participants in the equivalent age and occupational sub-sample of the general population.

**Results:** Self-reported smoking prevalence among Cork bar workers was much higher (51%), particularly in women (61%), than in the occupationally equivalent general population sub-sample (28%). There was a non-significant decline in smoking prevalence among Cork bar workers one year post-ban (self report: -2.8%, p=0.51; combined self report and cotinine: -4.7% from 56.1% to 51.4%, p=0.13), but a significant decline in consumption of four cigarettes (95%CI 2.21 to 6.36) per day. Within the matched general population sub-sample there was a significant drop (3.5%, p=0.06) in smoking prevalence one year post-ban but no significant change in consumption. Among the 77 bar workers followed for three years, smoking prevalence rates declined significantly two years post-ban (p=0.05).

**Conclusions:** Ireland's workplace smoking legislation was accompanied by a drop in smoking prevalence among both bar workers and the general population sub-sample.

*Supported by Office of Tobacco Control through the Research Institute for a Tobacco Free Society (Republic of Ireland); the National Cancer Institute of the United States (R01 CA90955); Irish Cancer Society; Irish Heart Foundation; Health Research Board of Ireland (RP/2005/290).*

**CORRESPONDING AUTHOR:** Bernie Mullally, University College Cork, Department of Epidemiology & Public Health, Brookfield Health Sciences Complex, College Road, Cork, Ireland; Phone: 00353879539776; Email: b.mullally@ucc.ie

### PA1-3

#### WHAT DO SMOKERS SMOKE WHEN "LIGHT" AND "MILD" DESCRIPTORS ARE REMOVED FROM CIGARETTE PACKAGES?

Joanna E. Cohen, Ph.D.<sup>\*</sup>, Rita Luk, M.A., Roberta Ferrence, Ph.D., Susan J. Bondy, Ph.D., Paul W. McDonald, Ph.D., J. Charles Victor, M.Sc., and John M. Garcia, Ph.D.; Ontario Tobacco Research Unit

**Objective:** In 2007, major Canadian cigarette manufacturers voluntarily agreed (after investigation by the Competition Bureau of Canada) to remove "light" and "mild" descriptors from cigarette packages. Each company signed its own agreement prior to July 31, 2007. We examined changes in brand descriptors smoked by smokers of "light" and "mild" brands after these descriptors were removed from cigarette packages in 2007.

**Methods:** Data collected from January-June 2006 and January-June 2008 as part of the ongoing Ontario Tobacco Survey were used for these cross-sectional analyses. Adult smokers were asked the brand and strength of cigarettes they usually smoked. Smokers who reported smoking a brand family that was covered under the voluntary agreements (n=965, 2006; n=803, 2008) were categorized as to whether they reported smoking: cigarette brands with "light", "mild" or similar terms in the name; the replacement form of the "light" and "mild" brands (e.g., premiere and smooth, 2008 only); or, regular or full strength brands. Analyses addressed population weights and complex sampling design.

**Results:** Among smokers who reported smoking on of the brand families covered under the voluntary agreements, there was an increase from 2006 to 2008 in the proportion of those smoking regular strength brands (28.0% vs. 38.0%, p<0.05) [due predominantly to an increase among males and among respondents older than 24 years of age]; a majority of these smokers in 2008 were smoking brands with "light" descriptors 41% [95% CI 36-46%] or replacement terms 21% [95% CI 18-25%] in its name. There were no significant differences by gender in the proportion smoking regular strength brands in 2006 or 2008, and no significant differences by age group in 2008.

**Conclusions:** Even after "light" and "mild" descriptors were supposed to be removed from cigarette packages, a significant proportion of smokers still report smoking these brands. The possible reasons for this, including the use of replacement package cues based on colour rather than words, is described.

*This research was conducted by the Ontario Tobacco Research Unit, which receives funding from the Ontario Ministry of Health Promotion.*

**CORRESPONDING AUTHOR:** Joanna Cohen, Ph.D., Director of Research and Training, University of Toronto, Ontario Tobacco Research Unit, 33 Russell Street, T5, Toronto, ON M5S 2S1, Canada; Phone: 416-535-8501 x4510; Fax: 416-595-6068; Email: joanna\_cohen@camh.net

### PA1-1

#### ANTI-CONTRABAND POLICIES: EVIDENCE FOR BETTER PRACTICE

Robert Schwartz\* and Jeff Sweeting, Ontario Tobacco Research Unit, University of Toronto

This knowledge synthesis explores and evaluates anti-contraband tobacco policies, through a study that is global in scope. This project combines both academic and policymaker research and perspectives, to assess which measures have been most successful at addressing contraband tobacco, and how the illicit trade frequently adapts to policy implementations, requiring iterative strategies by policymakers. An important contribution of this research looks at the various ways in which contraband tobacco can exist, ranging from illicit growing and distribution, unlicensed manufacturing, as well as organized tobacco smuggling and counterfeiting. The case-studies addressed in this research range from provincial and federal approaches in Canada; State approaches in the United States; as well as international case-studies including the UK, Australia, Brazil, and the European Union. In combining this diverse set of case-studies, we were able to gather information about the various policy measures taken in each jurisdiction, what the impacts have been, and what we might learn from their respective experiences. An innovative knowledge synthesis design reaches beyond traditional sources of information. Systematic searches, reviews and assessments were conducted of formal and grey literature. A total of 113 scholarly articles were identified, but only 12 specifically addressing issues of contraband policy. A total of 39 governmental reports, and 45 non-academic reports were also reviewed. To further understanding of the contexts, mechanisms and outcomes associated with various anti-contraband measures 47 semi-structured interviews were conducted with academics, policymakers and practitioners. Findings were then validated through four unique face-to-face expert focus panel groups.

*Canadian Tobacco Control Research Initiative.*

**CORRESPONDING AUTHOR:** Robert Schwartz, Ph.D., Director of Evaluation & Monitoring, Associate Professor, Ontario Tobacco Research Unit, University of Toronto, Dalla Lana School of Public Health, 155 College Street, Ste. 530, Toronto, ON M5T 3M7, Canada; Phone: 416-978-3901; Fax: 416-946-0340; Email: Robert.Schwartz@utoronto.ca

**PA1-4**

**SUPPORT FOR SMOKE FREE POLICIES AMONG SMOKERS AND NON-SMOKERS IN SIX CITIES IN CHINA: FINDINGS FROM ITC CHINA**

Qiang Li<sup>1</sup>, Yuan Jiang<sup>2</sup>, Lin Du<sup>3</sup>, Xun Li<sup>4</sup>, Lin Li<sup>5</sup>, Andrew Hyland<sup>6\*</sup>, and Geoffrey T. Fong<sup>1</sup>; <sup>1</sup>University of Waterloo; <sup>2</sup>Chinese Centers for Disease Control and Prevention; <sup>3</sup>Guangzhou Center for Disease Control and Prevention; <sup>4</sup>Shenyang Center for Disease Control and Prevention; <sup>5</sup>Cancer Council Victoria; <sup>6</sup>Roswell Park Cancer Institute

**Objectives:** To examine the current situation of smoke free policies and factors associated with support for comprehensive smokefree policies in six cities in China.

**Methods:** The current smokefree policies in Beijing, Shenyang, Shanghai, Changsha, Guangzhou, and Yinchuan were reviewed. Multistage sampling was used to sample 4,815 smokers and 1,270 non-smokers in the six cities. Face-to-face interviews were conducted to examine their support for smokefree policies. Multivariate Logistic regression models were used to explore factors associated with attitudes towards comprehensive smoke free policies.

**Results:** None of the six cities have implemented comprehensive smokefree policies. Most respondents support comprehensive smokefree policies in hospitals, schools, conference rooms, and public transport vehicles. In contrast, only 42.8% of the smokers and 52.9% of the non-smokers support comprehensive smokefree policies in workplaces; 21.3% of the smokers and 40.4% of the non-smokers support comprehensive smokefree policies in restaurants and bars. Smokers' support for comprehensive smoke free policies in workplaces, restaurants and bars were associated with knowledge about the adverse health effects of secondhand smoke (for workplaces OR=1.26, 95% C.I. 1.06-1.48; for restaurants and bars OR=1.57, 95% C.I. 1.08-2.09).

**Conclusions:** More comprehensive smokefree policies are needed in the six cities. Efforts need to be made to increase public knowledge about the adverse health effects of secondhand smoke, which may in turn increase support for comprehensive smoke free policies in China.

*The U.S. National Cancer Institute/NIH (from the Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC), P50 CA111236, and from R01 CA100362), and the Canadian Institutes for Health Research (#57897 and #79551).*

CORRESPONDING AUTHOR: Andrew Hyland, Ph.D., Associate Member, Roswell Park Cancer Institute, Health Behavior, Elm and Carlton Streets, Buffalo, NY 14263, United States; Phone: 716-845-8391; Email: andrew.hyland@roswellpark.org

**PA1-5**

**SUPPORT AND CORRELATES OF SUPPORT FOR BANS ON SMOKING IN CARS WITH CHILDREN IN CANADA, THE UNITED STATES, THE UNITED KINGDOM, AND AUSTRALIA: FINDINGS FROM THE 2007 WAVE OF THE ITC FOUR COUNTRY SURVEY**

Sara Hitchman<sup>1\*</sup>, Mark Travers<sup>2</sup>, Andrew Hyland<sup>2</sup>, Mark Zanna<sup>1</sup>, Maansi Travers<sup>2</sup>, and Geoff Fong<sup>1</sup>; <sup>1</sup>University of Waterloo; <sup>2</sup>Roswell Park Cancer Institute

Beginning in 2006, banning smoking in cars with children has become a rapidly growing tobacco control policy movement, consistent with recent evidence from air quality monitoring studies that smoking in cars produces extremely high levels of secondhand smoke. As of August 2008, 19 jurisdictions throughout the United States, Canada, and Australia have implemented such a ban, with many other jurisdictions considering such action. To date, there have been very few studies examining the correlates of support for car smoking bans, and none of the existing studies have been international in nature. We conducted such a study among smokers in four countries with jurisdictions considering laws. We analyzed data from 6,955 adult current smokers from the 2007 wave of the International Tobacco Control (ITC) Four Country Survey, a longitudinal cohort survey of smokers in Canada, United States, United Kingdom, and Australia. Support for car bans was highest among smokers in Australia (83%), followed by smokers in the UK (75%) and Canada (74%); support was considerably lower—but still high—among smokers in the US (60%). Controlling for demographics, support was found to be higher among smokers who: believe that SHS causes asthma in children, believe that smoking around children may cause them to smoke, and among those who already had a personal policy of never smoking in their cars in the presence of non-smokers. Overall these findings demonstrate high support for such bans even among smokers, and highlight the importance of educating the public on the negative impacts of smoking around children to potentially increase support. Additional results suggest greater support in jurisdictions that have bans on smoking in cars with children and a longer history of smoke-free laws.

*The research was funded by grants from the U.S. National Cancer Institute/NIH (from the Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC), P50 CA111236, and from R01 CA100362), the Canadian Institutes for Health Research (#57897 and #79551), Robert Wood Johnson Foundation (#045734), the Australian National Health and Medical Research Council (#265903), Cancer Research UK (#C312/A3726), the Australian Commonwealth Department of Health and Ageing, the Centre for Behavioural Research and Program Evaluation of the National Cancer Institute of Canada/Canadian Cancer Society, and the Canadian Tobacco Control Research Initiative.*

CORRESPONDING AUTHOR: Sara Hitchman, M.A.Sc., University of Waterloo, Psychology, 200 University Avenue West, Waterloo, ON N2L 3G1, Canada; Phone: 519-888-4567 x33597; Email: schitchm@artsmail.uwaterloo.ca

**PA2-1**

**EXTENDED TREATMENT OF OLDER SMOKERS**

Sharon M. Hall, Ph.D., Gary L. Humfleet, Ph.D., Ricardo F. Munoz, Ph.D., Victor I. Reus, M.D., Judith J. Prochaska, Ph.D., M.P.H., and Julie A. Robbins, M.A.

**Aims:** Smoking cessation treatments achieve abstinence rates of 25% to 30% at one year. Low rates may reflect failure to conceptualize smoking as a chronic disorder. The aims of the present study were to determine the efficacy of extended cognitive behavioral and pharmacological interventions in smokers > or = to 50 years of age, and to determine if gender differences in efficacy existed.

**Design:** Open randomized clinical trial. **Setting:** A free-standing, smoking treatment research clinic. **Participants:** 403 smokers of > or = 10 cigarettes per day, all 50 years of age or older. **Intervention:** Participants completed a 12-week treatment that included group counseling, nicotine replacement therapy (NRT), and bupropion. Participants, independent of smoking status, were then randomly assigned to follow-up conditions: (1) Brief Treatment (BT; no further treatment); (2) Extended NRT (E-NRT; 40 weeks of nicotine gum availability); (3) Extended Cognitive Behavioral Therapy (E-CBT; 11 cognitive behavioral sessions over a 40 week period); or (4) E-CBT plus E-NRT (E-Combined; 11 cognitive behavioral sessions plus 40 weeks nicotine gum availability).

**Measurements:** Primary outcome variable was seven-day point prevalence biochemically verified abstinence at weeks 24, 52, 64, and 104.

**Findings:** The most clinically important findings were significant main effects for treatment condition, time, and the treatment X time interaction. The E-CBT condition produced high abstinence rates that were maintained throughout the two year study period (week 24 (58.3%), 52 (55.0%), 64 (54.6%), and 104 (54.8%)), and was significantly more effective than E-NRT, E-Combined, and BT across that period. No other treatment condition was significantly different than BT. No effects for gender were found.

**Conclusions:** Extended cognitive behavioral treatments can produce high and stable abstinence rates for both men and women. NRT does not add to the efficacy of extended CBT, and may hamper its' efficacy. Research is needed to determine if these results can be replicated in a sample with a greater range of ages, and improved upon with the addition of medications other than NRT.

NIH.

CORRESPONDING AUTHOR: Sharon Hall, Ph.D., Professor, University of California - San Francisco, Psychiatry, 401 Parnassus Ave, San Francisco, CA 94143, United States; Phone: 415-476-7574; Fax: 415-476-7677; Email: shall@lppi.ucsf.edu

**PA2-2**

**PROVISION OF COMPREHENSIVE SMOKING CESSATION CARE TO SURGICAL PATIENTS: THE CASE FOR ROUTINE CLINICAL DELIVERY**

John Wiggers<sup>1\*</sup>, Luke Wolfenden<sup>2</sup>, and Jenny Bowman<sup>1</sup>; <sup>1</sup>University of Newcastle, Australia; <sup>2</sup>Hunter New England Health Service

**Introduction:** Surgical patients can reduce their risk of post-operative complications and chronic disease if they quit smoking. This paper describes the findings of studies examining the feasibility, efficacy, cost and acceptability of computer based smoking cessation care delivered to surgical patients.

**Methods:** A randomized controlled trial was conducted of a smoking cessation intervention delivered in a hospital that involved computerized: screening of patient smoking status, provision of smoking cessation counseling, provision of self help materials, prompting of clinician brief advice, prescribing of NRT, and referral to a Quitline.

**Results:** The screening program was found to accurately identify smokers (sensitivity 93%, specificity 95%). In a controlled trial, the delivery of each component of cessation care was significantly greater in the intervention group relative to controls. Further, the intervention significantly increased patient cessation prior to admission (56% vs. 73%) and at a 3 month post-discharge (5% vs. 18%) for nicotine dependent patients. All components of care were found to be acceptable to patients and staff and the intervention was relatively inexpensive to deliver.

**Conclusions:** Despite the challenges for clinicians to routinely provide smoking cessation care to patients, such care can be provided to patients in a way that is feasible, efficacious and acceptable to both patients and staff.

*NSW Cancer Council National Heart Foundation of Australia.*

CORRESPONDING AUTHOR: John Wiggers, Ph.D., Associate Professor, University of Newcastle, Australia, Medicine and Public Health, Locked Bag 10, Wallsend, NSW 2287, Australia; Phone: +61 2 49246247; Email: john.wiggers@hnehealth.nsw.gov.au

**PA2-3**

**42 MG/DAY PRE-CESSATION NICOTINE PATCH TREATMENT FOR HIGHLY DEPENDENT SMOKERS**

Jed E. Rose\*, Frederique M. Behm, Joseph E. Herskovic, and Eric C. Westman, Duke University

Previous studies have shown that initiation of nicotine skin patch treatment two weeks before a target quit date approximately doubles rates of continuous smoking abstinence compared to initiating NRT on the quit date. Pre-cessation NRT may reduce dependence on cigarettes before the quit smoking date, thereby facilitating smoking cessation. In one study, we also found that smokers with relatively low levels of dependence, assessed by FTND scores, benefited more from 21 mg/day pre-cessation nicotine patch treatment than highly dependent smokers. We hypothesized that highly dependent smokers may require higher doses of NRT than 21 mg/day. In the current study, 480 smokers are divided into groups receiving either 21 mg/day or 42 mg/day nicotine patch treatment (double-blind), beginning two weeks before quitting smoking. All participants are asked to switch to smoking denicotinized cigarettes before the quit date in order to reduce the likelihood of nicotine overdose. Based on previous findings that the decrease in FTND score during the pre-cessation period predicted subsequent abstinence, we assess participants' change in FTND score after two weeks on patch treatment. After the quit date, participants are weaned off NRT using successively lower doses of nicotine patch over 10 weeks. Based on 353 subjects enrolled thus far, 42 mg nicotine patch treatment produced a significantly greater decrease in FTND score than the 21 mg patch ( $p < .03$ ). Reduction in FTND score, in turn, predicted successful abstinence ( $p < .04$ ). As hypothesized, abstinence also tended to be greater for highly dependent smokers (FTND score  $> 6$ ) receiving 42 mg nicotine patch treatment, whereas the opposite trend was found for low dependence smokers (interaction  $p < .1$ ). Results support the hypothesis that highly dependent smokers differentially benefit from higher doses of pre-cessation NRT. Moreover, dependence level could be a useful predictor of outcome. Smokers who do not show reductions in dependence before reaching their target quit dates may need to be assigned to alternative treatments that are more likely to succeed.

Philip Morris USA, Inc.

CORRESPONDING AUTHOR: Jed Rose, Ph.D., Director, Center for Nicotine & Smoking Cessation Research, Duke University, Psychiatry & Behavioral Sciences, 2424 Erwin Road, Suite 201, Durham, NC 27705, United States; Phone: 919-668-5055; Fax: 919-668-5088; Email: rose0003@mc.duke.edu

**PA2-4**

**EFFICACY OF THREE SINGLE AND TWO COMBINATION PHARMACOTHERAPIES AMONG DAILY SMOKERS: A RANDOMIZED PLACEBO-CONTROLLED CLINICAL TRIAL**

Megan E. Piper, Ph.D.\*, Stevens S. Smith, Ph.D., Tanya R. Schlam, Ph.D., Michael C. Fiore, M.D., M.P.H., Douglas E. Jorenby, Ph.D., David Fraser, M.S., and Timothy B. Baker, Ph.D., University of Wisconsin

The Wisconsin Transdisciplinary Tobacco Use Research Center (TTURC) conducted head-to-head comparisons of single and combination pharmacotherapies for smoking cessation in a randomized placebo-controlled clinical trial. 1504 adult smokers were randomized to one of six different pharmacotherapy conditions: Bupropion ( $n = 264$ ), Nicotine Lozenge ( $n = 260$ ), Nicotine Patch ( $n = 262$ ), Bupropion + Nicotine Lozenge ( $n = 262$ ), Nicotine Patch + Nicotine Lozenge ( $n = 267$ ) or Placebo ( $n = 189$ ). Approximately 58% of the participants were women, 83.9% were White, and 13.6% were African-American. Participants had a mean age of 44.7 years ( $SD = 11.1$ ) and smoked, on average, 21.43 cigarettes per day ( $SD = 8.93$ ). Abstinence rates at 6 months post-quit were: Placebo (22.2%), Bupropion (31.8%), Lozenge (33.5%), Patch (34.4%), Bupropion + Lozenge (33.2%) and Patch + Lozenge (40.1%). All 5 active conditions, relative to placebo, had significantly higher abstinence rates at 1 week, end of treatment and 6 months post-quit, with the exception that individuals assigned to the lozenge did not have significantly higher abstinence rates than the placebo group at 1 week post-quit. However, only the Patch + Lozenge condition was superior to placebo at 6 months with correction for familywise error. When the combination therapies were compared to the monotherapies, results showed that combinations outperformed their respective monotherapies at the end of treatment and that Lozenge alone performed worse than Patch + Lozenge or Bupropion + Lozenge at 1 week post-quit. These results agree with the 2008 Public Health Service Guideline that both single and combination pharmacotherapies are effective, with combination NRT therapy being particularly effective.

These studies were conducted at the University of Wisconsin and supported by NIH Grant # P50-DA0197. Dr. Piper was supported by an Institutional Clinical and Translational Science Award (UW-Madison; KL2 Grant # 1KL2RR025012-01).

CORRESPONDING AUTHOR: Megan Piper, Ph.D., Assistant Scientist, University of Wisconsin, School of Medicine and Public Health, 1930 Monroe St., Suite 200, Madison, WI 53711, United States; Phone: 608-265-5472; Fax: 608-265-3102; Email: mep@ctri.medicine.wisc.edu

**PA2-5**

**EFFECTIVENESS OF MOOD MANAGEMENT THERAPY AS AN ADJUNCT TO A TELEPHONE COUNSELING SMOKING CESSATION INTERVENTION FOR SMOKERS WITH PAST MAJOR DEPRESSION: A RANDOMISED CONTROLLED TRIAL**

Regina M. van der Meer, M.P.H.\*<sup>1</sup>, Marc C. Willemsen, Ph.D.<sup>1</sup>, Filip Smit, Ph.D.<sup>2</sup>, Pim Cuijpers<sup>2</sup>, and Gerard M. Schippers<sup>3</sup>; <sup>1</sup>STIVORO for a smokefree future; <sup>2</sup>VU University Amsterdam; <sup>3</sup>University of Amsterdam

Objective: Smokers with past major depression who attempt to quit smoking have a higher risk of relapsing than smokers without past major depression. This may be attributable to elevations in negative mood and depressive symptoms. These smokers may be able to quit more easily if they can better manage mood swings. Therefore a new intervention was developed. This consisted of proactive telephone counseling with the addition of a self-help mood management manual. The objective of the study was to evaluate the effectiveness of this intervention.

Methods: 485 smokers with a past major depression were randomly assigned to the mood management intervention (MM) or control intervention (C). The outcome measures were seven-day point prevalence abstinence, prolonged abstinence and depressive symptoms (CES-D), at 6 and 12-month follow-up.

Results: Seven-day point prevalence abstinence rates at 6-month and 12-month follow-up for the MM condition were 37.4% and 27.6%, respectively, and for the C condition were 31.0% and 24.0%. 6-month OR was 1.39 (95%CI 0.95-2.03), 12-month OR was 1.22 (95%CI 0.82-1.86). Prolonged abstinence rates at 6-month and 12-month follow-up for the MM condition were 30.5% and 23.9%, respectively, and for the C condition were 22.3% and 14.0%. 6-month OR was 1.55 (95%CI 1.03-2.34), 12-month OR was 1.96 (95%CI 1.23 - 3.14). In the MM condition, 49.0% and 43.6% of the participants had depressive symptoms at 6-month and 12 month follow-up, respectively. For the C condition this was 39.3% and 41.3%. The 6-month OR was 0.72 (95%CI 0.50-1.03) and the 12-month OR was 0.97 (95%CI 0.68-1.41).

Conclusion: Mood management therapy as an adjunct to telephonic counseling for smoking cessation seems to increase success rates for smokers with past major depression. Contrary to our expectations, this effect was not mediated by reductions of depressive symptoms.

This study was funded by the Netherlands organisation for health research and development (ZonMw).

CORRESPONDING AUTHOR: Regina Van der Meer, M.P.H., Researcher, STIVORO for a smokefree future, Research, PO Box 16070, The Hague, 2500 BB, Netherlands; Phone: +31 70 312 0416; Fax: +31 70 312 0495; Email: rvandermeer@stivoro.nl

**PA3-1**

**DISCOVERY OF NOVEL SUBTYPE-SELECTIVE NICOTINIC RECEPTOR ANTAGONISTS AS POTENTIAL THERAPEUTIC AGENTS FOR SMOKING CESSATION**

Andrew M. Smith<sup>1</sup>, Marharyta Pivavarchyk<sup>1</sup>, Tom E. Wooters<sup>2</sup>, Zhenfa Zhang<sup>1</sup>, Guangrong Zheng<sup>1</sup>, J. Michael McIntosh<sup>3</sup>, Peter A. Crooks<sup>1</sup>, Michael T. Bardoo<sup>2</sup>, and Linda P. Dvoskin<sup>1</sup>; <sup>1</sup>Dept. of Pharmaceutical Sciences, Univ. of Kentucky College of Pharmacy, Lexington; <sup>2</sup>Dept. of Psychology, Univ. of Kentucky, Lexington; <sup>3</sup>Depts. of Psychiatry and Biology, Univ. of Utah, Salt Lake City

The nicotinic receptor (nAChR) antagonist, N,N'-dodecane-1,12-diyl-bis-3-picolinium dibromide (bPiDDB), orthosterically inhibits (IC<sub>50</sub>=2 nM; I<sub>max</sub>=64%) nicotine (NIC)-evoked striatal dopamine (DA) release and decreases NIC self-administration, but does not decrease NIC's discriminative stimulus properties in rats. However, toxicity emerged with repeated bPiDDB treatment. The current study determined effects of a bPiDDB analog, N,N'-decane-1,10-diyl-bis-3-picolinium diiodide (bPiDI). bPiDI inhibited NIC-evoked DA release (IC<sub>50</sub>=180 nM, I<sub>max</sub>=60%). Schild analysis showed a rightward shift in the NIC concentration response and surmountability; however, Schild regression slope was significantly different from 1.0, suggesting competitive allosteric inhibition. To assess bPiDI interaction with alpha6-containing nAChRs, slices were exposed to maximally effective concentrations of bPiDI (1 μM, 48% inhibition) or alpha-conotoxin MII (alpha-CTX; 1 nM, 62% inhibition). bPiDI/alpha-CTX co-exposure failed to produce greater inhibition (64%) than either antagonist alone, suggesting that bPiDI acts at alpha6-containing nAChRs. Using slices from NIC-sensitized rats (0.4 mg/kg for 10 days), concentration-response for NIC-evoked DA release was not altered, however, bPiDI inhibited NIC-evoked DA release with 100-fold higher potency (IC<sub>50</sub>=1.13 nM, I<sub>max</sub>=77%) compared to control, suggesting altered nAChR subunit conformation, stoichiometry or composition in NIC-sensitized rats. Acute bPiDI (0.2-6 μmoles/kg) reduced NIC self-administration at doses that did not alter responding for food. Tolerance did not develop to the bPiDI-induced decrease in NIC self-administration across seven daily treatments and no toxicity was observed. bPiDI failed to decrease discriminative stimulus properties of NIC, suggesting that alpha6-containing nAChRs do not mediate the NIC cue. To augment drugability, 3-picolinium moieties in bPiDDB and bPiDI were chemically reduced to 3-methylpiperidin-3-ene to eliminate the quaternary nitrogens in their structures. Acutely, reduced-bPiDDB decreased NIC self-administration. These preclinical results support our approach towards developing subtype-selective, nAChR antagonists as therapeutic agents for smoking cessation.

Supported by USPHS Grants U19DA17548, T32DA007304 and F31DA023853.

CORRESPONDING AUTHOR: Linda Dvoskin, Ph.D., University of Kentucky, College of Pharmacy, Rose Street, Lexington, KY 40536, United States; Phone: 859-257-4743; Fax: 859-323-3575; Email: ldvoskin@email.uky.edu

**PA3-2**

**BEHAVIOURAL STUDIES WITH THE ACTIVE METABOLITE HYDROXYBUPROPION ON THE POSITIVE REINFORCING AND AVERSIVE STIMULUS PROPERTIES OF NICOTINE IN RATS**

Mohammed Shoaib\*, Emma Malcolm, Bruce Blough, and Ivy Carroll, Psychobiology Research Laboratories, Institute of Neuroscience, Newcastle University, Newcastle; Research Triangle Institute, NC

Preclinical studies with bupropion in rodent models of nicotine dependence have generated equivocal findings with regards to translating the clinical efficacy of the antidepressant as a smoking cessation agent. Given that rats are poor metabolizers of bupropion, the present experiments examined hydroxybupropion, the major active metabolite on the positive reinforcing and aversive stimulus properties of nicotine in rats. In male hooded Lister rats, hydroxybupropion (0.3-10.0 mg/kg IP) administered 20 min prior to each intravenous nicotine (0.03 mg/kg/inf) self-administration session for 3 sessions attenuated nicotine intake in a manner similar to that produced by mecamylamine pretreatment (1.0 mg/kg SC). In contrast, using the conditioned taste aversion procedure to assess the aversive stimulus properties of nicotine, a function implicated in the regulation of nicotine intake, hydroxybupropion (1, 3 & 10 mg/kg IP) pre-treatment failed to modify the aversive effects produced by a small dose of nicotine (0.1 mg/kg SC). These results suggest this metabolite may modify the positive reinforcing effects via mechanisms not related to blockade of nicotinic receptors, since the aversive effects of nicotine remained unaffected by hydroxybupropion pre-treatment. The ability of the metabolite to reduce nicotine-taking behaviour may help to explain the clinical efficacy of bupropion as a smoking cessation agent.

*University of Newcastle, UK.*

CORRESPONDING AUTHOR: Mohammed Shoaib, Institute of Neuroscience, Newcastle University, Newcastle, NE2 4HH, United Kingdom; Phone: +44 1912227839; Email: mohammed.shoaib@newcastle.ac.uk

**PA3-3**

**ADOLESCENT VS. ADULT DIFFERENTIAL NEUROCHEMICAL RESPONSE TO ACUTE NICOTINE CHALLENGE IN RATS**

Donnie Eddins, Ph.D., Ann Petro, M.S., and Edward D. Levin, Ph.D.\*, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC

Adolescence is a period of high risk for the onset of tobacco addiction. In rat models, increased nicotine self-administration has been seen with adolescent vs. adult onset. Differential response to nicotine (0.13 mg/kg as of the base weight) across this critical age span may help explain the increased nicotine self-administration rates seen with adolescent onset. We studied acute nicotine effects on dopamine (DA), norepinephrine (NE) and serotonin (5HT) in the nucleus accumbens and frontal cortex of adolescent (6 week old) and young adult (10-week-old) male and female Sprague-Dawley rats (N=8/sex/nicotine treatment group). DA levels in the nucleus accumbens were significantly higher in adults than adolescents after nicotine, whereas there was no age-related difference without nicotine challenge. In the frontal cortex there was a complex significant 3-way age x nicotine x sex interaction with a reversal by nicotine administration of the sex x age difference in which without nicotine adult males have more DA than adolescent males while females do not differ across from adolescent to adulthood. With nicotine the females take on the male pattern of age differences and the males take on the female pattern. NE levels were significantly higher in adults in both the accumbens and frontal cortex regardless of nicotine condition and sex. 5HT levels in the accumbens were significantly increased by nicotine as a main effect. There was a significant nicotine-induced in accumbens 5HT in adults but not in adolescents. Frontal cortical 5HT was not found to be significantly affected by age, sex or nicotine. This study found decreased responsivity of adolescents to nicotine-induced increases in nucleus accumbens dopamine and serotonin levels. This decreased neurochemical responsivity of adolescents to a fixed dose of nicotine may be related to the increases in nicotine dose levels they seek in the self-administration paradigm.

*Supported by the NIDA grant DA015756.*

CORRESPONDING AUTHOR: Edward Levin, Ph.D., Professor of Psychiatry, Duke University Medical Center, Psychiatry, Box 3412 DUMC, Durham, NC 27710, United States; Phone: 919-681-6273; Fax: 919-681-3416; Email: edlevin@duke.edu

**PA3-4**

**DELETION OF THE BETA4 NICOTINIC RECEPTOR SUBUNIT ENHANCES TOLERANCE DEVELOPMENT FOLLOWING CHRONIC NICOTINE TREATMENT**

Michael J. Marks\*, Erin E. Meyers, and Allan C. Collins, Institute for Behavioral Genetics University of Colorado, Boulder

Chronic exposure of mice to nicotine results in tolerance development and elicits increases in nicotinic receptors, a phenomenon that is termed upregulation. The extent of upregulation varies among receptor subtypes, and it is well established that this response is most robust for the alpha4beta2 subtype that can be measured by high affinity agonist binding. Previous work from our laboratory reported that beta2 null mutant mice, which express no detectable high affinity nicotine binding sites and which are initially less sensitive to acute nicotine administration, become more sensitive to an acute challenge dose of nicotine following chronic nicotine administration (McCallum et al., *Psychopharmacology* 184:314-327, 2006). This observation suggests that nicotinic receptors other than the widely expressed alpha4beta2 subtype mediate aspects of nicotine tolerance, perhaps eliciting supersensitivity. In order to investigate the possible role of beta4 containing subtypes on tolerance development and receptor regulation, mice differing in expression of the beta4 subunit (wild-type, heterozygotes and null mutants) were chronically treated with saline or one of four nicotine doses by constant intravenous infusion. Following treatment mice were tested for response to acute challenge doses of nicotine. The null mutant and heterozygote mice developed more tolerance to nicotine than did wild-type mice as evidenced by significant increases in ED50 values. The extent of upregulation of the alpha4beta2 subtype by nicotine treatment differed among brain regions, but was unaffected by deletion of the beta4 subunit. The binding sites postulated to be alpha3beta4 receptors were eliminated in the null mutants. The change in tolerance development following deletion of beta4 supports a role for these receptors in reducing development of tolerance to nicotine and indicates that these receptors may modulate the supersensitivity to nicotine noted for chronically treated beta2 null mutants. However, little change in the levels of beta4 receptor binding sites was observed, suggesting that simple regulation of receptor numbers does is not responsible.

*This work was supported by grants DA003194 and DA015663.*

CORRESPONDING AUTHOR: Michael Marks, Senior Research Associate, University of Colorado, Boulder, Institute for Behavioral Genetics, IBG-447 UCB, Boulder, CO 80309, United States; Phone: 303-492-9677; Email: marksm@colorado.edu

**PA3-5**

**OVERSHADOWING AND BLOCKING OF APPETITIVE CONDITIONING BY THE INTEROCEPTIVE STIMULUS EFFECTS OF NICOTINE**

Jennifer E. Murray\*, Nicole R. Wells, and Rick A. Bevins, Department of Psychology University of Nebraska, Lincoln, NE

Environmental stimuli that co-occur with tobacco use can come to evoke drug-seeking conditioned responses (CRs) that facilitate use and relapse. In that situation, nicotine serves as an unconditioned stimulus (US). Research has shown that nicotine can also function as a conditional stimulus (CS) for non-drug USs prompting the question of whether the CS properties of nicotine can compete with the environmental CSs for conditioned excitation. We conducted an overshadowing and a blocking experiment to assess whether such competition occurs. Male rats were prepared with jugular catheters. We used a dose of nicotine known to maintain self-administration (0.03 mg base/kg/infusion). In the Overshadowing study there were 4 groups: nicotine+light compound paired with sucrose (NL+), nicotine+light compound unpaired with sucrose (NL-), nicotine paired and light unpaired with sucrose (N+L-), and nicotine unpaired and light paired with sucrose (N-L+). In each 2-h session, there were 10 paired stimulus presentations (light and/or nicotine); 30 s after stimulus onset was 4-s access to sucrose. Unpaired stimuli were temporally separated from sucrose. The stimuli were 30-s illumination of a houselight, 1-s nicotine infusion, or a compound composed of the two elements. Following training, tests of nicotine and light alone were conducted by intermixing non-reinforced trials into a training session. Excitatory training with one element did not generalize to the unpaired element. Responding to the light in the NL+ group was reduced relative to the N-L+ group (i.e., overshadowing). In the Blocking study there were 3 groups: nicotine paired with sucrose before nicotine+light training (N+/NL+), nicotine unpaired with sucrose before nicotine+light training (N-/NL+), and nothing before nicotine+light training (O/NL+). Tests of nicotine and light alone were again conducted. Proportion of total responding to the elements was reduced on light trials in the N+/NL+ group compared to the other groups (i.e., blocking). These findings suggest that the interoceptive stimulus effects of nicotine compete with exteroceptive stimuli thus altering the associative strength of environmental stimuli.

*Research supported by DA018114 to Rick A. Bevins. Jennifer E. Murray supported by DA025399. Nicole R. Wells supported by UNL Undergraduate Creative Activities and Research Experiences.*

CORRESPONDING AUTHOR: Jennifer Murray, M.A., University of Nebraska-Lincoln, Department of Psychology, 238 Burnett Hall, Lincoln, NE 68588-0308, United States; Phone: 402-472-3129; Email: jemurray@bigred.unl.edu

**PA4-1****fMRI STUDIES OF IMPULSIVITY AND TREATMENT OUTCOME IN ADDICTION**

Marc N. Potenza, M.D., Ph.D.\*, Departments of Psychiatry and Child Study Center, Yale University School of Medicine

Impulsivity has been defined as "a predisposition toward rapid unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or others." In factor analyses, impulsivity has been found to fractionate into two or more domains that involve decision-making (including delay discounting) and response disinhibition (involving rapid and inaccurate responding) domains. We have incorporated assessments of impulsivity and fMRI measures of cognitive control (using the Stroop color-word interference task) into behavioral therapy trials for individuals with addictions. Among adults with cocaine dependence, brain activations within ventromedial prefrontal cortex and striatum during Stroop performance at treatment onset correlated with cocaine abstinence and dorsolateral prefrontal cortical activation correlated with treatment retention. Within the same subjects, out-of-magnet measures on the Stroop and Continuous Performance Task (CPT) were correlated within specific domains (e.g., reaction time measures correlated across tasks and incongruent errors on the Stroop correlated with commission errors on the CPT). Comparatively, measures of delay discounting and risk-taking typically did not correlate as strongly with each other or with Stroop and CPT performance measures. Consistently, out-of-magnet measures of both Stroop and CPT performance showed a diffuse pattern of correlation with brain activations involving cortico-striatal and posterior attentional network regions. In contrast, measures of delay discounting and risk-taking more focally correlated with fMRI Stroop measures in regions including the insula and ventromedial prefrontal cortex, respectively. Concurrent with our studies of cocaine dependent patients, we have been investigating in adolescent smokers the relationship between impulsivity, brain activity and behavioral treatment outcome. Preliminary results from these studies indicate that our fMRI paradigms activate similar regional networks in the adolescents as in adults and that impulsivity measures correlate with activations in cortico-striatal circuitry.

Funding: RO1 DA020908, R37 DA15969, P50 DA09241, P50 AA015632.

CORRESPONDING AUTHOR: Suchitra Krishnan-Sarin, Ph.D., Associate Professor, Yale University School of Medicine, Psychiatry, S208, CMHC, 34 Park Street, New Haven, CT 06519, United States; Phone: 203-974-7595; Fax: 203-974-7606; Email: suchitra.krishnan-sarin@yale.edu

**PA4-2****DOES DELAY DISCOUNTING PLAY AN ETIOLOGICAL ROLE IN SMOKING OR IS IT A CONSEQUENCE OF SMOKING?**

Janet Audrain-McGovern, Ph.D.\*, Daniel Rodriguez, Ph.D., Jocelyn Cuevas, B.A., Kelli Rodgers, B.A., and E. Paul Wileyto, Ph.D., Department of Psychiatry, University of Pennsylvania

Delay discounting describes the tendency to discount the value of a reward as a function of the length of delay to its delivery. Higher delay discounting rates have been linked to cigarette smoking. Little is known about the stability of delay discounting (state versus trait), whether delay discounting promotes smoking acquisition, whether smoking contributes to impulsive choices, or if different relationships exist in distinct subgroups. This study sought to fill these gaps within a prospective longitudinal cohort study (N=988) spanning mid adolescence to young adulthood (age 15 to 21 years old). Smoking and delay discounting were measured across time. Covariates included peer and household smoking, academic performance, depression, and alcohol and marijuana use. An associated processes Latent Growth Curve Model (LGM) with paths from delay discounting level and trend factors to the smoking trend factor fit the data well, chi-square(16, n=988) = 13.36, p=.65, CFI=1.00, RMSEA=0, WRMR=.37. The model revealed that the average delay discounting trend did not change significantly from baseline. Baseline delay discounting had a significant positive effect on smoking trend (beta=.09, z=2.56, p=.01). A standard deviation (SD=1.41) increase in baseline delay discounting resulted in a 13% increase in the odds of smoking uptake (OR=1.13, 95% CI= 1.03, 1.23). The effect of delay discounting trend on smoking trend was not significant. The alternative path LGM revealed insignificant paths from smoking level and trend to delay discounting level and trend (p > .05). Growth Mixture Modeling identified three smoking trajectories: nonsmokers, early smoking adopters, and slow smoking adopters. Delay discounting was higher in the smoking versus nonsmoking trajectories, but did not distinguish between the smoking trajectories, despite different acquisition patterns. Delay discounting may provide a variable by which to screen for smoking vulnerability. Adolescents at higher risk of smoking due to higher delay discounting may be a subgroup to target for more intensive smoking prevention efforts that include novel behavioral components directed toward aspects of impulsivity.

This study was supported by a Transdisciplinary Tobacco Use Research Center grant from the National Cancer Institute and the National Institute on Drug Abuse P50 84718 and National Cancer Institute RO1s CA109250 and CA096836.

CORRESPONDING AUTHOR: Janet Audrain-McGovern, Ph.D., Associate Professor, Department of Psychiatry, University of Pennsylvania, 3535 Market Street, Suite 4100, Philadelphia, PA 19104, United States; Phone: 215-746-7145; Fax: 215-746-7140; Email: audrain@mail.med.upenn.edu

**PA4-3****BEHAVIORAL AND PHARMACOLOGICAL ANALYSIS OF METHYLPHENIDATE-INDUCED INCREASES IN CIGARETTE SMOKING: FINDINGS FROM THE HUMAN LABORATORY**

Andrea Rae Vansickel<sup>1,2</sup>, William W. Stoops<sup>2</sup>, Megan M. Poole<sup>1,2</sup>, Paul E.A. Glaser<sup>3</sup>, and Craig R. Rush<sup>1,2,3</sup>; <sup>1</sup>Univ. of Kentucky, Dept. of Psychology; <sup>2</sup>Univ. of Kentucky, Dept. of Behavioral Science; <sup>3</sup>Univ. of Kentucky, Dept. of Psychiatry

Stimulants increase smoking in humans. This relationship is a matter of public health concern given that the extent of smoking-related morbidity and mortality is directly related to the amount and duration of cigarette smoking and also given the high concordance between stimulant use disorders and nicotine dependence. The pharmacological and behavioral factors that contribute to stimulant-induced increases in smoking are unknown. A series of studies in our laboratory have begun to elucidate both the pharmacological and behavioral mechanisms that mediate methylphenidate-induced increases in smoking. Methylphenidate is a stimulant often prescribed for the treatment of ADHD. In the first experiment, the effects of methylphenidate were assessed on smoking. Participants in this study were given a pack of their preferred brand of cigarettes 1-hour after methylphenidate administration and were allowed to smoke ad libitum for four-hours. This 4-hour period was video-recorded and later scored for various smoking behaviors. Carbon monoxide levels, subjective effects, caloric intake and cardiovascular measures were also recorded. Methylphenidate dose-dependently increased smoking. In a series of subsequent studies that used nearly identical procedures the following questions are addressed: 1) what are the potential pharmacological mechanisms, 2) does rate-of-onset of drug effects influence the effects of methylphenidate on smoking, 3) does methylphenidate increase the reinforcing efficacy of smoking, and 4) does methylphenidate increase smoking in persons diagnosed with ADHD? Findings from these studies: 1) support the notion that methylphenidate-induced increases in smoking result from an interactive effect of nicotine and methylphenidate on extra cellular dopamine levels in brain reward areas; 2) rate-of-onset generally does not modulate the effects of methylphenidate on smoking, 3) methylphenidate increases the reinforcing effects of smoking; and 4) methylphenidate increases smoking in ADHD diagnosed individuals. This line of research could lead to improved treatment options for persons that smoke and use stimulants either therapeutically or recreationally.

The National Institute on Drug Abuse Grant DA 012665, DA 010325, Research funds from the Department of Psychiatry, University of Kentucky (Rush), Pilot grant money from the Center on Drug and Alcohol Research and the Department of Behavioral Science at the University of Kentucky (Vansickel).

CORRESPONDING AUTHOR: Andrea Rae Vansickel, M.A., University of Kentucky, Psychology and Behavioral Science, 465 E. High St, Suite 204B, Lexington, KY 40508, United States; Phone: 859-576-5695; Fax: 859-257-7684; Email: arvans2@uky.edu

**PA4-4****ACUTE NICOTINE EFFECTS ON IMPULSIVITY IN ADULT ADHD AND CONTROL SUBJECTS**

Alexandra S. Potter\*, Katherine K. Ryan, and Paul A. Newhouse, Clinical Neuroscience Research Unit, Department of Psychiatry, University of Vermont College of Medicine

The strong association between ADHD and cigarette smoking and the known effects of nicotine on cognition has led to interest in the role of cholinergic function in ADHD cognitive deficits. We have previously demonstrated that acute nicotine improves behavioral inhibition (motor impulsivity) in non-smoking adolescents and young adults with ADHD. This study examined the specificity of these findings by examining the acute effects of both nicotine and mecamylamine (a nicotinic antagonist) on behavioral inhibition in non-smoking young adults with ADHD-C and healthy controls. 27 non-smoking young adults (15 healthy controls and 12 young adults with ADHD-C) received acute nicotine (7 mg patch for 45 minutes), mecamylamine (20 mg oral) and placebo on separate days. The Stop Signal Task was used to assess behavioral inhibition with the Stop Signal Reaction Time (SSRT) as the primary outcome variable. In the ADHD group, but not the control group, nicotine administration was associated with a significant (p<.05) improvement of SSRT. In contrast, mecamylamine was associated with a trend (p<.10) toward impairment of SSRT in the control group but not the ADHD group. These findings taken together with recent data to suggest a relationship between SSRT and behaviors which place people at risk for smoking (i.e. impulsivity, risk taking) suggest that nicotinic effects on cognition may be useful to more fully understand the vulnerability to smoking among individuals with ADHD.

RO3MH073573, GRCM01-00109, R21MH69670-01.

CORRESPONDING AUTHOR: Alexandra Potter, Ph.D., Research Assistant Professor, University of Vermont, Psychiatry, 1 South Prospect Street, Burlington, VT 05401, United States; Phone: 8028476955; Fax: 8028477889; Email: Alexandra.Potter@uvm.edu

**PA4-5**

**BASELINE CHARACTERISTICS AND ACUTE ABSTINENCE EFFECTS DIFFERENTIATE ADULT SMOKERS WITH AND WITHOUT ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)**

Scott H. Kollins, Ph.D.\*, and F. Joseph McClernon, Ph.D., Duke University Medical Center

Compared to the general population, those with Attention Deficit Hyperactivity Disorder (ADHD) smoke more, start at a younger age, and have a harder time quitting. Little is known about the mechanisms underlying this comorbidity. The objective of this study was to characterize smoking behavior of adults with and without ADHD and to examine effects of smoking abstinence. To date, 26 adult, male and female, moderate to heavy smokers (n=12 with ADHD; n=14 without ADHD) have completed a range of baseline measures to characterize smoking behavior and personality constructs. All subjects then began a contingency management (CM) program to promote smoking abstinence. Withdrawal related measures (i.e., physiological, mood, craving) were collected after 1, 3, and 5 days of biologically verified abstinence. No group differences were observed for any demographic variables, IQ, years of smoking, or nicotine dependence, suggesting the groups were well matched. By contrast, ADHD smokers scored higher on the Novelty Seeking scale of the Tridimensional Personality Questionnaire ( $p < 0.0001$ ); cognitive enhancement, positive reinforcement, and negative reinforcement subscales of the Wisconsin Inventory for Smoking Dependence Motives ( $p$ 's  $< 0.03$ ); and a range of questions relating to smoking enjoyment and craving reduction. Smokers with ADHD also showed significantly less interest/motivation for quitting compare to smokers without ADHD ( $p < 0.001$ ). During the CM phase, main effects of session were observed for heart rate and several subscales of the Shiffman-Jarvik Withdrawal Questionnaire (SJ). Main effects of Group were also observed for a number of SJ scales, including Negative Affect, Arousal, and Habit Withdrawal ( $p$ 's  $< 0.05$ ), indicating that smokers with ADHD experienced greater symptoms of withdrawal. These findings are among the first to describe differences between smokers with and without ADHD both at Baseline and following short-term abstinence. Results suggest that smokers with ADHD may smoke to increase concentration and reduce attentional deficits and that these motivations for smoking are different than from non-ADHD smokers.

*NIDA (R21DA020806).*

CORRESPONDING AUTHOR: Scott Kollins, Ph.D., Duke ADHD Program, 718 Rutherford Street, Durham, NC 27701, United States; Phone: 919-416-2098; Email: koll001@mc.duke.edu

**PA5-1**

**MULTI-LEVEL PREDICTORS OF SUCCESSFUL QUITTING BEHAVIOR AMONG ADOLESCENTS IN COMMUNITY-BASED SMOKING CESSATION PROGRAMS**

Susan J. Curry<sup>1</sup>\*, Sherry Emery<sup>2</sup>, Robin Mermelstein<sup>2</sup>, Amy K. Sporer<sup>2</sup>, Julia Lee<sup>2</sup>, Eisuke Segawa<sup>2</sup>, Oksana Pugach<sup>2</sup>, and Michael Berbaum<sup>2</sup>; <sup>1</sup>University of Iowa College of Public Health; <sup>2</sup>University of Illinois at Chicago, Institute for Health Policy and Research

**Background:** Most work evaluating youth cessation treatment has been limited to research settings. The Helping Young Smokers Quit (HYSQ) initiative conducted the first longitudinal analyses of predictors of cessation success within community-based programs, considering individual, program, and community level characteristics.

**Methods:** Baseline interviews with 858 youth smokers enrolled in one of 41 community-based smoking cessation programs across 18 states in the US were conducted; follow-up surveys were completed at end-of-program, 6 months and 12 months after baseline. Interviews of program providers and organizational leaders provided information about program format, content, provider characteristics, and organizational policies. Archival data collection and community leader interviews provided information on community context and policies related to youth smoking. Multi-level, multivariate models were developed to analyze participant, site-level (program, provider, and organization), and community-level characteristics associated with a) 7-day abstinence at end-of-program, b) serious quit attempts at end of program (any vs. none), and c) 30-day abstinence at 12-months after baseline.

**Results:** In the multi-level models, amount smoked, measures of addiction, and confidence about quitting were among the significant baseline correlates of end-of-program abstinence and serious quit attempts. Notably, voluntary or mandatory youth enrollment was unrelated to outcomes at end-of-program and 12-month follow-ups. Variables related to program, provider and organization level characteristics were not associated with short-term abstinence, but program length and provider experience were related with making serious quit attempts at end-of-program and 30-day abstinence at 12 months. Community characteristics, including ordinances that limit tobacco advertising and youth possession or use of tobaccos were important correlates of each outcome.

**Discussion:** This is the most comprehensive study to date to analyze the relationships between individual, program and community-level characteristics and quitting behavior among youth smokers in community-based cessation programs.

*The Helping Young Smokers Quit initiative is supported by the Robert Wood Johnson Foundation, National Cancer Institute, and Centers for Disease Control and Prevention.*

CORRESPONDING AUTHOR: Sherry Emery, Ph.D., Senior Scientist, University of Illinois at Chicago, Institute for Health Research and Policy, 1747 W. Roosevelt Rd., Suite 558, Chicago, IL 60615, United States; Phone: 312-355-2758; Email: slemery@uic.edu

**PA5-2**

**GENDER DIFFERENCES AND CHANGES IN THE PREVALENCES OF SUBSTANCE USE AMONG CANADIAN YOUTH: EXAMINING DATA FROM THE 2002, 2004 AND 2006 CANADIAN YOUTH SMOKING SURVEY (YSS)**

Scott Leatherdale<sup>1</sup>\*, and Rashid Ahmed<sup>2</sup>; <sup>1</sup>Cancer Care Ontario; <sup>2</sup>University of Waterloo

**Purpose:** To examine (a) gender differences in the prevalence of tobacco, alcohol and marijuana use, (b) changes in marijuana and alcohol use prevalence by smoking status, (c) the relationship between age of first use for tobacco, marijuana and alcohol use, and (d) changes in the use of these substances between 2002, 2004 and 2006 using nationally representative samples of Canadian youth.

**Methods:** Data were collected from students in grades 7 to 9 as part of the Canadian Youth Smoking Survey (n=19,018 in 2002; n=29,243 in 2004; n=27,030 in 2006). Gender specific analyses were performed to examine prevalence of use, age of onset, co-morbid substance use and changes over time.

**Results:** Rates of ever use of tobacco were similar for males and females, and although the prevalence of ever use has decreased since 2002, the prevalence of ever use increased between 2004 and 2006. Rates of marijuana use follow a similar pattern as tobacco use, although rates of ever use are higher among males. Rates of alcohol use are higher among males; however, overall rates of alcohol use have decreased between 2004 and 2006 following a substantial increase in use between 2002 and 2004. Co-morbid substance use was very common, and it was rare to find youth who had used tobacco who had not also used alcohol and/or marijuana.

**Conclusions:** The data presented here suggest that tobacco, alcohol and marijuana continue to be used by a substantial number of youth in Canada, despite age and legal regulations prohibiting their use. Considering the high rates of co-morbid substance use and that youth are substantially more likely to use tobacco if they have also tried alcohol, highlights a limitation of much of the current youth tobacco control programming. A more comprehensive poly-substance approach to youth tobacco control prevention programming may be required.

*No funding.*

CORRESPONDING AUTHOR: Scott Leatherdale, PhD, Scientist, Cancer Care Ontario, Population Studies & Surveillance, 620 University Ave, Toronto, ON M5G2L7, Canada; Phone: 416-971-9800 x3237; Fax: 416-971-7554; Email: scott.leatherdale@cancerca.on.ca

**PA5-3**

**EXPECTANCIES AND ADOLESCENTS' ACUTE NEGATIVE AFFECT CHANGE FOLLOWING SMOKING: IS THERE A FEEDBACK LOOP?**

Peter J. Colvin\* and Robin J. Mermelstein, Ph.D., The University of Illinois at Chicago

Mood benefits have long been implicated in smoking, but there is a dearth of research on adolescents' mood benefits following smoking. The magnitude of adolescents' negative affect (NA) change following smoking may be important in understanding smoking progression. This study used ecological momentary assessments to examine adolescent smokers' real time reports of mood during smoking events to test: 1) potential predictors of the magnitude of NA change following smoking including cognitive factors (i.e., expectations about the acute mood benefits of smoking), background influences (i.e., sensation seeking, parental smoking), and current smoking behavior (i.e., current level of smoking, dependence, self-reported subjective smoking experience); 2) the degree to which the magnitude of NA change following smoking predicts change in future expectancies; and 3) whether expectancies predict the magnitude of future NA change following smoking. Participants were 234 9th and 10th graders (54% female) who recorded, on hand-held PDAs, at least one smoking event during 7 days of data collection at baseline and 6 months. NA was assessed with a series of adjectives rated on a 10-point Likert scale both before and after smoking. NA change was the difference in scores from post-pre. Standard hierarchical regressions were used to examine the relationship of key variables to the magnitude of NA change following smoking. Results indicated that the magnitude of NA reduction following smoking was associated with expectancies ( $p < 0.05$ ), current unpleasurable smoking experience ( $p < 0.01$ ), and number of days smoked in the last 30 days ( $p < 0.001$ ). As expected, greater reductions in NA following smoking predicted increases in expectancies assessed several months later ( $p < 0.001$ ). In addition, higher levels of reported expectancies predicted greater NA decreases following smoking ( $p < 0.05$ ). These results indicate a possible feedback loop between NA change following smoking and expectations in adolescents. Furthering our understanding of the relationship between adolescents' acute NA change following smoking and expectations may help increase our understanding of dependence.

*This work was supported by grant 5PO1 CA98262 from the National Cancer Institute.*

CORRESPONDING AUTHOR: Peter Colvin, University of Illinois, Clinical Psychology, 426 W. Belmont Ave, Apt 601, Chicago, IL 60657, United States; Phone: 801-699-3928; Email: pcolvi2@uic.edu

**PA5-4 STRATEGIES USED SPONTANEOUSLY BY TEENS TO QUIT SMOKING**

Ali M. Yurasek, M.A.\*, Leslie A. Robinson, Ph.D., Ashley A. Jackson, B.S., and Khatidja S. Ali, M.A., The University of Memphis

Although numerous smoking cessation programs have been developed for teens, few have been able to match the success rate found in quitting programs designed for adults. Although the reason for this discrepancy is not clear, teenagers may differ from adults in their knowledge or acceptance of effective quitting strategies. The purpose of this report is to identify the smoking cessation strategies that adolescents use spontaneously (i.e., without prompting from a cessation program). Participants were 161 high school students caught with tobacco at school. All were offered enrollment in exchange for reduced school sanctions. The students averaged 16 years of age, with 76% male and 58% Caucasian. Over 62% of the teens smoked daily, with 84% having previously attempted quitting or cutting down on cigarette smoking. As part of the overall study, the youth were asked to identify which of a total of 26 potential strategies for quitting they had used during the course of the study. For example, the adolescents were asked about their utilization of common strategies such as information gathering, social and professional support, and replacement activities, as well as more effective, yet underutilized strategies such as stimulus control. Our results suggest that teens use a number of strategies in their unaided attempts to stop smoking. For example, 56% of the students reported increasing exercise during a quit attempt, and 64% used substitutes (e.g., toothpicks) for sensory stimulation. Most (83%) of the teens attempted to cut down their smoking slowly, and social support was apparently important to them as they tried to quit. Fully 62% of the teens talked to their friends about quitting and 40% talked with their parents. Nonetheless, the youth did not use a number of smoking cessation strategies that are known to be quite effective. For example, they made little attempt at stimulus control, so that only 14% attempted to avoid smoking family members and only 21% tried to avoid friends who smoked. Clearly, young smokers need further information about effective methods for smoking cessation and how these methods might be adapted to their use.

Funding for this research was provided by NIDA, DA15765.

CORRESPONDING AUTHOR: Leslie Robinson, Ph.D., Associate Professor, The University of Memphis, Psychology, 202 Psychology Building, Memphis, TN 38152, United States; Phone: 901-678-1667; Email: L.Robinson@mail.psyc.memphis.edu

**PA5-5 SMOKING TEENS: PSYCHOSOCIAL COMPLEXITIES IMPACT INTERVENTION RESEARCH**

Pamela J. Murray, M.D., M.P.H.<sup>1\*</sup>, Julie M. Longo, M.A.<sup>1</sup>, Melissa A. Jones, M.P.H.<sup>1</sup>, Jonathan R. Pletcher, M.D.<sup>1</sup>, Deborah R. Moss, M.D., M.P.H.<sup>1</sup>, and Janet Audrain-McGovern, Ph.D.<sup>2</sup>; <sup>1</sup>Children's Hospital of Pittsburgh of the University of Pittsburgh Medical Center; <sup>2</sup>University of Pennsylvania

Adolescent smoking has been correlated with increased incidence of psychiatric co-morbidity and lower socio-economic status. As such, challenges in adolescent smoking cessation research are expected, but the scope of the challenges in community samples has not yet been described.

Methods: As part of an ongoing, three-site, randomized controlled trial comparing two behavioral smoking cessation treatments in 14-18 year old smokers, this descriptive study examined and categorized challenges that occurred to date during the research process using IRB reportable and non-reportable events.

Results: Events were classified yielding five major categories of concern. These included: legal issues and official sanctions (e.g., incarceration, lack of legal guardianship, repeated expulsions and truancy); major psychiatric co-morbidities and impairment (e.g., hospitalization for psychiatric issues); psychosocial complexity (e.g., lack of housing and adequate care, relationship violence, transience); illicit drug use (e.g., inpatient rehabilitation); and lack of childcare (e.g., insufficient support to have others care for child during participation in the study). These categories represent unique challenges that impact staff training, participant recruitment, consent, treatment, retention, and professional responsibility.

Conclusions: In order to recruit and retain adolescent smokers into smoking cessation trials, these challenges will need to be considered. These adolescents may represent those in most need of a cessation intervention. There may be a need for additional staff and training to ensure proper support for adolescent smokers in cessation trials to promote optimal retention. Multiple contact points and methods should be obtained due to the unstable environment of adolescents in our urban populations. Understanding challenges unique to, and inherent in, conducting adolescent smoking cessation research may help in planning and implementing future investigations.

Funding is provided through a grant from the Pennsylvania Department of Health.

CORRESPONDING AUTHOR: Julie Longo, M.A., Research Coordinator, Children's Hospital of Pittsburgh of the University of Pittsburgh Medical Center, Adolescent Medicine/General Academic Pediatrics, 115 Boots St, Ellwood City, PA 16117, United States; Phone: 847-754-1499; Email: julie.longo@chp.edu

**PA6-1 GENDER, RACE AND EDUCATION DIFFERENCES IN ABSTINENCE RATES AMONG PARTICIPANTS IN A RANDOMIZED PLACEBO-CONTROLLED SMOKING CESSATION TRIAL**  
 (Former POS2-8)

Megan E. Piper, Ph.D.\*, Stevens S. Smith, Ph.D., Tanya R. Schlam, Ph.D., Michael C. Fiore, M.D., M.P.H., Douglas E. Jorenby, Ph.D., David Fraser, M.S., and Timothy B. Baker, Ph.D., University of Wisconsin

In addition to establishing the efficacy of smoking cessation pharmacotherapies, it is important to know how well these pharmacotherapies work for different subgroups of smokers. Past research suggests that women, African-Americans and people with less formal education are less likely to succeed in quitting smoking. The current study assessed gender, race and education differences in outcomes of smokers (N=1504) in a smoking cessation trial. Participants were assigned in a random, double-blind manner to: Bupropion (n=264), Nicotine Lozenge (n=260), Nicotine Patch (n=262), Bupropion+Nicotine Lozenge (n=262), Nicotine Patch+Nicotine Lozenge (n=267) or Placebo (n=189). The study comprised 876 (58.2%) women, 204 (13.6%) African-Americans, 84 (5.6%) smokers with less than a high school education, 353 (23.6%) smokers with a high school education and 1058 smokers (70.8%) with greater than a high school education. At 1 week post-quit logistic analyses revealed a significant gender by treatment interaction: women in the Bupropion+Lozenge condition were significantly less likely to be abstinent (32.5%) than men in the Bupropion+Lozenge condition (44.4%; OR=.41; p=.04). At 6-months post-quit a main effect of gender emerged: women were less likely to be abstinent than men (OR=.77, p=.02). African-American smokers and smokers with less than a high school education were less likely to be abstinent at 1 week, end of treatment and 6-months, relative to White or smokers with a high school education, respectively, regardless of treatment condition. At the end of treatment, smokers with more than a high school education had significantly higher abstinence rates than those with only a high school education. These results suggest that African-American smokers and smokers with less than a high school education have more difficulty quitting regardless of treatment and that the gender differences that emerge in the 6-month cessation rates may be related to events that occur post-treatment.

These studies were conducted at the University of Wisconsin and supported by NIH Grant # P50-DA0197. Dr. Piper was supported by an Institutional Clinical and Translational Science Award (UW-Madison; KL2 Grant # 1KL2RR025102-01).

CORRESPONDING AUTHOR: Megan Piper, Ph.D., Assistant Scientist, University of Wisconsin, School of Medicine and Public Health, 1930 Monroe St., Suite 200, Madison, WI 53711, United States; Phone: 608-265-5472; Fax: 608-265-3102; Email: mep@ctri.medicine.wisc.edu

**PA6-2 A FAMILY APPROACH FOR TOBACCO CONTROL IN AFRICAN-AMERICANS**

Martha S. Tingen, Ph.D., R.N.<sup>1\*</sup>, Jeannette O. Andrews, Ph.D., APRN-BC<sup>2</sup>, Janie Heath, Ph.D., APRN, FAAN<sup>1</sup>, Matthew C. Humphries, M.S.<sup>1</sup>, Donavon L. Reimche, M.H.E.<sup>1</sup>, Sheree G. Cartee, B.S.<sup>1</sup>, Ashley M. Williams, B.A.<sup>1</sup>, Sandra B. Inglett, B.S.N., R.N.<sup>1</sup>, Jennifer L. Waller, Ph.D.<sup>1</sup>, and Frank A. Treiber, Ph.D.<sup>1</sup>; <sup>1</sup>Medical College of Georgia; <sup>2</sup>Medical University of South Carolina

African-American (AA) families continue to suffer disproportionate health disparities related to tobacco use and exposure. There is a paucity of research with comprehensive tobacco control approaches that include both child and parent/guardian, and that focus on both primary and secondary prevention efforts. This randomized control clinical trial investigated the impact of a family approach to prevent tobacco use in children, decrease second-hand smoke exposure, promote parent's self-efficacy with anti-tobacco socialization, and promote cessation in parent smokers. The treatment arm included concurrent school-based and home-based interventions (i.e., LifeSkills) that focused on promoting skill development for making healthy behavior choices. Additionally, cessation treatment (pharmacotherapy and motivational interviewing) was offered to parent smokers. The control arm included the traditional health curriculum for children and a home-based component of general health education for parents. Subjects (N=279) were 4th grade children (N=136) and parents/guardians (N=143) from rural and urban settings in the southeastern United States. Children were nearly equal in numbers of males (N=63) and females (N=73), with 71% residing in single-parent homes. Parents were 94% female and 50% of the parent sample reported having an annual household income of < \$10,000. Mean salivary cotinine was 1.4 (SD 2.2) in children and 122.8 (SD 257) in parents. Repeated measures clustered ANOVA analyses revealed significantly greater increases in LifeSkills overall knowledge (F [1, 132] = 5.16, P = 0.0248) and LifeSkills drug knowledge (F [1, 261] = 8.09, P = 0.0048) among the intervention group compared to the control group. For parents in the intervention group, self-efficacy in creating an anti-tobacco socialization environment at home was significant (F [1, 263] = 5.81, P = 0.0166). Study results suggest that an approach that includes both school and home components occurring simultaneously may be positive in promoting tobacco control in AA families.

Funding: NIH, R01 CA118066 to the primary author, Dr. Tingen, Ph.D.

CORRESPONDING AUTHOR: Martha S. Tingen, Ph.D., Professor, Medical College of Georgia, Georgia Prevention Institute, 1120 Fifteenth Street, HS-1755, Augusta, GA 30912, United States; Phone: 706-721-0471; Fax: 7067215492; Email: mtingen@mcg.edu

**PA6-3**

**THE INFLUENCE OF RISK PERCEPTION ON SMOKING CESSATION AMONG LATINO LIGHT AND HEAVY SMOKERS**

Rashelle B. Hayes, Ph.D.\*, and Belinda Borrelli, Ph.D., Centers for Behavioral and Preventive Medicine, The Miriam Hospital, and Warren Alpert Brown University Medical School

Light smoking (<10 cpd) is disproportionately represented among Latinos (Zhu et al., 2008). High levels of risk perception are prospectively associated with smoking cessation (McKee et al., 2005; Hays, et al., 2007), but no studies have examined a) differences between light and heavy smokers in smoking-related risk perception and b) whether the interaction between light/heavy smoking and risk perception is prospectively associated with smoking cessation.

**Objective:** We examined whether increases in risk perception (perceived vulnerability (PV) to the risks smoking) and precaution effectiveness (PE, perceived diminution of risk upon quitting) prospectively predicts smoking outcomes among a Latino sample of light and heavy smokers.

**Methods:** Participants (N=131; M age=36.8, 73% female, M=10.8 cpd; 53.1% light smokers; 46.9% heavier smokers) were randomly assigned to receive one of two nurse-delivered smoking interventions provided over 3 home-based visits. Participants did not have to want to quit smoking to be in the study; free nicotine patches were given to those wanting to quit. Smoking outcomes (7 & 30 day point prevalence abstinence (ppa)) were biochemically verified at end of treatment (EOT) and 2 and 3 months later.

**Results:** ITT analyses showed that increases in PE from baseline to EOT predicted 7 & 30-day ppa abstinence at both 2- and 3-month follow-ups, however, this relationship was moderated by smoker status. Light smokers were 1.34 times more likely to quit for each 1-unit increase in change of PE from baseline to EOT at the 2-month follow-up (7-day ppa: OR = 1.34, 95%CI 1.04-1.74; 30-day ppa: OR = 1.34, 95%CI 1.03-1.74) and were nearly 1.5 times more likely to quit smoking at the 3mo follow-up for each 1-unit increase in change of PE from baseline to EOT (7-day ppa: OR = 1.46, 95%CI 1.11-1.93; 30-day ppa: OR = 1.47, 95%CI 1.10-1.97). Among heavy smokers, changes in PE were not associated with subsequent smoking status. Neither changes in PV nor the interaction with light/heavy smoking predicted smoking cessation at any time point. **Conclusions:** Interventions designed to highlight the health benefits of quitting may be needed for Latino light smokers.

*Funded by the Robert Wood Johnson Foundation to B. Borrelli.*

**CORRESPONDING AUTHOR:** Rashelle Hayes, Ph.D., Post-Doctoral Fellow, Centers for Behavioral and Preventive Medicine, Brown University, One Hoppin Street, Providence, MA 02903, United States; Phone: 401-793-8129; Fax: 401-793-8078; Email: rhayes@lifespan.org

**PA6-4**

**DIFFERING MEASURES OF NICOTINE DEPENDENCE DO NOT OVERLAP IN AFRICAN-CANADIAN SMOKERS**

Rachel F. Tyndale\* and Jill Mwenifumbo, Centre for Addiction and Mental Health and Department of Pharmacology, University of Toronto

The dimensions of nicotine dependence measures were explored among a Canadian population of black African descent. We assessed nicotine dependence by three measures, Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV), International Classification of Diseases Tenth Edition (ICD-10), and the Fagerström Test for Nicotine Dependence (FTND). The different measures resulted in different diagnosis rates of nicotine dependence: 91% were dependent by DSM-IV; 48% were dependent by ICD-10; and 48% were dependent by FTND (score  $\geq 3$ ). However, although ICD-10 and FTND had the same diagnosis rates of nicotine dependence, they did not identify the same individuals as dependent since 35% of those who were dependent by ICD-10 were not dependent by FTND. The different dimensions of nicotine dependence may not be captured, or contribute equally, to each measure of dependence. For exploratory purposes, we expressed the DSM-IV, ICD-10, and FTND as scale measures. ICD-10 with FTND had the strongest relationship ( $r=0.61, p<0.001$ ), followed by DSM-IV with ICD-10 ( $r=0.43, p<0.001$ ), and DSM-IV with FTND ( $r=0.25, p=0.003$ ). We also investigated the following questions: What are the most important criteria/questions in each measure for predicting the dependence score? What is the importance of individual criteria/questions relative to the others in a measure? What are the architectural sources of inter-instrument discordance? We have examined the variability among nicotine dependence measures and found that the three measures capture different dimensions of dependence, but the differences are also a result of measurement architecture. Tolerance, withdrawal, and the heaviness of smoking were important predictors of dependence measure scores in these relatively light smokers. Gaining a better understanding of dependence measures, and knowing when different measures are, or are not, exchangeable should improve their use in the field of tobacco research.

*Funding from CAMH, a CRC to RFT, and CIHR MOP86471.*

**CORRESPONDING AUTHOR:** Neal Benowitz, 1001 Potrero Ave., Bldg. 30, 3rd Floor, San Francisco, CA 94110, United States; Phone: 415-206-8324; Email: nbenowitz@medsfgh.ucsf.edu

**PA6-5**

**SMOKING BEHAVIOR AND BIOMARKERS OF EXPOSURE IN AFRICAN-AMERICAN AND WHITE SMOKERS**

Neal L. Benowitz, M.D., and Peyton Jacob, III, Ph.D., University of California at San Francisco

On average adult African-American (AA) smokers smoke fewer cigarettes per day (CPD) than do Non-Hispanic Whites (NHW) — 10 and 16, respectively based on NHANES data from 1999-2004. AA smokers have a higher risk of lung cancer compared to NHW smokers. The increased risk of cancer varies with level of cigarette consumption, with a more than two-fold increased risk in AA smokers of 1-9 cpd but no significant increased risk above 30 cpd compared to NHW. On average AA smokers metabolize nicotine (Nic) and cotinine (Cot) more slowly and take in 30% more nicotine and tobacco smoke per cigarette compared to NHW. As a result of slower metabolism of Cot and greater intake of Nic per cigarette, AA have substantially higher blood Cot levels normalized for cpd compared to NHW. To explore the basis for racial differences in lung cancer risk at different levels of smoking, we examined the relationship between cpd, urine Nic metabolite excretion and excretion of the carcinogen markers NNAL and polycyclic aromatic hydrocarbons (PAH) in 120 AA and white smokers. The relationship between cpd and Nic or carcinogen exposure was weaker in AA than in whites. This discrepancy was particularly true at lower levels of cigarette consumption. In contrast there was a very strong relationship between urine Nic metabolite and carcinogen biomarker excretion, which was independent of race or cpd. Both AA and white demonstrate higher Nic and carcinogen exposure per cigarette at lower levels of cpd, but this effect was much greater in AA smokers. In summary we provide evidence of racial differences in intensity of smoking and related Nic and carcinogen exposure in relation to cigarette consumption. More intense smoking among "light" AA smokers explains, at least in part, the high risk of lung cancer in AA at low levels of cigarette consumption, and may have implications for treatment of such smokers. Why AA light smokers smoke more intensely than white light smokers and the importance of intense smoking to racial differences in nicotine dependence remain to be elucidated.

*Supported by NIH grants DA02277, DA12393 and CA78603.*

**CORRESPONDING AUTHOR:** Neal Benowitz, 1001 Potrero Ave., Bldg. 30, 3rd Floor, San Francisco, CA 94110, United States; Phone: 415-206-8324; Email: nbenowitz@medsfgh.ucsf.edu

**PA7-1**

**GENDER DIFFERENCES IN REACTIVITY TO SMOKING AND STRESS CUES**

Michael E. Saladin, Ph.D.<sup>1,3\*</sup>, Matthew J. Carpenter, Ph.D.<sup>1,2</sup>, Kevin M. Gray, M.D.<sup>1</sup>, Stacia M. DeSantis, Ph.D.<sup>4</sup>, and Himanshu P. Upadhyaya, M.B.B.S., B.S.<sup>1</sup>; <sup>1</sup>Medical University of South Carolina (MUSC), Department of Psychiatry & Behavioral Sciences, Clinical Neuroscience Division; <sup>2</sup>MUSC, Hollings Cancer Center; <sup>3</sup>MUSC, Department of Health Sciences and Research; <sup>4</sup>MUSC, Department of Biostatistics, Bioinformatics, and Epidemiology

There is some evidence that women may be less successful when attempting to quit smoking than men. One potential contributory cause of this gender difference is differential craving and stress reactivity to smoking-related and stress-related cues. The present human laboratory study (derived from a recently completed parent investigation) investigated the effects of gender on reactivity to smoking and stress cues by exposing nicotine dependent men and women to four types of cues: 1) in vivo smoking cues, 2) in vivo neutral control cues, 3) imagery-based stressful cues, and 4) relaxing imagery control cues. Both before and after each cue exposure, women (n=37) and men (n=53) smokers provided subjective reports of smoking-related craving and affective reactions. Results indicated that participants reported greater craving and arousal in response to smoking vs. neutral cues and greater craving, arousal, stress and unpleasantness in response to the stressful vs. relaxing imagery cues. A diminished feeling of control was also reported in response to the stressful vs. relaxing imagery cues. With respect to gender differences, women evidenced over three times greater odds of reporting higher craving in response to the stressful script and over two and half times greater odds of reporting a higher stress rating in response to the stressful imagery cues. There were no gender differences in responses to smoking cues. Since the menstrual phase status of female participants was objectively verified and determined to be uncorrelated with the craving and affect measures, the identified gender differences cannot be attributed to variation in menstrual cycle phase (i.e., follicular vs. luteal). While this study did not yield evidence of gender differences in reactivity to smoking cues, it did identify gender as a potential moderator of craving and stress reactivity to stress-eliciting cues.

*Funding through NIDA grants P50 DA016511-02 (Saladin & Gray, Co-PIs, component #3), K23 DA020482 (Carpenter), K12 DA000357 (Gray), and MUSC GCRC grant #M01 RR01070.*

**CORRESPONDING AUTHOR:** Michael Saladin, Ph.D., Associate Professor, Medical University of South Carolina, Health Sciences and Research, 77 President St., Charleston, SC 29425, United States; Phone: 843-792-5306; Email: saladinm@musc.edu

**PA7-2 NEURAL RESPONSES ASSOCIATED WITH REWARD SENSITIVITY IN CIGARETTE SMOKERS**

Laura E. Martin\*, Lisa Sanderson Cox, Rebecca Chambers, and Cary R. Savage, University of Kansas Medical Center

Previous neuroimaging studies have found differences between smokers and non-smokers in the neural systems of reward in response to smoking-related cues. Smokers also show higher levels of impulsivity on self-report and behavioral measures, and impulsivity has been associated with enhanced sensitivity to immediate versus delayed rewards. The neural systems of reward involve dopaminergic (DA) projections from the ventral tegmental area (VTA) to regions of the prefrontal cortex (PFC). The current study employed functional magnetic resonance imaging (fMRI) to examine the neural systems of reward in smokers and non-smokers when monetary rewards and punishments were predicted and delivered. The task consisted of presenting cues predicting the delivery of a reward or punishment with 75% probability. Participants received feedback on how much money they won or lost on a given trial. In this ongoing study, we have collected data in four smokers and six nonsmokers (data collection will be completed in Spring 2009 and data from 10 smokers and 10 nonsmokers will be presented). Preliminary results identified an area of the PFC that responded differentially in smokers compared to non-smokers. Non-smokers but not smokers showed greater PFC activations when punishments were predicted compared to when rewards were predicted. However, this pattern was reversed during the delivery phase of the trial: smokers but not nonsmokers showed greater PFC activations when rewards compared to punishments were delivered. The results demonstrate that smokers may be more sensitive to reward delivery compared to reward prediction. The results are consistent with previous behavioral findings showing a preference for immediate over delayed reward delivery among smokers. The observed activation of the PFC to rewards and punishments extends previous research by showing a differentiation between reward prediction and delivery related to cigarette smoking. These results could inform treatment intervention, taking into account how smokers may weigh the immediate reward delivery associated continued smoking versus positive treatment outcomes, such as long-term health benefits.

*Hoglund Brain Imaging Center, University of Kansas Medical Center, Pilot Funds NIH, NIDA F32DA023327.*

CORRESPONDING AUTHOR: Laura Martin, Ph.D., Postdoctoral Fellow, University of Kansas Medical Center, Hoglund Brain Imaging Center, 3901 Rainbow Blvd., Kansas City, KS 66160, United States; Phone: 913-588-7279; Fax: 913-588-9071; Email: lmartin2@kumc.edu

**PA7-4 ALCOHOL-ELICITED CRAVINGS TO SMOKE: CUES AND CONSUMPTION**

Jason A. Oliver, B.A.\*, Christina Reichert, H.S., David E. Evans, Ph.D., and David J. Drobes, Ph.D., University of South Florida and the Moffitt Cancer Center

Research has demonstrated that exposing smokers to stimuli associated with smoking can reliably produce cravings to smoke. However, despite the abundance of research demonstrating strong associations between alcohol and tobacco use, relatively few studies have examined the effects of alcohol cues and intake on craving to smoke. The present study examined the separate and combined effects of nicotine and alcohol on cue-elicited cravings to smoke and drink in participants with a wide range of alcohol and tobacco usage patterns. Across four sessions and using counterbalancing and double-blind procedures, participants (n=60) consumed two beverages containing either alcohol or placebo, and smoked one nicotine or denicotinized cigarette in a fully-crossed 2 x 2 design. After consuming the drinks and smoking the cigarette, a computerized cue-reactivity assessment of responding to a series of smoking, alcohol and neutral images was completed. Participants rated the images across several dimensions, though the present analyses focus on cravings to smoke. Preliminary results indicate that smokers lower in alcohol dependence (based on a median split on the alcohol dependence scale) experience greater craving to smoke in response to smoking cues, relative to alcohol cues ( $p < .05$ ), whereas smokers higher in alcohol dependence experience similar levels of craving to smoke regardless of whether presented with smoking or alcohol cues. These cross reactivity effects remained even when controlling for level of nicotine dependence. Furthermore, receiving alcohol (relative to placebo) did not affect cue-elicited cravings to smoke in response to alcohol pictures among low alcohol dependent participants. However, receiving alcohol further increased cravings to smoke in response to alcohol images among smokers higher in alcohol dependence ( $p < .05$ ). This finding must be interpreted cautiously, as the results drop to trend significance when controlling for nicotine dependence ( $p < .10$ ). Overall, these findings demonstrate a need for increased attention to the contributory role that alcohol intake and alcohol dependence may play in maintaining smoking behavior.

*This research was supported by NIH grant #AA011157.*

CORRESPONDING AUTHOR: Jason Oliver, B.A., Graduate Student, University of South Florida, Psychology, 4115 E. Fowler Ave., Tampa, FL 33617, United States; Phone: 813-745-1753; Email: Jason.Oliver@moffitt.org

**PA7-5 THE EFFECTS OF ACUTE EXERCISE ON ATTENTIONAL BIASES TO SMOKING-RELATED STIMULI DURING TEMPORARY ABSTINENCE FROM SMOKING**

Kate Janse Van Rensburg, M.Sc.\*<sup>1</sup>, Adrian H. Taylor, Ph.D.<sup>1</sup>, and Tim L. Hodgson, Ph.D.<sup>2</sup>; <sup>1</sup>School of Sport and Health Sciences, University of Exeter; <sup>2</sup>School of Psychology, University of Exeter

Visual attentional bias towards smoking-related cues, is increased during abstinence, and predicts relapse after quitting. Exercise has been found to reduce cigarette cravings and desire to smoke during temporary abstinence and attenuate increased cravings in response to smoking cues. The purpose of this investigation is to assess the acute effects of exercise on attentional bias to smoking-related cues during temporary abstinence from smoking. Following institutional ethical approval, participants (n=20) were assigned to a 15-minute treatment period of passive seating or stationary cycling following 15-hours abstinence, on separate days in a randomised cross-over design. Attentional bias was measured (Eyelink II eye-tracking system) at baseline and post-treatment. Direction and duration of gaze (dwell time) was assessed during the passive viewing of a series of paired smoking (e.g., hand holding cigarette) and neutral (e.g., hand holding pen) images. The order and selection of images were randomised for each trial and presented for 1000ms on a computer screen (15 x 20 cm) approximately 60 cm from the participant. Self-reported "desire to smoke" was recorded at baseline, mid- and post treatment and post image viewing. A fully repeated 2-way ANOVA showed a significant condition x time interaction for dwell time on smoking-related images,  $F(1, 18) = 5.51, p = .031, (\eta^2 = .234)$  with a significantly longer dwell time on smoking images following the control compared with exercise treatment, 5.15 (1.35) and 4.35 (1.78) seconds, respectively. A significant interaction effect for desire to smoke,  $F(2.29, 43.68) = 7.36, p = .000 (\eta^2 = .278)$  was also found, with significantly lower urges to smoke after exercise at all assessments post baseline. Findings support previous research that acute exercise reduces desire to smoke. This is the first study to show that exercise appears to also influence the salience and implicit wanting of cigarettes, which verifies self-appraised urges to smoke. The study provides further support for the value of exercise as an aid to stopping smoking.

*No funding.*

CORRESPONDING AUTHOR: Kate Janse Van Rensburg, University of Exeter, School of Sport and Health Sciences, st Lukes Campus, Exeter, Devon EX2 2LU, United Kingdom; Phone: 07980 769 661; Email: kj214@exeter.ac.uk

**PA7-6 RESPONSES TO SMOKING CUES INCREASE WITH DURATION OF ABSTINENCE**

H. de Wit\*<sup>1</sup>, G. Bedi<sup>1</sup>, A.C. King<sup>1</sup>, D.H. Epstein<sup>2</sup>, S.J. Heishman<sup>2</sup>, K.L. Preston<sup>2</sup>; <sup>1</sup>Human Behavioral Pharmacology Laboratory, University of Chicago; <sup>2</sup>NIDA Intramural Research Program, Baltimore, MD

Most attempts at smoking cessation fail. For reasons that are not well understood, the risk of relapse continues long beyond the initial period of abstinence and withdrawal. In laboratory animals, drug-seeking elicited by conditioned stimuli increases with duration of abstinence, over periods of several months. This phenomenon, referred to as "incubation", may partially explain high rates of relapse to smoking after withdrawal, if smoking related cues fail to lose, and possibly even gain, potency with time. The present study examined the relationship between reactivity to cues and duration of abstinence in regular cigarette smokers. Smokers abstained from smoking for 7, 14 or 35 days of verified abstinence, and their reactions to cues were assessed at the end of this period. It was hypothesized that reactions to the cues would increase with duration of abstinence. Non-treatment seeking daily smokers (> 10 cigarettes/day) were randomly assigned to abstain from smoking for 7, 14 or 35 days (N=15, 15, 15). Abstinence was verified daily using CO and cotinine measures. After the assigned abstinence period, subjects participated in a laboratory session in which they were exposed to smoking-related and neutral images, sights and smells. Heart rate, blood pressure, mood and acute smoking cravings in response to the cues were compared across the three groups. Early analyses indicate that, as hypothesized, responses to smoking-related cues increased in relation to the duration of abstinence. Smokers who abstained longer exhibited greater increases in heart rate and reported heightened cigarette cravings in response to the smoking cues. These data suggest that "incubation", in which responses to drug-related stimuli increase with longer periods of abstinence, may occur in relation to human nicotine use. This observation has significant implications for treatment of smoking and other drug abuse in which users are protected from exposure to drug-related stimuli: It suggests that the risk for resuming drug use after treatment may increase, rather than decrease, as the time patients are kept away from drug-related cues, increases.

*Funding: R21DA020773, NIH NIDA Intramural Research Program.*

CORRESPONDING AUTHOR: Harriet de Wit, PhD, Professor, University of Chicago, Psychiatry, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, United States; Phone: 773-702-1537; Fax: 773-834-7698; Email: hdeiw@uchicago.edu

**PA8-1**

**TEACHING ABOUT TOBACCO IN MEDICAL SCHOOLS: A WORLD WIDE STUDY**

Robyn L. Richmond\*, Nicholas Zwar, Rachel Taylor, Joanne Hunnisett, and Fran Hyslop, School of Public Health and Community Medicine, University of New South Wales, Australia

Background: As medical practitioners of the future, medical students should be taught about tobacco control strategies and smoking cessation interventions.

Aim: to determine the extent of teaching about tobacco and smoking cessation techniques in medical schools worldwide

Methods: cross sectional survey of all medical schools (n=2090) in 171 countries was conducted. A questionnaire was designed, translated and sent to all medical schools. Main outcome measures included whether and how tobacco is taught; comparisons with the survey conducted 10 years ago; tobacco content in the curriculum; format of teaching; and barriers to teaching and solutions.

Results: 665 medical schools from 109 countries completed the full questionnaire, with a response rate of 31.8% from medical schools (39% in developed and 28% in less developed countries) and 64% of countries. A further 67 medical schools responded to a single question on whether they taught about tobacco. The total response rate was 35%. Of 561 medical schools responding to questions on teaching options, 27% of medical schools taught a specific module on tobacco compared to only 11% in our survey of medical schools conducted a decade ago; 77% integrated teaching on tobacco with other topics compared to 40% ten years ago; 31% taught about tobacco informally as the topic arose (vs. 58%), and 4% did not teach about tobacco (vs. 12%). Most common topics taught were: health effects of smoking (94%), health effects of passive smoking (84.5%), epidemiology of tobacco use (81%), nicotine dependence (78%), and taking a smoking history (75%).

Conclusions: We found an encouraging increase in the extent of teaching on tobacco in medical schools over 10 years. There is still a great deal more effort required so that education on tobacco is an ongoing part of medical curricula. The teaching content is generally based on evidence based smoking cessation guidelines.

No Funding.

CORRESPONDING AUTHOR: Robyn Richmond, M.A., M.H.Ed., Ph.D., Professor, University of New South Wales, School of Public Health and Community Medicine, Kensington, New South Wales 2052, Australia; Phone: +61 2 9385 2512; Fax: +61 2 9313 6185; Email: R.Richmond@unsw.edu.au

**PA8-2**

**A GLOBAL SURVEY OF PROGRAMS THAT TRAIN TOBACCO DEPENDENCE TREATMENT PROVIDERS**

Asaf Bitton, M.D.\*<sup>1</sup>, Nancy A. Rigotti, M.D.<sup>2,3</sup>, Ann E. Richards<sup>2</sup>, Michele Reyren, M.P.H.<sup>2</sup>, Kenneth Wassum<sup>4</sup>, and Martin Raw, Ph.D.<sup>5</sup>; <sup>1</sup>Division of General Medicine and Primary Care, Brigham and Women's Hospital, Boston, MA; <sup>2</sup>Tobacco Research and Treatment Center and General Medicine Division, Massachusetts General Hospital, Boston, MA; <sup>3</sup>Department of Medicine, Harvard Medical School, Boston, MA; <sup>4</sup>Free and Clear, Inc., Seattle, WA; <sup>5</sup>Division of Epidemiology and Public Health, University of Nottingham, Nottingham, UK

Background: The WHO Framework Convention on Tobacco Control (FCTC) requires countries to implement tobacco dependence treatment programs. To provide treatment effectively, a country needs individuals trained to deliver these services. Very little is known about the global status of programs that train tobacco treatment providers. This project aimed to develop a methodology for obtaining this information and to conduct an initial global survey.

Design: Cross-sectional web-based survey of tobacco treatment training programs in a stratified convenience sample of countries chosen to vary by WHO geographic region and World Bank income level.

Methods: Key informants in 47 countries were identified. A total of 69% of informants who were sent surveys responded. We measured program prevalence, frequency, duration, and size. We also assessed background of trainees, content (adherence to pre-defined core competencies), funding sources, and program challenges.

Findings: We identified 55 current tobacco treatment training programs in 36 (77%) of 47 countries responding to the survey. Three-quarters of programs began in 2000 or after, and 40% began after 2003, when the FCTC was signed. Training programs were less frequent in low-income countries (p<.001) and in Africa (p=.019). Programs estimated training 13,447 individuals in 2007, of which only 1% of trainees were from low-income countries. Training was offered most often to physicians and nurses, and less often to community health workers except in Africa and the Western Pacific (p=.004). Median program duration was 16 hours, but programs' duration, intensity, and size varied widely. Most programs used evidence-based guidelines and reported adherence to core tobacco treatment competencies. Securing funding was the major challenge for most programs.

Conclusion: Training programs for tobacco treatment providers are heterogeneous and growing. Most upper- and middle-income countries have some form of training programs, and most programs appear to be evidence-based. However, funding is a major challenge. A particular need was identified for programs that train non-physicians in low-income countries.

Grant from Association for the Treatment of Tobacco Use and Dependence (ATTUD) with funds provided by the Global Treatment Partnership. Dr. Rigotti's time was funded by a grant from the National Heart Lung and Blood Institute (#K24-HL04440).

CORRESPONDING AUTHOR: Asaf Bitton, M.D., Physician, Brigham and Women's Hospital, General Medicine, 75 Francis St, Boston, MA 02115, United States; Phone: 617-432-1134; Email: abiton@partners.org

**PA8-3**

**UNIVERSITY OF EXCELLENCE FOR TOBACCO-DEPENDENCE TREATMENT: A TRANS-DISCIPLINARY MODEL OF FACULTY DEVELOPMENT AND CURRICULUM CHANGE AT LOMA LINDA UNIVERSITY (LLU)**

David P.L. Sachs, M.D.\*<sup>1</sup>, Linda Hyder Ferry, M.D., M.P.H.<sup>2</sup>, and Bonnie L. Sachs, R.N., M.S.<sup>1</sup>; <sup>1</sup>Palo Alto Center for Pulmonary Disease Prevention, Palo Alto, CA; <sup>2</sup>Loma Linda Univ. School of Medicine and School of Public Health, Loma Linda, CA

National surveys of US health-professional schools show inadequate didactic and clinical tobacco-dependence curriculum. We describe the results of a discipline-specific tobacco curriculum enhancement project at LLU.

Methods: LLU received a 2-year grant to improve the tobacco-dependence education of all clinical students (2007-2009). The University Chancellor invited the Deans of the Schools of Dentistry (SD), Medicine (SM), Nursing (SN) and Pharmacy (SP) to support tobacco-dependence curriculum evaluation and change. Each Dean assigned a task force to match and enhance the US PHS Guidelines to their profession. After the Deans identified key faculty in each school, the investigators met with them monthly to review specific academic needs to achieve curricular change. Only 1 of the key faculty had previously attended a tobacco-dependence training program or professional meeting. The SD (2 hrs), SM (7 hrs) and SP (9 hrs) had identifiable, didactic tobacco education. However, only the SM offered clinical training and objectively measured student performance.

Results: Faculty (n=8) from all 4 schools joined SRNT and attended SRNT 2008. This greatly enhanced their confidence and knowledge of tobacco-dependence mechanisms and treatment. SD and SN Faculty surveys indicated widespread desire to improve tobacco-treatment knowledge and clinical training. Faculty development seminars (4 hrs) were well attended in the SD and will be held in SN and SP. SD required lecture time increased from 2 to 7 hrs. Dental and Nursing students received credit for observing an on-campus, 4-hr tobacco-treatment clinic. SN increased tobacco didactics from 1 to 4 hrs. The SP revamped its didactic course, sent faculty to intensive training, and is launching a required, 1-month clinical tobacco rotation for all Yr-4 students. All schools are increasing clinical training and will evaluate graduates' clinical competency in 2009.

Conclusions: Simple, low-budget, faculty development activities, with strong Chancellor and Deans support, initiated remarkably rapid tobacco curriculum improvement in all 4 health professional schools to prepare graduates to effectively treat tobacco dependence.

Palo Alto Center for Pulmonary Disease Prevention, Palo Alto, CA

CORRESPONDING AUTHOR: Linda Ferry, M.D., M.P.H., Chief, Preventive Medicine Section, Jerry L. Pettis Veterans Affairs Medical Center, Medical Service (111PM), 11201 Benton Street, Loma Linda, CA 92357, United States; Phone: 909-583-6290; Email: lherry@aol.com

**PA8-4**

**ASSOCIATIONS OF MEDICAL STUDENT PERFORMANCE IN STANDARDIZED PATIENTS ON SMOKING CESSATION WITH COGNITIVE EXAMINATIONS**

William C. Wadland, M.D., M.S., Carlos F. Rios-Bedoya, Sc.D., M.P.H., and Mary M. Noel, M.P.H., Ph.D., Dept. of Family Medicine, Michigan State University

Aim: To determine whether performance on a standardized patient (SP) providing smoking cessation is independent of performance on cognitive examinations.

Methods: MSU-College of Human Medicine 3rd year students participate in a required 8-week clinical clerkship in Family Medicine. The study population consists of 978 medical students between 1997 and 2007. From 1997 to 2002 (cohort 1), 470 students completed a performance based assessment (PBA) with a simple assessment (SP1) on standardized patients, providing the 5 A's on smoking cessation. From 2003-2007 (cohort 2), a total of 508 students took a revised, complex based assessment (SP2) involving a "shared-decision making" process on smoking cessation and general preventive care more consistent with usual clinical practice. Both cohorts were evaluated on the PBA and their cognitive performance with comprehensive oral and multiple-choice exams. The cognitive performance outcomes serve as our key response variables and the PBA as the main explanatory variables. Multiple linear regression was used to examine the relationships. Adjusted estimates controlled for gender, campus and clerkship sequence (i.e., fall, spring, and summer).

Results: We found a positive unadjusted statistical association between SP1 performance and the multiple-choice exam (p<0.05) for cohort 1 but not for cohort 2. Conversely, a statistical, crude association was found for SP2 and the oral exam (p<0.05) for cohort 2 but not for cohort 1. The associations for the SP remained statistically robust after controlling for campus and clerkship sequence. Comparing cohorts 1 and 2 (SP1 versus SP2) on their smoking PBA assessment, we found no performance difference.

Conclusion: Medical student performance on a standardized patient, providing smoking cessation counseling, is not consistently associated with performance on cognitive written or oral examinations. Performance during a clinical clerkship of smoking cessation counseling did not differ by student cohorts given a simple standardized case on smoking cessation versus more complex cases requiring shared decision-making on preventive care as well as smoking cessation.

No Funding.

CORRESPONDING AUTHOR: William Wadland, M.D., M.S., Professor and Chair, MSU, Family Medicine, B106 Clinical Center, East Lansing, MI 48824, East Lansing, MI 48824, United States; Phone: 517-884-0428; Fax: 517-353-8579; Email: wadland@msu.edu

**PA8-5**

**SMOKING CARE POLICIES AND PROCEDURES IN AUSTRALIAN PSYCHIATRIC FACILITIES**

P. Wye<sup>1</sup>, J. Bowman<sup>1</sup>, J. Wiggers<sup>2</sup>, A. Baker<sup>3</sup>, J. Knight<sup>4</sup>, V. Carr<sup>5</sup>, M. Terry<sup>6</sup>, and R. Clancy<sup>6</sup>; <sup>1</sup>School of Psychology, University of Newcastle, Australia; <sup>2</sup>School of Medicine and Public Health, University of Newcastle, Australia; <sup>3</sup>Centre for Brain and Mental Health Research, Faculty of Health, University of Newcastle, Australia; <sup>4</sup>Population Health, Hunter New England Area Health Service, NSW Health; <sup>5</sup>Hunter New England Mental Health Services, Hunter New England Area Health Service, NSW Health

Tobacco smoking is the leading preventable cause of death and disease in Australia. Despite a reduced smoking prevalence within the general population (20%), a high prevalence remains for psychiatric inpatients (70-90%).

Objective: This study aimed to identify (1) smoking policies and procedures in public psychiatric inpatient units in New South Wales (NSW), Australia; (2) smoking care in such units; and (3) policies and procedures associated with the assessment of smoking status and provision of smoking care.

Method: A cross-sectional survey was mailed to all public psychiatric inpatient units in NSW for completion by Nurse Unit Managers.

Results: Of the 131 units, 123 completed surveys were returned (94%). Over one third (36%) of respondents reported instances of inpatients commencing smoking during their admission. A similar proportion (39%) reported that some smoking patients were provided with cigarettes when their own supply was expended. While 50% of respondents reported that all patients were assessed for smoking status, 70% reported that nicotine dependence was not assessed. Respondents who reported that staff adhered to smoking restrictions had three times the odds of assessing patient smoking status compared to those who reported never doing so (OR = 3.05, df = 1, p = 0.01).

Conclusions: Inadequate reinforcement of non-smoking environments and inconsistencies in smoking care procedures were apparent. The findings suggest that the failure of psychiatric services to provide smoking care is systemic and not related to particular types of services.

*This research was supported by a grant from the Commonwealth Department of Health and Ageing, Australia.*

CORRESPONDING AUTHOR: Paula Wye, B.Psych., University of Newcastle, School of Psychology, "Mowanjum," Top Somerton Road, Somerton, NSW 2340, Australia; Phone: +61 458090467; Fax: +61 24921 6980; Email: Paula.Wye@newcastle.edu.au

**PA9-1**

**COMMUNITY-BASED YOUTH CESSATION PROGRAMS: CHARACTERISTICS OF SUSTAINING PROGRAMS**

Amy K. Sporer, M.S.\*<sup>1</sup>, Robin J. Mermelstein, Ph.D.<sup>1</sup>, Sherry Emery, Ph.D.<sup>1</sup>, Oksana Pugach, M.P.H.<sup>1</sup>, and Susan J. Curry, Ph.D.<sup>2</sup>; <sup>1</sup>University of Illinois at Chicago; <sup>2</sup>University of Iowa

Although substantial resources are spent to implement community-based health programs, they often do not continue beyond initial funding. Identifying factors that support program sustainability is vital to ensuring that best treatment practices are available for youth smokers. To investigate sustainability, the Helping Young Smokers Quit initiative attempted to recontact 591 programs three years after they were profiled in a national survey of community-based youth cessation programs. The follow-up survey measured 5 constructs of sustainability: Organizational Alignment/Integration, Resources, Standard Operating Procedures, Demand, and Local Ownership. This paper examines characteristics of sustained programs by comparing their baseline and follow-up reports. A total of 305 programs (52% of the original sample) were located and completed follow-up surveys. Of the 305, 188 were still in operation. Most sustained programs were school-based, offering cognitive-behavioral interventions in a group format. Since first offered, 37% transitioned from trial status to permanent programs, and 20% were temporarily suspended. Primary reasons for suspending operations were: not having a program leader, lack of funds, and too few youth enrolled. Over the three years since baseline, sustained programs reported changing enrollment criteria with a decrease in mandated-only participation. Among programs initially reporting mandatory-only enrollment, 63% subsequently opened up enrollment to any interested youth. There were also significant changes in type of program used; 38% of those using internally developed programs at baseline were using externally developed programs at follow-up. That only 32% of the original programs could be located and were found to be still in operation suggests significant volatility in the availability of community-based youth cessation programs. Results point to the relevance of organizational alignment/integration (e.g., transition from pilot to permanent program status), standard operating procedures (e.g., adoption of standardized programs), and demand (e.g., expanded eligibility criteria) to program sustainability.

*The Helping Young Smokers Quit initiative is supported by the Robert Wood Johnson Foundation, National Cancer Institute, and Centers for Disease Control and Prevention.*

CORRESPONDING AUTHOR: Amy Sporer, M.S., Deputy Director, Helping Young Smokers Quit, University of Illinois at Chicago, Institute for Health Research and Policy, 1747 W. Roosevelt Rd, Rm 558 (M/C 275), Chicago, IL 60608, United States; Phone: 312-355-3696; Fax: 312-413-4750; Email: aksporer@uic.edu

**PA9-2**

**COMPARING THE 5 A'S VS. 3 A'S PLUS QUITLINE COUNSELING IN FEE-FOR-SERVICE DENTISTRY**

Judith S. Gordon, Ph.D.\*<sup>1</sup>, Judy A. Andrews, Ph.D., Karen M. Crews, D.D.S., Thomas J. Payne, Ph.D., and Herbert H. Severson, Ph.D., Oregon Research Institute and University of Mississippi Medical Center

Study Purpose: The primary aim of our study was to evaluate the relative efficacy of two dental office-based interventions compared to usual care in a randomized clinical trial for patients who use tobacco.

Methods: The 3 A's condition consisted of a combination of dental practitioner advice to quit plus referral telephone counseling, and the 5 A's consisted of an intervention based on the Clinical Practice Guideline. Participants were assessed at 3 and 12 months.

Results: 2,160 tobacco-using patients were enrolled from 68 private dental practices in Mississippi. The majority was: smokers (79%); white (80.5%); female (60%); some college education (60%). There were significant differences between groups on prolonged abstinence, with participants in the intervention conditions more likely to report quitting than those in usual care ( $\chi^2(1, 2160) = 4.5, p < .05$ ). Although not significant, more patients in the 5 A's condition reported quitting than those in the 3 A's condition. Only 16.3% of smokers in the 3 A's Condition reported receiving quitline counseling; 7.9% of those reported prolonged abstinence vs. 1.9% of those who did not receive counseling ( $p < .001$ ).

Conclusions: These results suggest that there are advantages and disadvantages of using quitlines as an adjunct to dental interventions. Patients receiving telephone counseling quit at higher rates than those who did not, but only a small percentage of patients got counseling. Dental professionals may be most effective in helping their patients quit by regularly providing the 5 A's plus referring only patients who are highly motivated to a quitline for more intensive counseling.

*National Institute on Drug Abuse R01 DA017972.*

CORRESPONDING AUTHOR: Judith Gordon, Ph.D., Senior Research Scientist, Oregon Research Institute, 1715 Franklin Blvd., Eugene, OR 97403, United States; Phone: 541-484-2123; Email: judith@ori.org

**PA9-3**

**EFFECTIVENESS OF A SMOKING CESSATION SERVICE IN PRIMARY CARE**

Robyn L. Richmond\*<sup>1</sup>, Nick A. Zwar<sup>1</sup>, and Gail Forlonge<sup>2</sup>; <sup>1</sup>School of Public Health and Community Medicine, University of New South Wales, Australia; <sup>2</sup>Southern Highlands Division of General Practice

Background: General practice nurse involvement in providing smoking cessation advice has not been evaluated in the Australian context.

Aim: to evaluate the enhanced role of general practice nurses offering smoking cessation advice.

Methods: Two divisions of general practice in southwestern Sydney participated. Following a half-day training workshop for practice nurses, participating general practices each identified 25 patients to be advised to quit by the nurse over four visits. Patients were offered counselling and subsidised nicotine replacement therapy (patch). Evaluation consisted of point prevalence and continuous abstinence six months after quit day and satisfaction with the service model.

Results: 35 general practitioners and 31 practice nurses from 23 general practices participated. Outcome data was collected from 498 patients. Mean age of patients was 46 years with 61% female. 83% decided to quit. Mean number of visits to the practice nurse was 2.8 out of a possible 4. At six months, point prevalence was 22% and continuous abstinence was 16%, with validation using carbon dioxide measurement. 95% used NRT and 46% the Quitline. Cost per quitter was estimated at AUD\$1074. Qualitative evaluation through interviews with 22 practice nurses and 11 general practitioners revealed positive feedback about the enhanced role.

Conclusion: practice nurses have considerable potential for improving the amount and quality of behavioural risk factor advice offered in primary care.

*Australian Commonwealth Department of Health and Ageing.*

CORRESPONDING AUTHOR: Robyn Richmond, M.A., M.H.Ed., Ph.D., Professor, University of New South Wales, School of Public Health and Community Medicine, Kensington, NSW 2052, Australia; Phone: +61 2 9385 2512; Fax: +61 2 9313 6185; Email: R.Richmond@unsw.edu.au

**PA9-4**

**COMMUNITY LEVEL IMPLEMENTATION OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION BEST PRACTICES RECOMMENDATIONS FOR EFFECTIVE TOBACCO CONTROL**

Thom Taylor, B.A.S.<sup>1</sup>, Nora Y. Hernandez, B.S.<sup>1</sup>, Theodore V. Cooper, Ph.D.<sup>\*1</sup>, Michael Kelly, Ph.D.<sup>2</sup>, Jon Law, M.P.A.<sup>2</sup>, and Brian Colwell, Ph.D.<sup>3</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>The Paso del Norte Health Foundation; <sup>3</sup>Texas A&M University

The Centers for Disease Control and Prevention (CDC) developed and recently updated recommendations for comprehensive and effective tobacco control in the United States. These recommendations include the implementation of activities at the community level that prevent initiation of and promote cessation of tobacco use, eliminate exposure to secondhand smoke, and eliminate existing health disparities among diverse populations. In 2000, the Paso del Norte Health Foundation in El Paso, Texas implemented a tobacco control initiative at the community level in line with the CDC's best practices. To examine the impact of this initiative, smoking prevalence estimates were attained for the county of El Paso, TX, the state of Texas, and U.S. national estimates for the past 10 years (1997 – 2007) from annual Behavioral Risk Factor Surveillance System surveys. Estimates were compared at the county, state, and national level prior to and after 2000 when the initiative was enacted in El Paso only. Initiative impact on smoking prevalence was tested with the median test with exact probability to account for the small sample size (N = 10 time points). At the local level, rates after the introduction of the initiative were significantly below the median smoking rate across years ( $\phi = .81$ , exact  $p = .03$ ). At the state and national levels, there were no comparable significant associations (both exact  $ps > .40$ ). While the prevalence of smoking has decreased in all three strata from 1997-2007, it appears that the decline was more extensive (from 28% to 18%) at the El Paso county level relative to Texas and national declines. This lends support to the necessity of implementing CDC recommendations for effective tobacco control at not only the state and national levels, but also the community level. With the strengthening of the initiative since 2007 and the adaptation of the initiative in 2008 to the updated CDC best practices guidelines, the tobacco use prevalence reductions already observed in El Paso, TX are anticipated to continue.

*This project was funded by The Paso del Norte Health Foundation Grant No. 26-8112-97.*

CORRESPONDING AUTHOR: Theodore Cooper, Ph.D., Assistant Professor, University of Texas at El Paso, Psychology, 500 West University Avenue, El Paso, TX 79968, United States; Phone: 915-747-6270; Fax: 915-747-6553; Email: tvcooper@utep.edu

**PA9-5**

**PHARMACY AND GROUP-BASED INTERVENTIONS FOR SMOKING CESSATION: WHAT WORKS FOR WHOM IN WHICH CIRCUMSTANCES?**

L. Bauld, J. Ferguson, J. Chesterman, and K. Judge

Limited evidence exists regarding the efficacy of different models of behavioural support for smoking cessation, particularly in community settings. This paper outlines results from an observational study that compared pharmacy-based one to one support with group-based support in Glasgow, Scotland. The study collected detailed data from 1,700 smokers accessing these two types of services within a 10-week period in 2007. In the short term, clients accessing group services were more than twice as likely to be abstinent at four weeks than those using pharmacy support, even after controlling for a wide range of client and service characteristics. In the longer term, at one year, the differences in outcomes between services were not as significant but group support still outperformed the pharmacy model. The study also found, as previous research has done, that a range of client characteristics including age, level of addiction, health status and other factors affected outcomes. The study concludes with a discussion of implications for policy, practice and future research in the UK and further afield.

*Glasgow Centre for Population Health, Health Scotland, NHS Greater Glasgow and Clyde.*

CORRESPONDING AUTHOR: Linda Bauld, Ph.D., University of Bath, UK Centre for Tobacco Control Studies, Bath, BA2 7AY, United Kingdom; Phone: 01225 383160; Email: L.Bauld@bath.ac.uk

**PA10-1**

**COMPARING THE EFFECTS OF ENTERTAINMENT MEDIA AND TOBACCO MARKETING ON YOUTH SMOKING IN THE U.S.**

James D. Sargent, M.D.<sup>\*1</sup>, and Todd Heatherton, Ph.D.<sup>2</sup>; <sup>1</sup>Dartmouth Medical School; <sup>2</sup>Dartmouth College

Objectives: To examine the concurrent effects of exposure to movies and tobacco marketing on adolescent smoking onset and progression.

Methods: Cross sectional study of 4524 Northern New England adolescents aged 10-14 in 1999 with longitudinal follow up of 2603 baseline never smokers. For cross-sectional analyses, outcomes included ever tried smoking and higher level of lifetime smoking among 794 experimenters. For the longitudinal analysis, the outcome was onset of smoking among baseline never smokers two years later. Movie smoking exposure was modeled as four population quartiles, tobacco marketing receptivity included two levels – having a favorite tobacco ad and wanting/owning tobacco promotional items. All analyses controlled for sociodemographics, other social influences, personality characteristics of the adolescent and parenting style.

Results: In the full cross-sectional sample, 17.5% had tried smoking. Movie smoking and marketing receptivity were both associated with trying smoking, but few adolescents had a favorite ad and the association with promotional item ownership was relatively weak (adjusted odds ratio [AOR] = 1.34), limiting the population effect of marketing receptivity. In contrast, the majority of experimental smokers were receptive to tobacco marketing and it was strongly associated with higher level of lifetime smoking (adjusted proportional odds ratio = 3.6 and 2.5 for favorite ad and promo item respectively); movie smoking was not. In the longitudinal study of never smokers, 9.5% tried smoking and only movie smoking predicted onset (AOR 2.0-2.7 for higher quartiles compared with quartile 1).

Conclusions: In this study, exposure to movie smoking was a stronger predictor of trying smoking compared to tobacco marketing receptivity. Among experimental smokers, attention to tobacco marketing was common and strongly associated with higher levels of lifetime smoking. The results suggest that the exposures act at different levels in the smoking uptake continuum. Both exposures deserve equal emphasis from a public health standpoint.

*NIH CA-77026, American Legacy Foundation.*

CORRESPONDING AUTHOR: James Sargent, M.D., Professor, Dartmouth Medical School, Pediatrics, 1 Medical Center Drive, Lebanon, NH 05055, United States; Phone: 802-649-1256; Email: james.d.sargent@dartmouth.edu

**PA10-2**

**COMPARING THE EFFECTS OF ENTERTAINMENT MEDIA AND TOBACCO MARKETING ON YOUTH SMOKING IN GERMANY**

Reiner Hanewinkel, Ph.D.<sup>\*</sup>, and James D. Sargent, M.D.

Objective: Examine the differential effects of movies and tobacco marketing in Germany, where there are fewer controls on tobacco advertising compared to U.S.

Method: Longitudinal study of 5,611 German adolescents age 10-14 at T1; 4603 were resurveyed 1 year later and of whom 4,384 have complete data for the analysis. A lifetime smoking/current smoking outcome variable (smk) was constructed from two items ( $\alpha = 0.87$ , range 1-5). Exposure to smoking in 398 internationally distributed U.S. movies was modeled as a continuous variable, with 0 corresponding to 5th percentile and 1 to 95th percentile of exposure. Tobacco marketing receptivity consisted of naming a brand for favorite tobacco ad. The ordinal logistic regressions controlled for sociodemographics, other social influences, personality characteristics of the adolescent and parenting style.

Results: Ever smoking prevalence was 38% at T1 and mean for smk was 1.65 and 1.81 at T1 and T2, respectively. Whereas 34% of experimental smokers were receptive to tobacco marketing at baseline, only 6% of never smokers were. In an unadjusted model, the interaction of movie smoking and tobacco marketing receptivity on eversmoking at T1 were both statistically significant at the  $p < 0.05$  level. Among baseline never smokers, exposure to movie smoking was a strong predictor of higher T2 lifetime smoking (adjusted proportional odds ratio [apor] 2.84 [1.90, 4.26]) but tobacco marketing receptivity was not (apor 1.48 [1.04, 2.1]); in post hoc testing, the movie estimate was significantly higher than the marketing estimate. Among baseline experimental smokers, tobacco marketing receptivity was a strong predictor of higher T2 lifetime smoking (apor 2.22 [1.83, 2.70]) but exposure to movie smoking was not (apor 1.60 [1.16, 2.20]).

Conclusions: In this longitudinal study movie smoking primarily affected smoking initiation and tobacco marketing receptivity primarily affected experimental smoking. The results suggest that movie smoking should be emphasized in programs aimed at preventing onset and marketing emphasized in programs directed at experimental smokers. Both deserve equal attention from a public policy standpoint.

*This work supported by the Ministry of Health of the Federal Republic of Germany, NIH CA-7026 and The American Legacy Foundation.*

CORRESPONDING AUTHOR: James Sargent, M.D., Professor, Dartmouth Medical School, Pediatrics, 1 Medical Center Drive, Lebanon, NH 05055, United States; Phone: 802-649-1256; Email: james.d.sargent@dartmouth.edu

**PA10-3 SELF-CONTROL BUFFERS THE IMPACT OF MEDIA SMOKING EXPOSURE ON SMOKING INTENTIONS AND BEHAVIOR**

Thomas A. Wills<sup>1</sup>, Frederick X. Gibbons<sup>2</sup>, Meg Gerrard<sup>3</sup>, James D. Sargent<sup>3</sup>, Susanne E. Tanski<sup>3</sup>, and Mike Stoolmiller<sup>4</sup>; <sup>1</sup>Dept. of Epidemiology and Population Health, Albert Einstein College of Medicine; <sup>2</sup>Dartmouth College; <sup>3</sup>Norris Cotton Cancer Center, Dartmouth Medical School; <sup>4</sup>College of Education, Univ. of Oregon

**Objective:** Media exposure to smoking cues has been linked to onset and progression of smoking in several studies of youth. However, at present there is little knowledge about factors that moderate the impact of media exposure. We investigated whether self-control buffers the impact of media advertising and movie smoking exposure on smoking-related attitudes and behavior in samples of children and adolescents.

**Method:** Study 1 was a household interview study of 366 children (M age 9.3 years) in a metropolitan area. They were asked 4 questions regarding their exposure to, and attitudes about, tobacco advertising. Their willingness to use cigarettes and their affiliation with peer smokers was assessed. Good self-control was assessed with scales on planfulness, problem solving, and delay of gratification. Study 2 was a telephone interview study of a national sample of 6,522 youth aged 10-14 years (M age 12.0 years). Exposure to smoking in a pool of 534 movies was assessed with an objective coding procedure. Self-control was assessed by a 4-item scale. Similar measures were obtained for willingness to smoke, friends' smoking, and ever smoked cigarettes (No/Yes). Regression analyses tested main-effect terms for media exposure and self-control, and their cross-product, as predictors for smoking willingness and affiliations, and smoking behavior in Study 2. The analyses controlled for a range of demographics and also for IQ in Study 1.

**Results:** In Study 1, significant advertising exposure x self-control interactions were found for willingness to smoke (cross-product  $t = 3.09, p < .01$ ) and peer smoking ( $t = 2.18, p < .05$ ). In Study 2, movie exposure x self-control interactions were found for willingness ( $t = 7.28, p < .0001$ ), peer smoking ( $t = 5.23, p < .0001$ ), and smoking behavior ( $t = 4.87, p < .0001$ ). In both studies, results showed that the impact of media exposure on smoking willingness, affiliations, and behavior was reduced among persons who scored higher on self-control.

**Conclusions:** Self-control may be an important moderator of the impact of media exposure to smoking cues. The results have implications for smoking prevention studies and media literacy programs.

R01 DA12623 2R01CA077026-11.

**CORRESPONDING AUTHOR:** Tom Wills, Ph.D., Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, NY 10461, United States; Phone: 718-430-3654; Email: wills@aecom.yu.edu

**PA10-4 RELEVANCE OF HEALTH WARNINGS ON CIGARETTE PACKAGES: A PSYCHOLINGUISTIC INVESTIGATION**

Christelle Gay\*, Marlène Bosson, Pascal Gygas, and Farfalla Ribordy, University of Fribourg-Switzerland

Theories on the cognitive processing of health warnings usually stress the impact of variables such as message framing (e.g. Rothman & Salovey, 1993), graphical display (O'Hegarty et al., 2006), or individual differences (Dillard et al., 2005). However, only few psycholinguistic studies have examined the mental representation of health warnings printed on cigarette packages. In our experiment, we predominantly investigated the mental representation that adolescents build when reading short tobacco warnings. In our experiment, 14-, 16-, and 18-year-olds first filled a questionnaire on their exposure to tobacco. They then participated in a computer-based experiment in which short passages portraying a main protagonist in specific situations were presented, one after the other. Each passage was presented in three parts: a context sentence (e.g., John read in a magazine), a tobacco warning (e.g., Smoking makes your teeth go yellow) and a target sentence describing the main protagonist's behaviour (e.g., John decided to stop smoking). For half of the participants, a picture accompanied the tobacco warning. Participants had to quickly decide whether the target sentence (behaviour) was a sensible continuation of the first two sentences. The tobacco warnings differed along three variables: (1) severity, (2) time consequence and (3) focus of the message. We monitored both the actual responses, and the time it took participants to respond. Our main result demonstrated noticeable differences between the age groups and between smoking experiences in the sensitivity to tobacco warnings. Fourteen-year-old adolescents seemed to be sensitive to all messages, but more particularly to messages with a high severity content. Images only had an impact upon 16-year-olds. Sixteen-year-old smokers also seemed to be sensitive to short-term message focused on health, and long-term messages focused on others. Finally, non-smokers of eighteen years seemed to be sensitive to messages focused on health, whereas the smokers seemed to be sensitive to long-term messages focused on health, but to short-term messages focused on others.

*Tobacco Prevention Fund (TPF) Federal Office of Public Health (FOPH) #07.007894.*

**CORRESPONDING AUTHOR:** Christelle Gay, Research Assistant, University of Fribourg-Switzerland, Psychology, Rte de Faucigny 2, Fribourg, 1700, Switzerland; Phone: +41 26 300 76 26; Email: christelle.gay2@unifr.ch

**PA10-5 CIGARETTE PACKAGE DESIGN AND PERCEPTIONS OF RISK AMONG UK ADULTS AND YOUTH: EVIDENCE IN SUPPORT OF PLAIN PACKAGING**

D. Hammond<sup>\*1</sup>, M. Dockrell<sup>2</sup>, D. Arnott<sup>2</sup>, A. Lee<sup>1</sup>, S. Anderson<sup>3</sup>, and A. McNeill<sup>3,4</sup>; <sup>1</sup>University of Waterloo, Canada; <sup>2</sup>ASH, UK; <sup>3</sup>University of Nottingham, UK; <sup>4</sup>UK Centre for Tobacco Control Studies, UK

Cigarette packages that give the impression that some brands are less harmful than others are illegal in the EU and prohibited under Article 11 of the FCTC. This study examined consumer perceptions of leading UK brands and evaluated the impact of "plain packaging," in which colours and other design elements were removed. A total of 516 adult smokers and 806 youth (aged 11 to 17) participated in an online survey in 2008. Participants were shown pairs of cigarette packages and were asked to compare the packages on 5 measures: taste, tar delivery, health risk, attractiveness, and either ease of quitting (adult smokers) or which brand they would choose if trying smoking (youth). Compared to "regular" brands, adults and youth were significantly more likely to rate packages with the terms "smooth," "silver," and "gold" as lower tar, lower health risk, and either easier to quit (adults) or their choice of pack if trying smoking (youth). For example, compared to Mayfair King Size, Mayfair Smooth was rated as lower tar by 64% of youth, lower health risk by 54%, while 39% of youth indicated that they would prefer Mayfair Smooth if they were to try smoking. Similar perceptions were reported by adult smokers; in addition, 31% of adult smokers rated Mayfair Smooth as easier to quit. The use of colours had a similar effect: for example, both adults and youth rated a light grey package as lower tar and lower health risk compared to darker grey and red packages, which were otherwise identical. Plain packaging — where the colour and design elements were removed — reduced these misperceptions, as well as the perceived attractiveness of brands. Overall, the findings indicate that considerable proportions of UK youth and adults hold misleading perceptions of risk based on package design. The findings suggest that removing the terms "light" and "mild" is insufficient to eliminate misleading information from packages, and that plain packaging regulations would increase compliance with existing EU law and FCTC guidelines.

*Supported by Action on Smoking on Health (ASH) with funding from the British Heart Foundation and Cancer Research UK.*

**CORRESPONDING AUTHOR:** David Hammond, Ph.D., Assistant Professor, University of Waterloo, Health Studies & Gerontology, 200 University Ave West, Waterloo, ON N2L 3G1, Canada; Phone: 519-888-4567 x36462; Email: dhammond@uwaterloo.ca

**PA11-1 SMOKING CESSATION IN RECOVERY: A PRELIMINARY COMPARISON OF TWO DIFFERENT COGNITIVE BEHAVIORAL TREATMENTS**

Yvonne M. Hunt, Ph.D., M.P.H.<sup>\*1,3,4</sup>, Carla J. Rash, Ph.D.<sup>2,3,4</sup>, Randy S. Burke, Ph.D.<sup>3,4</sup>, and Jefferson D. Parker, Ph.D.<sup>3,4</sup>; <sup>1</sup>Cancer Prevention Fellowship Program, National Cancer Institute, Bethesda, MD; <sup>2</sup>University of Connecticut Health Center, Farmington, CT; <sup>3</sup>G.V. (Sonny) Montgomery VA Medical Center, Jackson, MS; <sup>4</sup>University of Mississippi Medical Center, Jackson, MS

A growing body of evidence supports concurrent treatment of nicotine dependence and substance use disorders (SUDs). Recovering substance users are often motivated to quit smoking and cessation may confer added benefits for sobriety. Residential substance abuse recovery programs offer the administrative and clinical structure to support effective implementation of tobacco cessation interventions. However, the optimal parameters for successful tobacco cessation programming in such settings remain unclear. The current study examined differences in treatment engagement, treatment retention, and treatment outcomes for a contingency-based smoking cessation treatment versus a usual care condition. Participants were 65 male veterans in inpatient treatment for a primary SUD who expressed interest in quitting smoking and were invited to participate in either standard or contingency-based smoking cessation treatment. All participants were offered four sessions of cognitive-behavioral group counseling; participants in the contingency-management condition also had the opportunity to earn cash vouchers for attendance and abstinence. Despite having an equal number of eligible participants at each wave, treatment engagement was significantly more robust in the contingency-based treatment condition compared to the usual care condition (91% vs. 35%). Importantly, the observed discrepancy in recruitment rates cannot be attributed to baseline differences in cigarettes per day, nicotine dependence, or other aspects of smoking history. The contingency-based treatment also demonstrated superior treatment retention (100% contingency-based vs. 57% usual care). Survival analysis showed that 58% of participants receiving contingency-based treatment were smoke-free on quit day, versus only 17% of participants in usual care. In addition, the end of treatment continuous abstinence rate was significantly higher in the contingency-based condition compared to usual care (21% vs. 0%). These preliminary results suggest that contingency management approaches may be useful for maximizing participation in smoking cessation treatment and improving treatment outcomes among recovering substance users.

*This project was funded by a Pilot Study Grant awarded to Yvonne M. Hunt by the South Central Mental Illness Research Education and Clinical Center.*

**CORRESPONDING AUTHOR:** Yvonne Hunt, Ph.D., M.Ph., Cancer Prevention Fellow, National Cancer Institute, TCRB/BRP/DCCPS, 6130 Executive Blvd., MSC 7337, Bethesda, MD 20892-7337, United States; Phone: 301-496-0278; Email: huntym@mail.nih.gov

**PA11-2**

**STAFF AND CLIENT PERSPECTIVES ON TOBACCO TREATMENT DURING DRUG TREATMENT**

Jamie Hunt\*, Susan Garrett, Kimber P. Richter, Ana Paula Cupertino, Peter D. Friedmann, Byron Gajewski, and Edward F. Ellerbeck

**Background:** Some drug treatment facilities are beginning to treat tobacco. Understanding why and how services are currently delivered may aid efforts to promote treatment adoption/quality improvement.

**Methods:** We conducted semi-structured interviews as part of a mixed-method study of tobacco treatment in 8 facilities in the U.S. Midwest. The purposive sample of facilities varied by ownership, size, drug treatment mode, and level of tobacco services. Eight directors, 25 staff and 29 smoking clients participated. Open-ended questions covered treatment delivery, staff roles, leadership, reimbursement, and attitudes toward treatment. Discussions were audiotaped, transcribed, and coded using Ethnograph; inter-observer reliability was 98%.

**Results:** Counseling: No facility routinely offered individual/group counseling for tobacco use. None had designated staff to treat tobacco. Several devoted an occasional group session to "health promotion" in which tobacco was discussed. Most reported clients had to raise the subject of tobacco and indicate a strong interest in cessation before it was included as a treatment goal or addressed. No facilities had protocols/policies for promoting motivation to quit among clients unwilling to quit. Many staff used tobacco as an example or treatment "tool" for raising awareness about withdrawal, craving, and other aspects of addiction — not to treat tobacco but in service of treating other drug use. Pharmacotherapy: One facility provided on-site NRT. Most encouraged clients to discuss pharmacotherapy with a physician. Major themes: For-profit facilities tended to focus on helping clients fulfill diversion or court-related requirements for DWI or drug possession—tobacco was not considered a treatment priority because it is not illegal or the reason for treatment. Most clients wanted to quit, but differed on how/when treatment should occur. Staff and clients disagreed regarding the type/amount of tobacco treatment offered in each facility.

**Conclusions:** All agreed that tobacco was dependence-forming and harmful, but the current U.S. focus on legal aspects of addiction, and lack of focus on health, may hinder treatment adoption.

*National Institute on Drug Abuse (R21 DA020489).*

**CORRESPONDING AUTHOR:** Jamie Hunt, M.S., A.B.D., Postdoctoral, University of Kansas, Preventive Medicine and Public Health, 3901 Rainbow Boulevard, Kansas City, KS 66160, United States; Phone: 913-588-2777; Fax: 913-588-2780; Email: jhunt2@kumc.edu

**PA11-3**

**PSYCHIATRIC DISORDERS IN SMOKERS SEEKING TREATMENT: DIFFERENCES IN DEPENDENCE AND OUTCOMES**

Megan E. Piper, Ph.D.\*, Stevens S. Smith, Ph.D., Michael C. Fiore, M.D., M.P.H., and Timothy B. Baker, Ph.D., University of Wisconsin

Individuals with mental illness represent a significant proportion of the smoking population. Using data from a smoking cessation trial, we analyzed how psychiatric comorbidity related to dependence and ability to quit. Participants were 1,504 smokers enrolled in a randomized double-blind placebo-controlled smoking cessation trial comparing five active treatment conditions versus placebo. 1,470 participants were interviewed pre-quit using the WMH-Composite International Diagnostic Interview. 1,080 participants (73.5%) met criteria for a history of at least one Axis I disorder and 305 participants (20.7%) met criteria for a current (in the last 12 months) Axis I diagnosis. Logistic regression analyses revealed that smokers with a current mood disorder ( $n=71$ ; Wald=7.25,  $p=.01$ , OR=.48), a history of an anxiety disorder ( $n=579$ ; Wald=6.35,  $p=.01$ , OR=.76) or a current anxiety disorder ( $n=205$ ; Wald=3.92,  $p=.05$ , OR=.74) were less likely to achieve abstinence by the end of treatment than smokers without these disorders, regardless of treatment condition. Smokers with a current mood disorder had higher scores on multidimensional dependence scales such as smoking to feel better and improve cognitive ability. They also reported more negative affect, less positive affect and were less likely to be married, but did not differ in gender, age, education, race, living with a smoker, or cigs/day from smokers with no history of a mood disorder. Smokers with a history of an anxiety disorder scored higher on the majority of multidimensional dependence subscales and were more likely to be female, live with a smoker and have more smoking friends and were less likely to be married, have a 4-year college degree, or work in a smoke-free environment relative to smokers without a history of an anxiety disorder. These results suggest that individuals with psychiatric comorbidity may also have affective and environmental factors that interfere with their ability to quit smoking.

*These studies were conducted at the University of Wisconsin and supported by NIH Grant # P50-DA0197 and by grant #M01 RR03186 from the General Clinical Research Centers Program of the National Center for Research Resources, NIH. Dr. Piper was supported by an Institutional Clinical and Translational Science Award (UW-Madison; KL2 Grant # 1KL2RR025012-01).*

**CORRESPONDING AUTHOR:** Megan Piper, Ph.D., Assistant Scientist, University of Wisconsin, School of Medicine and Public Health, 1930 Monroe St., Suite 200, Madison, WI 53711, United States; Phone: 608-265-5472; Fax: 608-265-3102; Email: mep@ctri.medicine.wisc.edu

**PA11-4**

**EFFECT OF DEPRESSION ON SMOKING CESSATION OUTCOMES**

Susan C. Sonne, Pharm.D.<sup>\*1</sup>, Edward V. Nunes, M.D.<sup>2</sup>, Huiping Jiang, Ph.D.<sup>2</sup>, and Malcolm S. Reid, Ph.D.<sup>3</sup>; <sup>1</sup>Medical University of South Carolina; <sup>2</sup>Columbia University/New York Psychiatric Institute; <sup>3</sup>New York University School of Medicine

A great deal of literature has been published on the effect of both cigarette smoking and cessation on mood. Less information is available on the effect of mood on smoking cessation outcomes, particularly in a substance abusing population. The NIDA Clinical Trials Network recently completed a randomized, open label trial comparing the use nicotine patches plus group counseling and treatment as usual (TAU) to TAU alone for substance-dependent outpatients interested in quitting smoking. We evaluated the effect of depression on smoking cessation outcomes. A total of 225 individuals were randomized in a 2:1 ratio to either Smoking Cessation (SC;  $n=153$ ) or TAU ( $n=72$ ). Approximately 31.1% of the sample ( $n=70$ ) had baseline Beck Depression Inventory (BDI) scores > 20, and approximately half of the sample ( $n=110$ ) reported a lifetime history of major depression (MDD). Individuals with a history of MDD reported an earlier age of onset for cigarette smoking (13.1 (3.7) vs. 14.3 (4.6) yrs;  $p=0.032$ ), an earlier age of regular smoking (15.2 (3.7) vs. 16.7 yrs;  $p=0.010$ ) as well as a higher baseline Fagerström score (6.6 (1.9) vs. 5.3 (2.0);  $p<0.001$ ). Individuals with baseline BDI scores > 20 smoked 26.3 (14.6) cigarettes/day vs. 21.3 (9.0)  $p=0.002$  as well as started regular smoking at an earlier age (15.0 (3.8) vs. 16.5 (4.9);  $p=0.034$ ). Although there was not a statistically significant effect of lifetime history of major depression on smoking abstinence rates (9.3% MDD, vs. 4.3% no MDD), there was a greater probability for smoking abstinence for those with lower baseline BDI scores ( $p=0.041$ ). These data suggest that for individuals with substance dependence who are interested in quitting smoking, evaluation and treatment of depressive symptoms may play an important role in improving smoking cessation outcomes.

*This is a secondary analysis of a NIDA Clinical Trials Network study. The authors listed contributed significantly to this project. CTN grant numbers for the investigators are U10 DA13046 (Reid), U10 DA13035 (Nunes and Jiang), U10 DA13727 (Sonne).*

**CORRESPONDING AUTHOR:** Susan Sonne, Pharm.D., Associate Professor of Psychiatry, Medical University of South Carolina, Psychiatry, 67 President Street, Clinical Neuroscience Division, Charleston, SC 29425, United States; Phone: 843-792-5221; Email: sonnesc@musc.edu

**PA11-5**

**SMOKING CESSATION INTERVENTION AMONG PEOPLE WITH A PSYCHOTIC DISORDER: 4 YEAR FOLLOW UP**

Robyn L. Richmond<sup>\*1</sup>, Amanda Baker<sup>2</sup>, Terry Lewin<sup>2</sup>, and Frances Kay-Lambkin<sup>2</sup>; <sup>1</sup>School of Public Health and Community Medicine, University of New South Wales, Australia; <sup>2</sup>Centre for Mental Health Studies, University of Newcastle, Australia

**Background:** People with a psychotic disorder have much higher rates of smoking than the general population (90% vs. 20%). Yet few randomised controlled trials have been conducted among this group.

**Aim:** to investigate 4-year outcomes among participants previously enrolled in a randomised controlled trial of an 8-session individually administered smoking cessation intervention for smokers with a psychotic disorder. **Methods:** Of the 247 participants recruited to the NHMRC funded randomised controlled trial in Sydney and Newcastle who had previously completed the 1-year follow-up, 149 completed the 4-year follow up.

**Results:** At 4-year follow up, 79% of the available sample reported maintenance or improvement in their smoking reduction status relative to 1-year. Abstinence at 1-year, rather than smoking reduction, was significantly associated with point prevalence abstinence at 4-years. Lengthy periods of abstinence were also evident among participants reporting 4-year point prevalence abstinence or at least a 50% reduction. No baseline or intervention status variables predicted smoking status at 4 years. There were improvements in symptoms and function between baseline and 4 years.

**Conclusion:** The results indicate that smokers with a psychotic disorder are capable of long-term change in their smoking. Although continuous abstinence is rare, lengthy periods of abstinence are not uncommon, suggesting that longer, more flexible interventions are needed which address the fluctuating course of smoking cessation.

*Rotary, CHATA, NHMRC, Commonwealth Department of Health and Ageing (Australia), GlaxoSmithCline.*

**CORRESPONDING AUTHOR:** Robyn Richmond, M.A., M.H.Ed., Ph.D., Professor, University of New South Wales, School of Public Health and Community Medicine, Kensington, NSW 2052, Australia; Phone: +61 2 9385 2512; Fax: +61 2 9313 6185; Email: R.Richmond@unsw.edu.au

**PA12-1****INTERACTION OF SMOKING HISTORY AND GRM7 (THE METABOTROPIC GLUTAMATE RECEPTOR 7 GENE) PREDICTS RISK OF MAJOR DEPRESSIVE DISORDER**

Michele L. Pergadia<sup>1\*</sup>, Anne L. Glowinski<sup>1</sup>, Arpana Agrawal<sup>1</sup>, Grant W. Montgomery<sup>2</sup>, Anu Loukola<sup>3,4</sup>, Ulla Broms<sup>5,6</sup>, Scott F. Saccone<sup>1</sup>, Tellervo Korhonen<sup>5,6</sup>, Jen C. Wang<sup>1</sup>, Julia D. Grant<sup>1</sup>, Christina N. Lessov-Schlaggar, Alexandre A. Todorov<sup>1</sup>, Naomi R. Wray<sup>2</sup>, Kauko Heikkilä<sup>5</sup>, Dixie J. Statham<sup>2</sup>, Anjali Henders<sup>2</sup>, Megan Campbell<sup>2</sup>, John P. Rice<sup>1,7</sup>, Alison M. Goate<sup>1,7</sup>, Leena Peltonen<sup>3</sup>, Andrew C. Heath<sup>1,7</sup>, Jaakko Kaprio<sup>5,6</sup>, Nicholas G. Martin<sup>2</sup>, and Pamela A.F. Madden<sup>1</sup>; <sup>1</sup>Department of Psychiatry, Washington University School of Medicine, Saint Louis, USA; <sup>2</sup>Queensland Institute of Medical Research, Brisbane, Australia; <sup>3</sup>Department of Molecular Medicine, National Public Health Institute, Helsinki, Finland; <sup>4</sup>Finnish Genome Center, University of Helsinki, Helsinki, Finland; <sup>5</sup>Department of Public Health, University of Helsinki, Helsinki, Finland; <sup>6</sup>Department of Mental Health and Alcohol Research, National Public Health Institute, Helsinki, Finland; <sup>7</sup>Department of Genetics, Washington University School of Medicine, Saint Louis, USA

Although Major Depressive Disorder (MDD) is heritable, few genetic linkage studies have reported convergent findings specifically for MDD. Co-morbid smoking history may provide additional insights into the genetic and environmental contributions to MDD. First, we examined whether DSM-IV MDD may be associated with specific genomic regions, using an affected sib-pair design, from a genome screen with a 10 cM microsatellite map. Second, we conducted genetic association analyses in an independent sample using SNPs within biologically relevant genes localized under significant linkage signals. Genome-wide scans (381 autosomal microsatellite markers) and telephone diagnostic interviews were conducted on 289 Australian (AUS) and 161 Finnish [combined N=450 families] families ascertained from twin registries through index-cases with a lifetime history of cigarette smoking. We used an affected sib-pair design, where at least two adult offspring reported a history of DSM-IV MDD per family (212 sib-pairs), and tested for linkage using MERLIN. We found one multipoint linkage signal with a LOD score > 3.0 on chromosome 3 in the AUS subsample. This LOD score of 3.9 at 24.9 cM met genome-wide significance ( $p = .009$ ). The highest single-point (D3S1304) in this region was associated with a LOD = 3.4, and lies within an interesting candidate gene: the metabotropic glutamate receptor 7 gene (GRM7). We then examined the association between 175 SNPs localized within GRM7 and MDD from an independent genome-wide association study in 866 Australian monozygotic female twins. Eighteen of the SNPs tested within GRM7 were nominally associated with MDD ( $p < .05$ ), and these effects were generally stronger in lifetime smokers [e.g. rs10490861 OR=6.21 (95%CI: 1.6-24.0)] compared to the entire sample [OR=1.7 (95%CI: 0.9- 3.2)]. Discordant-twin analyses suggested a possible gene (GRM7) by environment (smoking) interaction effect on MDD. MDD was found to be genetically linked and associated with a glutamate receptor gene (GRM7). The particular novelty of this report is evidence suggesting that smoking may moderate genetic influences (GRM7) on MDD.

NIH Grants: DA12854 (P.A.F.M.), DA019951 (M.L.P.), AA07728, AA07580, AA119981, AA13320, AA13321 (A.C.H.); Australian National Health and Medical Research Council (N.G.M.); European Union, Contract No. QL2-CT-2002-01254 (J.K. and L.P.); Academy of Finland Center of Excellence for Complex Disease Genetics (J.K. and L.P.); Academy of Finland Post-doctoral Fellowship (A.L.); Doctoral Programs of Public Health, University of Helsinki, Finland (U.B.); Academy of Finland Research Program on Substance Use and Addictions (118555, T.K.)

CORRESPONDING AUTHOR: Michele Pergadia, Ph.D., Research Assistant Professor, Washington University School of Medicine, Psychiatry, 660 S. Euclid Avenue, Campus Box 8134, Saint Louis, MO 63110, United States; Phone: 314-286-2270; Fax: 314-286-2213; Email: pergadim@psychiatry.wustl.edu

**PA12-2****PEER SMOKING AND THE NICOTINIC RECEPTOR GENES: AN EXAMINATION OF GENETIC AND ENVIRONMENTAL RISKS FOR NICOTINE DEPENDENCE**

Eric O. Johnson<sup>1\*</sup>, Li-Shiun Chen<sup>2</sup>, Naomi Breslau<sup>3</sup>, Dorothy Hatsukami<sup>4</sup>, and Laura J. Bierut<sup>2</sup>; <sup>1</sup>RTI International, Research Triangle Park, NC; <sup>2</sup>Washington University School of Medicine, St. Louis, MO; <sup>3</sup>Michigan State University, East Lansing, MI; <sup>4</sup>University of Minnesota, Minneapolis, MN

Peer smoking is a strong correlate of smoking behavior. Recently, a number of twin and family based studies have shown both gene by environment correlations and interactions between peer substance use and genetic liability for cigarette smoking and other substance use phenotypes. However, none of these studies have examined the role of specific genes. In prior studies we identified several independent associations between nicotine dependence (ND) and nicotine receptor genes including: CHRNA5 (rs16969968), CHRNA3 (rs578776), CHRN3 (rs13277254), and CHRN2 (rs12466358). Here we test the hypothesis that these genes modify the risk for nicotine dependence associated with peer smoking.

Methods: Cases of currently nicotine dependence (FTND < 4) and never nicotine dependent controls (lifetime FTND = 0) came from the Collaborative Genetic Study of Nicotine Dependence (n=2,081). Peer smoking was retrospectively assessed for grades 9-12 as the number of best friends who smoked cigarettes (0-8). Logistic regression was used to estimate the main effects of the four SNPs, gender, and peer smoking on nicotine dependence as well as test for gene x environment correlations and interactions.

Results: Level of peer smoking, gender and each of the four SNPs were associated with ND. None of the CHRN SNPs showed a correlation with peer smoking ( $p > 0.13$ ). Statistically significant interactions were found between peer smoking and both rs16969968 and gender ( $p = 0.008$  &  $p=0.005$ , respectively). For every peer that smoked there was a 24% increased risk of ND among those without the rs16969968 risk genotype (A/A;  $p < 0.001$ ) but no significant increased risk of ND associated with peer smoking for those with the rs16969968 risk genotype ( $p = 0.19$ ). Peer smoking appeared to have stronger effects on ND for males than for females (OR = 1.37 vs. 1.21).

Conclusion: There was no evidence of a gene by environment correlation between the CHRN SNPs tested and peer smoking. However, a gene by environment interaction was found for SNP rs16969968 and peer smoking association with ND. Given the presence of the rs16969968 risk allele (A/A) level of exposure to peer smoking did not add to the risk of ND.

This research was supported by NIH grant P01CA089392.

CORRESPONDING AUTHOR: Eric Johnson, Ph.D., Senior Research Scientist, RTI International, Behavioral Health Epidemiology, 3040 Cornwallis Rd, PO Box 12194, Research Triangle Park, NC 27709, United States; Phone: 919-990-8347; Email: ejohnson@rti.org

**PA12-3****A GENOTYPE-BASED V1.0 SCORE CAN PROSPECTIVELY PREDICT SMOKING CESSATION SUCCESS**

J.E. Rose<sup>1\*</sup>, F.M. Behm<sup>1</sup>, Q.R. Liu<sup>2</sup>, T. Drgon<sup>2</sup>, C. Johnson<sup>2</sup>, D. Walther<sup>2</sup>, and G. Uhl<sup>2</sup>; <sup>1</sup>Duke University, Durham, NC; <sup>2</sup>Molecular Neurobiology Branch, NIH-IRP, NIDA, Baltimore, MD

Classical genetic studies document substantial genetic influences on smokers' abilities to quit. We have recently reported genome wide association for success in quitting smoking that support polygenic contributions of variants at a number of loci to cessation success (Uhl et al., Arch Gen Psychiatry, 2008). In the current study, we test the prospective ability of a novel "version 1.0" (v1.0) smoking quit success genetic score to predict successful abstinence in a new trial. We use weighted scores for the alleles nominated in the recent publication that can be identified using Affymetrix 6.0 arrays to provide a "quit success genetic score" for each individual in the first half ( $n = 206$ ) of a new trial of smoking cessation aided by nicotine patch therapy (NRT). NRT was initiated 2 weeks before a target quit date at either 21 or 42 mg/day. Preplanned mid-trial analyses document significant effects of our v1.0 quit success genetic score, determined blindly to clinical outcome, in predicting successful 10-week continuous smoking abstinence. The effects are particularly notable in the more highly dependent (FTND) smokers who received the lowest 21 mg/day nicotine patch dose. None of the individuals in this group who displayed below-average v1.0 scores achieved abstinence. By contrast, 28% of individuals in this group who displayed above-average v1.0 scores were abstinent at 10 weeks. As these results are replicated in additional participants in this and other studies, they may well provide one of the first examples of the predictive abilities of genetic scores composed of weighted results from many SNP genotypes. As these and other datasets allow us to improve the sensitivity and specificity of personal genetic scores, we will have increased power to personalize the intensity and/or types of smoking cessation treatments, so that individual smokers obtain the best possible opportunities to improve their health by achieving successful abstinence.

Philip Morris USA, Inc. NIH IRP (NIDA).

CORRESPONDING AUTHOR: Jed Rose, Ph.D., Director, Center for Nicotine & Smoking Cessation Research, Duke University, Psychiatry & Behavioral Sciences, 2424 Erwin Road, Suite 201, Durham, NC 27705, United States; Phone: 919-668-5055; Fax: 919-668-5088; Email: rose0003@mc.duke.edu

**PA12-4**

**IMAGING BRAIN COGNITIVE EFFECTS OF NICOTINE WITHDRAWAL AND THE IMPACT OF NICOTINE REPLACEMENT**

John D. Beaver, Ph.D.\*<sup>1</sup>, Christopher J. Long, Ph.D.<sup>1</sup>, David M. Cole, M.Sc.<sup>1</sup>, Linda C. Bannon, B.Sc.<sup>2</sup>, Paul M. Matthews, M.D., D.Phil.<sup>1</sup>, Rajesh G. Mishra, M.D., Ph.D.<sup>2</sup>, and Michael J. Durcan, Ph.D.<sup>2</sup>; <sup>1</sup>GlaxoSmithKline Clinical Imaging Centre, Imperial College, London, UK; <sup>2</sup>GlaxoSmithKline Consumer Healthcare, Weybridge, UK

Mild cognitive impairments are an established symptom of nicotine withdrawal, and may be a driver of relapse to smoking. Anticipation of these symptoms may make repeat attempts at cessation more daunting for some smokers. Previous studies have shown that nicotine replacement therapy is effective in reversing abstinence-induced deficits in performance on cognitive tests of sustained attention. Here we used functional magnetic resonance imaging (fMRI), with a Rapid Visual Information Processing (RVIP) task, to evaluate during short-term smoking withdrawal the brain-activity correlates of cognitive enhancement by a 4mg nicotine lozenge. An evaluator and subject blind, randomised, placebo controlled, crossover design was employed in smokers denied access to cigarettes for approximately 8 hours. Performance on the RVIP task was significantly better in the 4mg nicotine condition than placebo ( $p < .05$ ). Relative to placebo, the nicotine lozenge increased task-associated brain activity in the medial thalamus, and in dorsolateral prefrontal and parietal cortical regions (corrected,  $p < 0.05$ , cluster detection). Other areas where nicotine increased task-induced brain activity included dorsal anterior cingulate, caudate, and the cerebellum. Previous research has implicated these brain regions in a number of cognitive processes, including executive control, attention and memory. Our findings show that in abstinent smokers a 4mg nicotine lozenge increases attention-related brain activity in these regions and enhances cognitive task performance. This suggests that nicotine replacement has a direct pharmacological effect to limit a negative cognitive symptom of smoking withdrawal, in addition to the well-described effects of reducing withdrawal-related nicotine craving.

This study was funded by GlaxoSmithKline. The authors are employees of GlaxoSmithKline.

CORRESPONDING AUTHOR: John Beaver, Ph.D., Senior Imaging Scientist, GSK Clinical Imaging Centre, Imperial College, Hammersmith Hospital, Du Cane Road, London, W12 0NN, United Kingdom; Phone: +44 (0) 2080 086 014; Fax: +44 (0) 2080 086 491; Email: john.d.beaver@gsk.com

**PA12-5**

**ASSOCIATIONS OF NICOTINE METABOLISM RATIO, SMOKING BEHAVIORS AND SMOKE EXPOSURE IN A TREATMENT-SEEKING POPULATION**

Andrew A. Strasser, Ph.D.\*<sup>1</sup>, Kathy Z. Tang, B.A.<sup>1</sup>, Neal Benowitz, M.D.<sup>1</sup>, and Caryn Lerman, Ph.D.<sup>2</sup>; <sup>1</sup>University of California - San Francisco; <sup>2</sup>University of Pennsylvania

Nicotine is metabolized to cotinine (COT) and cotinine to 3-hydroxycotinine (3-HC) predominantly by the cytochrome P450 CYP2A6 enzyme. Therefore the 3-HC to COT ratio provides a phenotypic indication of CYP2A6 activity and nicotine metabolism ratio. The rate of nicotine metabolism has previously been associated with daily cigarette consumption and smoking behaviors, such that slow metabolizers smoke fewer cigarettes and take smaller puffs. Smoking topography refers to how a person smokes a cigarette and includes number of puffs, total puff volume and puff velocity. Participants ( $n=112$ ) smoked one of their own preferred brand cigarettes through a smoking topography device as part of a baseline pre-treatment session of a large nicotine replacement therapy study and provided a blood sample from which plasma nicotine, COT and 3-HC were determined. Participants provided a breath carbon monoxide (CO) sample prior to, and after smoking, the difference of which reflected smoke exposure, or CO boost. Results indicate a significant positive association between 3-HC/COT and total puff volume ( $F=5.4$ ,  $p=.02$ ), and between total puff volume and CO boost ( $F=8.4$ ,  $p=.01$ ), but not between 3-HC/COT and CO boost ( $p=.33$ ), while controlling for sex, cigarette type and number of daily cigarettes. Those with relatively lower nicotine metabolism rates took smaller total puff volume compared to those with faster nicotine metabolism rates; and in turn reduced puff volume lead to decreased smoke exposure. Study results are consistent with previous research, which characterized the relationship between nicotine metabolism rate and smoking behaviors, and smoking behaviors and smoke exposure. Results suggest that smoking behavior may mediate the relationship between nicotine metabolism rate and smoke exposure.

This work was supported by Transdisciplinary Tobacco Use Research Center grant from the National Cancer Institute and National Institute on Drug Abuse (P5084718; Lerman) and National Cancer Institute grant (R01-120594; Strasser).

CORRESPONDING AUTHOR: Andrew Strasser, Ph.D., Assistant Professor, University of Pennsylvania, Tobacco Use Research Center, 3535 Market Street, Suite 4100, Philadelphia, PA 19104, United States; Phone: 215-746-5788; Fax: 215-746-7140; Email: strasse3@mail.med.upenn.edu

**PA13-1**

**RESIDENTIAL TOBACCO DEPENDENCE TREATMENT COMPARED TO OUTPATIENT TREATMENT**

J.T. Hays\*, D.R. Schroeder, I.T. Croghan, M.V. Burke, J.O. Ebbert, and R.D. Hurt, Mayo Clinic College of Medicine, Rochester, MN, USA

We determined the comparative effectiveness of residential treatment versus ambulatory treatment for tobacco dependence. Cigarette smokers treated in the Mayo Nicotine Dependence Center Residential Treatment Program (RTP) ( $N=226$ ) and outpatients provided comprehensive tobacco dependence consultations ( $N=4328$ ) between 1/1/2004 and 12/31/2007 were studied. The RTP is an 8-day inpatient program. Baseline data is collected at program admission or at initial consultation and follow-up self-reported abstinence is collected by telephone at 6 months after admission. Patient characteristics are summarized using mean  $\pm$ SD for continuous variables, frequency percentages for categorical variables and compared between treatment groups using the t-test or chi-square test respectively. Abstinence from all tobacco (30-day point prevalence abstinence) at 6 months was the outcome of interest. Logistic regression was used to assess if the likelihood of abstinence was increased with residential treatment. Compared to smokers treated as outpatients, smokers treated in the RTP were older ( $54 \pm 10$  vs.  $49 \pm 13$  years), smoked more ( $31 \pm 14$  vs.  $21 \pm 11$  cpd), had more severe nicotine dependence (FTND  $6.9 \pm 2.0$  vs.  $5.1 \pm 2.3$ ), and were more likely to have been treated for alcoholism (26% vs. 15%) or depression (56% vs. 42%), all  $p < 0.001$ . Residential patients were more likely to be in the preparation or action stage of readiness (96% vs. 83%) and believe that it was extremely important for them to stop smoking (64% vs. 31%), both  $p < 0.001$ . The abstinence rate at 6 months following treatment was significantly higher for residential patients compared to outpatients (52% vs. 27%; unadjusted OR=3.0; 95% C.I. 2.3 to 3.9). Similar findings were observed using a multiple logistic regression analysis, which adjusted for baseline covariates (adjusted OR=3.6; 95% C.I. 2.7 to 5.0). Compared to smokers receiving outpatient treatment, smokers in the RTP had more severe tobacco dependence but had significantly higher tobacco abstinence 6 months post treatment. Residential treatment for tobacco dependence is more effective than ambulatory treatment for selected patients who are highly nicotine dependent.

No Funding.

CORRESPONDING AUTHOR: J. Taylor Hays, M.D., Consultant Internal Medicine, Mayo Clinic, Internal Medicine, 200 1st Street SW, Rochester, MN 55905, United States; Phone: 507-538-6341; Fax: 507-284-4959; Email: hays.taylor@mayo.edu

**PA13-2**

**USING THE ELECTRONIC MEDICAL RECORD TO IMPROVE TOBACCO TREATMENT IN PRIMARY CARE: A CLUSTER RANDOMIZED CONTROLLED TRIAL**

Jeffrey A. Linder, M.D., M.P.H., Nancy A. Rigotti, M.D.\*, Louise I. Schneider, M.D., Jennifer H.K. Kelley, M.A., Phyllis Brawarsky, M.P.H., Jennifer S. Haas, M.D., M.S.P.H., Division of General Medicine and Primary Care, Brigham and Women's Hospital; Tobacco Research and Treatment Center and General Medicine Division, Massachusetts General Hospital; and Harvard Medical School. Boston, Massachusetts, USA

Background: Despite tobacco treatment guidelines, primary care physicians do not reliably document patients' smoking status or assist smokers to quit. Effective low-cost strategies are needed. Electronic medical records (EMR) are becoming more common in medical practice. They offer a cost-effective way to improve quality of care.

Methods: We built a 3-part enhancement to an existing EMR that included: (1) smoking status icons; (2) reminders to identify and treat tobacco use; and (3) a Tobacco "Smart Form" that facilitated medication ordering and referrals to a centralized tobacco counselor or to the state telephone quitline. We tested the intervention in a cluster randomized controlled trial in 26 Massachusetts primary care practices. The primary outcome was the proportion of smokers who made contact with a smoking cessation counselor. Secondary outcomes were rates of smoking status documentation, referral to counseling, and medication prescribing. We adjusted all results for clustering by practice.

Results: During 9 months (19/12/06-30/9/07), 132,630 patients made 315,962 visits to 521 clinicians in 26 practices. Documentation of smoking status in a coded field increased more in intervention practices (from 37% to 54% of patients, +17%) than in controls (35% to 46%, +11%;  $p < 0.001$ ). Among 12,207 documented smokers, more in intervention practices than in control practices made contact with a cessation counselor (3.9% vs. 0.3%,  $p < 0.001$ ). The likelihood of medication prescription did not differ by group (2.0% in both). Among 9589 patients who were documented as smokers at the start of the study, more in the intervention practices than in control practices were recorded as nonsmokers by the end of the study (5.3% vs. 1.9%;  $p < 0.001$ ).

Conclusions: This system-level EMR-based intervention improved primary care physicians' rates of smoking status documentation, smokers' contact with a tobacco counselor, and may have increased cessation rates. EMRs offer an effective, easily implemented, generalizable tool to improve the treatment of tobacco use in primary care.

National Cancer Institute (R21 CA121906); Agency for Healthcare Research and Quality (K08 HS014563) and National Heart Lung and Blood Institute (K24 HL044440).

CORRESPONDING AUTHOR: Nancy Rigotti, M.D., Director, Tobacco Research & Treatment Center, Harvard Medical School, Massachusetts General Hospital, 50 Staniford Street, Room 914, Boston, MA 02114, United States; Phone: 617-724-4709; Fax: 617-724-6774; Email: nrigotti@partners.org

**PA13-3 MASS MAILOUT OF PRIMARY CARE PHYSICIANS  
 ADVICE LETTERS AND NRT VOUCHERS TO  
 SMOKERS**

Christopher R. Bullen, M.D.\*; Donna Watson M.Sc., Hayden McRobbie, Ph.D., Marewa Glover Ph.D., and Varsha Parag M.Sc., The University of Auckland, Auckland, New Zealand

Personalized letters were mailed to 831 patients recorded as current smokers on the electronic databases of five family physician practices in an urban health district of Auckland, New Zealand. The number of Quit Cards redeemed and the number of calls made to the National Quitline from this and an adjacent health district comparable in socio-demographic characteristics, before, during and after the intervention, in late 2007 were collected. To assess the acceptability of this approach we surveyed a subset of mail recipients (n=21) by phone, and sent self-completion questionnaires to participating physicians. We monitored quitting promotional activity and policy over the study period. Quit Card redemptions increased following the intervention and were 9% higher (95% CI 3%–16%, p=0.0047) among people in the intervention area than in the comparison district; 73.8.8% of the Quit Cards issued were redeemed for NRT gum at community pharmacies. A small (5%, 95% CI 1%–12%) increase in Quitline calls from baseline to the end of the intervention period also occurred. We found no other concurrent change in tobacco or NRT policy, price, promotion or practice that could account for the observed effects. The strategy was acceptable to GPs and recipients but the work involved in accurately identifying patients who smoke from practice databases was substantial due to inaccurate or incomplete records. We conclude that posting unsolicited, written quit advice plus information about direct support and access to subsidized NRT to smokers, regardless of their motivation to quit, prompted a quit attempt in almost 10% of recipients and was acceptable. This approach has potential as a mass intervention that could be repeated at regular intervals by primary care physicians. However, to make it cost-effective, the maintenance of accurate smoking status documentation in patient records is essential.

*This study was supported by the New Zealand Ministry of Health.*

CORRESPONDING AUTHOR: Chris Bullen, MD, Acting Director, University of Auckland, Clinical Trials Research Unit, Private Bag 92019, Auckland Mail Centre, Auckland, New Zealand; Phone: +64 9 3737599; Email: c.bullen@auckland.ac.nz

**PA13-4 TELEPHONE CARE COORDINATION FOR SMOKING  
 CESSATION: A RANDOMIZED TRIAL**

Scott Sherman, M.D., M.P.H., Sharon Cummins, Ph.D., John Finney, Ph.D., Preeti Kalra, M.S., Ware Kuschner, M.D., Laura York, M.A., and Shu-Hong Zhu, Ph.D., Veterans Health Administration; New York University; University of California, San Diego

Background: Telephone counseling is effective but seldom used within health care. Patients rarely follow through with referrals to telephone programs. We evaluated the effectiveness of four approaches to telephone care coordination for smoking cessation.

Methods: We included 35 sites in a Veterans Health Administration (VA) group randomized trial of telephone care coordination (TeleQuit). Providers were responsible for initial brief counseling and for referring smokers to TeleQuit through two additional clicks in the electronic medical record. All patients enrolling in TeleQuit received medications and self-help materials. We randomly assigned referral weeks to different approaches to patient contact — either proactive (we called the patient) or reactive (we mailed materials and waited for the patient to call). In addition, we randomly assigned sites to either multi-session counseling from the California Smokers' Helpline (quitline) or self-help materials only. At 6-7 months, we called all referred patients (whether enrolled or not) to assess self-reported smoking status.

Results: Over 18 months, we received 6118 referrals. Proactive contact patients were more likely to enroll in the program (1725/3035 = 57%) than reactive contact patients (987/3083 = 32%) (OR 2.8, 95% CI 2.5-3.1). Self-help patients were more likely to enroll (1073/2257 = 48%) than quitline patients (1639/3861 = 42%) (OR 1.2, 95% CI 1.1-1.4). Of the 2369 patients who had reached 6-month follow-up, 210 had moved and 24 died prior to evaluation. Of the remaining subjects, we were able to evaluate 1495 subjects (70%), of whom 310 were abstinent (21%). Abstinence rates were comparable across groups — proactive self-help, 20%; proactive quitline, 25%; reactive self-help, 15%; reactive quitline, 22%.

Conclusions: Proactive contact dramatically increases participation in cessation services. Long-term abstinence rates were excellent in all four groups, although this preliminary follow-up analysis did not have the power to compare abstinence rates between groups.

VA HSR&D #IMV 04-088.

CORRESPONDING AUTHOR: Scott Sherman, VA New York Harbor Healthcare System, 423 E. 23rd Street, New York, NY 10010, United States; Phone: 212-686-7500 x7386; Email: scott.sherman@med.nyu.edu

**PA13-5 HEALTH PROFESSIONAL ADVICE ON QUITTING IN  
 HOSPITAL PATIENTS — ARE WOMEN TREATED  
 DIFFERENTLY TO MEN?**

Kirsten Doherty, Ph.D.\*<sup>1</sup>, and Leslie Daly, Ph.D.<sup>2</sup>; <sup>1</sup>St. Vincent's University Hospital; <sup>2</sup>University College Dublin

Hospitalisation provides an ideal opportunity to promote smoking cessation, due to an increase in health awareness and hospital smoking restrictions. Some population studies, but not most hospital studies, have found lower rates of quitting in women than in men. The aim of this study was to determine factors related to smoking cessation in smokers admitted to an Irish urban teaching hospital. 1086 smokers admitted to hospital were interviewed during admission and six months later (follow-up rate: 76.7%). Reports of smoking cessation at follow-up were biochemically validated using carbon monoxide testing. The six-month overall validated smoking cessation rate was 11.4%. Fewer than half the smokers recalled receiving advice from doctors. Men were more likely to quit than women and this difference persisted in multivariate analysis (OR 2.0 [95% CI: 1.2 – 3.4]), which included motivation to quit as a confounder. More men than women recalled advice to quit from doctors (43.2% versus 33.5% [p = 0.039]) and nurses (40.7% versus 27.3% [p = 0.003]). This difference was not explained by a lack of interest in women in receiving advice. Recall bias did not appear to explain the difference either, as similar proportions of men and women recalled advice from the hospital smoking cessation service, which was backed up by independent results from the service database. Recalled advice from doctors and nurses during admission was significantly related to quitting at follow-up, and they are the main referrers to the smoking cessation service, which also had a significant association with quitting (OR 2.7 [95% CI: 1.7 – 4.2]). The overall proportion of smokers recalling advice from doctors was lower than that reported in several American studies. Education on smoking cessation should be integrated into hospital and health professional training curricula. This study appears to show that there may be a real difference in the frequency that men and women are advised by doctors and nurses on smoking. Given that women in this study have a reduced rate of quitting, it is of concern that they may be put at further disadvantage by lack of advice from hospital staff.

*This study was carried out in St. Vincent's University Hospital, and was funded by the Irish Cardiovascular Health Strategy.*

CORRESPONDING AUTHOR: Kirsten Doherty, Ph.D., M.P.H., B.Sc., Senior Health Promotion Officer, St. Vincent's University Hospital, Dept. of Preventive Medicine & Health Promotion, Elm Park, Dublin, 4, Ireland; Phone: +353 1 221 4958; Fax: +353 1 283 8123; Email: k.doherty@svuh.ie

**PA14-1 EVALUATION OF FIRST "QUITLINE" IN IRAN DURING  
 2007-08**

Anahita Alvanpour, M.D.<sup>1</sup>, Jinus Jianfar, M.D.<sup>1</sup>, Zahra Hessami, M.D.<sup>1</sup>, Hooman Sharifi, M.D., M.P.H.<sup>1</sup>, and GholamReza Heydari, M.D., M.P.H.<sup>1</sup>; <sup>1</sup>Tobacco Prevention and Control Research Center (TPCRC), Massih Daneshvari Hospital, Tehran

Introduction: There are about 10 million smokers in Iran & 70,000 smoking related deaths annually. Like other countries there are different methods to quit smoking in Iran. Prominent recent development in tobacco control is the worldwide proliferation of telephone-based tobacco cessation programs, commonly referred to as quitlines.

Aims and Objectives: This study has been done for the first time in Iran. Since we didn't have a quitline in our country, we decided to establish it.

Methods: This service included a phone line, a smoking cessation trained counselor & was based on first-come, first-served pattern. In the beginning, we gave several announcements in November 2006. Our program consisted of five sessions with one-week intervals. Our questionnaires were based on WHO & IUATLD questionnaires. Nicotine dependency was evaluated by Fagerström test. According to the self-report of them, they were not smoking since the third session. This claim confirmed by the expiratory carbon-monoxide rate.

Results: 307 subjects made contact. 80% were male. The mean age was 38.54 years. 71% were married. 72.7% were educated & 50% had Fagerström test > 6. The mean time of whole consulting for each one was 24.50 minutes. 81 of 307 subjects were entered in our programs & 69 cases (85.2%) had successful cessation. The abstinence rates on the 6 & 12 months after quit day were respectively 60.7% & 50%.

Conclusions: It seems that this is an appropriate & accessible method, which can be used in smoking cessation.

*No Funding.*

CORRESPONDING AUTHOR: Anahita Alvanpour, Medical Doctor, Researcher and Smoking Cessation Consultant, Shahid Beheshti University of Medical Science, Tobacco Prevention and Control Research Center, Massih Daneshvari Hospital, Darabad, Shahid Bahonar Ave, Tehran, 1955841452, Iran; Phone: 00982120109515; Fax: 00982120109515; Email: anahita\_alvanpur@yahoo.com

**PA14-2**

**RANDOMIZED CONTROLLED TRIAL OF AN INTERACTIVE INTERNET SMOKING CESSATION PROGRAM WITH LONG TERM FOLLOW-UP**

Daniel F. Seidman, Ph.D.<sup>\*1</sup>, Steve Goldband, Ph.D.<sup>2</sup>, Vance Rabiun, Ph.D.<sup>3</sup>, J. Lee Westmaas, Ph.D.<sup>4</sup>, Edward S. Katkin, Ph.D.<sup>5</sup>, K. Joanne Pike, M.A., L.P.C.<sup>3</sup>, Dawn Elise Wiatrek, Ph.D.<sup>6</sup>, and Richard P. Sloan, Ph.D.<sup>7</sup>; <sup>1</sup>Columbia University Behavioral Medicine Program; <sup>2</sup>Stanford Center on Longevity; <sup>3</sup>American Cancer Society; <sup>4</sup>Behavioral Research Center, American Cancer Society; <sup>5</sup>State University of New York at Stony Brook; <sup>6</sup>National Cancer Information Center, American Cancer Society; <sup>7</sup>Columbia University Medical Center

**Context:** Internet smoking cessation programs are widely available but there are no large-scale, controlled studies demonstrating their long-term efficacy.

**Objective:** To determine whether an interactive Internet smoking cessation program is more effective in promoting long-term cessation compared to a control site and to evaluate the role of depressed affect in quitting.

**Design, Setting and Participants:** In a randomized controlled trial sponsored by the American Cancer Society (ACS), we compared an interactive Internet-based smoking cessation program called "SmokeClinic" (N=1106) to a control site (N=1047) on long-term outcomes. Participation in the study was limited to English-speaking daily smokers residing in the United States. The final sample consisted of 661 men and 1,492 women. Participants' ages ranged from 18 to 84, with a mean of 40.6 years (SD = 11.2).

**Interventions:** SmokeClinic employed a clinical theory modeled on an in-person treatment approach presenting a set sequence of interactive steps including assessment, preparation, quitting, and relapse prevention. The control site contained downloadable self-help booklets.

**Main Outcome Measures:** 30-day point prevalence abstinence rates were collected 13 months after randomization. Data were analyzed according to intention-to-treat principles.

**Results:** SmokeClinic participants were significantly more likely to be abstinent at 13-month follow-up than control participants (12.9% vs. 10.1%, OR = 1.58, CI 1.15 – 2.16, p = .005). The depression by site interaction also was significant (p = .03), indicating that among participants not reporting depressed affect at intake, SmokeClinic users were more likely than control participants to be abstinent at follow-up (15.0% vs. 10.1%, OR = 1.58, CI 1.15-2.16, p = .005). There was no difference between the two conditions among participants reporting depressed affect (8.1% vs. 10.2%, ns).

**Conclusions:** Data support the efficacy of an Internet-based intervention for smoking cessation modeled on an in-person treatment approach, especially for participants not experiencing depressed affect.

*This study was funded internally by the American Cancer Society. The development of the SmokeClinic Internet program was supported by the American Legacy Foundation, and the National Institute of Drug Abuse (NIDA).*

**CORRESPONDING AUTHOR:** Daniel Seidman, Ph.D., Assistant Professor, Columbia University Medical Center, Psychiatry/Behavioral Medicine, 1150 St. Nicholas Ave., Suite 1-121, New York, NY 10032, United States; Phone: 212-851-5598; Fax: 212-851-5580; Email: dfs2@columbia.edu

**PA14-3**

**USING INTERACTIVE VOICE RECOGNITION TECHNOLOGY TO ASSESS SMOKING OUTCOMES AND LINK SMOKERS TO COUNSELING AFTER HOSPITAL DISCHARGE**

Susan Regan, Ph.D.<sup>\*</sup>, Michele B. Reyen, M.P.H., Abigail C. Lockhart, Ann E. Richards, and Nancy A. Rigotti, M.D. Tobacco Research and Treatment Center; Massachusetts General Hospital; Harvard Medical School

**Background:** A hospital stay provides an opportunity to promote smoking cessation, but interventions are effective only if counseling continues after hospital discharge (d/c). Interactive voice recognition (IVR) technology may provide an effective way to link inpatients to outpatient counseling and assess smoking outcomes. We tested whether IVR can be substituted for a live phone survey and used to channel live counselor callbacks (CB) to appropriate patients.

**Methods:** Inpatient smokers at MGH are identified, offered brief bedside counseling, and called at 2 and 12 weeks post-d/c by research staff to assess outcomes (live phone survey). From 11/07-7/08, 732 smokers were randomly assigned to be assessed by IVR instead of a live survey at 2 weeks (IVR) or to receive a series of 4 IVR calls (3, 7, 14, and 30 days post-d/c) to assess smoking status and offer live counselor call backs (IVR+CB). Live surveys were attempted on those not reached by IVR at 2 weeks. Both groups were assessed at 12 weeks by live survey. Randomized patients were compared to 689 smokers seen 4/07 to 9/07 (PreIVR) and followed by live survey. We calculated 7-day abstinence rates, rate ratios and 95% CI, counting nonresponders as smokers and adjusting for sex, age, cig/day, and quit intention.

**Results:** The response rate at 2 weeks with IVR (75%) did not differ from the PreIVR period (71%). During the IVR period, 39% of 2-week calls were completed via IVR. The rest required live survey calls. Quit rates were higher during IVR than before IVR; 39% vs. 28% at 2 wk f/u (RR: 1.31, 1.14-1.50); 26% vs. 21% at 12 wk f/u (RR: 1.20, 1.00-1.44). Quit rates did not differ between the IVR and IVR+CB groups. IVR assessment alone yielded higher quit rates than live survey (65% vs. 46%, p<.001). Callbacks were requested by 19% of those in the IVR+CB group; 88% were reached by counselors.

**Conclusion:** Automation with IVR is a feasible method for obtaining smoking outcomes, but requires live follow up of nonrespondents to give unbiased estimates. A substantial proportion of patients requested continued support. IVR may be a convenient way to link smokers to counseling after a hospitalization.

*Partners HealthCare System and NIH/NHLBI #.K24-04440 awarded to Nancy Rigotti.*

**CORRESPONDING AUTHOR:** Susan Regan, Ph.D., Analyst, Massachusetts General Hospital, Tobacco Research and Treatment Center, 50 Staniford Street, Boston, MA 02446, United States; Phone: 617-724-4656; Fax: 617-724-3544; Email: sregan@partners.org

**PA14-4**

**PROMOTING STATEWIDE HELPLINE AND WEB-BASED CESSATION SERVICES: AN ANALYSIS OF SERVICE VOLUMES AND MEDIA EFFORTS**

Andrea Mowery<sup>\*1</sup>, Barbara Schillo, Ph.D.<sup>1</sup>, Marietta Dreher<sup>1</sup>, Ann St. Claire, M.P.H.<sup>1</sup>, Michael Luxenburg, Ph.D.<sup>2</sup>, Matt Christensen<sup>2</sup>, and Andrew Zieffler, Ph.D.<sup>3</sup>; <sup>1</sup>ClearWay Minnesota; <sup>2</sup>Professional Data Analysts, Inc.; <sup>3</sup>University of Minnesota

ClearWay Minnesota offers the QUITPLAN Helpline and quitplan.com to help Minnesotans quit tobacco use. The number of people accessing these services was consistent from 2003 until 2007. Volumes for both services declined in 2007 and have remained lower than pre-2007 levels, despite a focused media campaign (television, radio, print and online ads) using both cessation and secondhand smoke messaging in an attempt to regain pre-2007 volumes. Understanding the relationships between media efforts and service volumes can inform decisions about timing, medium and messaging of campaigns to promote cessation services. Regression analysis was used to identify relationships between service volumes and media methods and campaign messages. Predictors included weekly television rating points (TRPs), online ad impressions, online ad click-through rates, notable earned media and events, and weekly gas prices. A natural log transformation was used on call volumes and web registrations to reduce outliers and normalize the distributions. Multivariate hierarchical linear regression, using both call volume and web registrations simultaneously as dependent variables, was used to identify predictors. Adjusted R-Square ranged from .29 to .56 for call volume and from .43 to .74 for web registrations. Adjusted R-square attributable to the media campaign ranged from .01 to .06 for call volume and from .11 to .17 for web registrations. After accounting for trends over time, stressful events (high gas prices) and earned media, this study found: weekly broadcast TRPs had a larger impact on web registrations than on call volume; web ads and print ads impacted call volume; individual cessation TV ads impacted call volume differently; all cessation ads impact web volume; secondhand smoke TV ads impacted call volume but not web volume. All types of advertising have a greater impact on web volumes than call volumes. Promoting cessation services and the dangers of secondhand smoke are important to call and web volumes. Stress and the economy appear to have the greatest impact on seeking assistance to quit smoking.

*ClearWay Minnesota.*

**CORRESPONDING AUTHOR:** Andrea Mowery, Director of Marketing and Communications, ClearWay Minnesota, Communications, 8011 34th Avenue South, Suite 400, Minneapolis, MN 55425, United States; Phone: 952-767-1404; Email: amowery@clearwaymn.org

**PA14-5** YOUTUBE AS A SOURCE OF INFORMATION ON  
 QUITTING SMOKING: A CONTENT ANALYSIS  
 (Former POS3-66)

Cathy L. Backinger, Ph.D., M.P.H.<sup>1</sup>, Andrea Frydl, B.S.\*<sup>1</sup>, Erik Augustson, Ph.D., M.P.H.<sup>1</sup>, Alison Pilsner, M.P.H.<sup>1</sup>, Todd Phillips, M.S.<sup>2</sup>, and Jessica Nadeau, M.A.<sup>2</sup>; <sup>1</sup>National Cancer Institute; <sup>2</sup>Academy for Educational Development

**Background:** Video-sharing Internet Web sites, such as YouTube provide a forum for public sharing of multimedia material. In January 2008 alone, nearly 79 million users visited YouTube with more than half of site users visiting weekly and 52 percent of 18-34 year-old site users sharing videos.

**Objective:** Smoking imagery is abundant on YouTube, including videos related to quitting smoking; however, little is known about the accuracy or quality smoking cessation information, especially whether they are evidence-based practices (EBPs).

**Methods:** We performed a search of YouTube by relevance and view count using the search terms, "quit smoking", "stop smoking", and "smoking cessation". Analyses was limited to the top 60 videos in each category (n=360). Although most interested in tobacco cessation methods presented and if they were EBPs, we also coded for source of video, video setting, quality of video, and characteristics of the primary person delivering message. Two coders viewed all sample videos in September 2008. Duplicate videos and those not mentioning quitting smoking were excluded.

**Results:** Preliminary analyses found that videos tagged as "smoking cessation" were more likely to be produced by professional health organizations, TV news, or to be Public Service Announcements that addressed cessation EBPs compared with "stop smoking" or "quit smoking". The majority of videos tagged as "stop smoking" or "quit smoking" addressed non-EBPs. For example, of the 41 "stop smoking" videos included from the relevance search, 61 cessation methods were mentioned but only 9 were clearly EBPs. The most frequent non-EBP method was hypnosis (n=7). Other non-EBP methods included 6 using Swedish snus as a cessation aid, 4 using scare tactics, 2 using herbal supplements, 2 "reducing the body's acidity" and others such as "emotional freedom techniques", and biorhythms.

**Conclusions:** With an extremely high level of utilization, YouTube has huge potential as a dissemination channel for young people. However, cessation EBPs are not highly visible, especially with more commonly searched terms such as "quit smoking" or "stop smoking" as opposed to "smoking cessation."

*Study support from the National Cancer Institute.*

CORRESPONDING AUTHOR: Cathy Backinger, Ph.D., M.P.H., Chief, Tobacco Control Research Branch, National Cancer Institute, 6130 Executive Blvd., EPN 4050, Rockville, MD 20852, United States; Phone: 301-496-8584; Email: backingc@mail.nih.gov

**PA15-1** EFFECTS OF CARBON DIOXIDE (CO<sub>2</sub>) CHALLENGE  
 ON ANXIETY RESPONSE IN CIGARETTE SMOKERS

Angela S. Attwood\*, Fayeza Saeed, Jayne E. Bailey, and Marcus R. Munafò, University of Bristol, UK

Cigarette smoking is associated with elevated risk of affective disorder, and there is a growing consensus that this relationship is bidirectional. While smokers often report smoking to alleviate anxiety, they may in fact be smoking to alleviate abstinence-induced stress. It is possible to investigate the effects of abstinence from smoking on anxiety symptoms using a CO<sub>2</sub> challenge, which acts as an unconditioned anxiogenic stimulus. Regular cigarette smokers (n = 16), defined as smoking at least 5 cigarettes per day and smoking within one hour of waking, and screened to ensure good physical and psychiatric health, attended one session and were randomized to either abstain from smoking for 12 hours or to smoke upon arrival. Participants then underwent two 20-minute inhalations, one of which comprised medical air and the other comprised 7.5% CO<sub>2</sub>-enriched air. Measures of anxiety (Spielberger State-Trait Anxiety Inventory; STAI) and affect (Positive and Negative Affect Schedule; PANAS) were recorded after each inhalation. A two-way ANOVA with abstinence and gas as between- and within-subject factors respectively revealed a significant abstinence by gas interaction (F [1,14] = 26.08, p < 0.001) for STAI-state scores. Both groups reported greater anxiety after inhalation of CO<sub>2</sub> compared to air; however, the difference between inhalations was significant for the non-abstinent group (air: M = 34, SD = 7; CO<sub>2</sub>: M = 51, SD = 10; p = 0.001) but not the abstinent group (air: M = 40, SD = 6; CO<sub>2</sub>: M = 46, SD = 12; p > 0.11). There was a main effect of gas for negative PANAS scores (F [1,14] = 11.52, p = 0.004), and a trend towards a main effect for positive PANAS scores (F [1,14] = 3.40, p = 0.086), indicating greater negative affect and lower positive affect after CO<sub>2</sub> compared to air. These data suggest that the belief that smoking alleviates stress is a misconception, and that anxiolytic effects of smoking may actually be relief from nicotine withdrawal. When faced with an acute stressor (CO<sub>2</sub>), non-abstinent smokers reported significantly greater anxiety (compared to air), suggesting nicotine may enhance the subjective anxiety response in a stressful situation.

*National Association for Research on Schizophrenia and Depression.*

CORRESPONDING AUTHOR: Angela Attwood, Ph.D., Psychology, Researcher, University of Bristol, Experimental Psychology, 12a Priory Rd, Bristol, BS8 1TU, United Kingdom; Phone: +44 (0)117 331 7898; Email: Angela.Attwood@bristol.ac.uk

**PA15-2** EFFECTS OF GENDER AND CIGARETTE SMOKING  
 ON REACTIVITY TO PSYCHOLOGICAL AND  
 PHARMACOLOGICAL STRESS PROVOCATION

K.T. Brady<sup>1</sup>, S.E. Back<sup>1</sup>, K. Hartwell<sup>1</sup>, M.E. Saladin<sup>1</sup>, A.L. McRae<sup>1</sup>, and M.J. Kreek<sup>2</sup>; <sup>1</sup>Medical University of South Carolina; <sup>2</sup>Rockefeller University

The influence of gender and nicotine dependence status on reactivity in two human laboratory stress paradigms. Participants were 46 (21 men, 25 women) healthy individuals who completed the Trier Social Stress Task (i.e., performed speech and math calculations in front of an audience) and a pharmacological stress provocation (i.e., administration of corticotrophin releasing hormone (CRH)) after an overnight hospital stay. Approximately half (53%) of the participants were smokers. Cortisol, adrenocorticotrophin hormone (ACTH), physiologic measures (heart rate, blood pressure), and subjective stress were assessed at baseline and at several time points post-task. Men demonstrated higher baseline ACTH and blood pressure as compared to women; however, ACTH and blood pressure responses were more pronounced in women. Women smokers evidenced a more blunted cortisol response as compared to non-smoking women, whereas smoking status did not affect the cortisol response in men. Finally, there was a more robust cardiovascular and subjective response to the Trier as compared to the CRH. Although preliminary, the findings suggest that women may be more sensitive than men to the impact of cigarette smoking on cortisol response. In addition, there is some evidence for a more robust neuroendocrine and physiologic response to acute laboratory stress in women as compared to men.

*Supported by: NIH/NIDA, K24 DA 00435-10; NIAMS/ORWH, P50 DA016511; NIH/NCRR: M01 RR01070.*

CORRESPONDING AUTHOR: Mustafa al'Absi, University of Minnesota Medical School, Duluth, MN 55812, United States; Phone: 218-726-8332; Email: malabsi@umn.edu

**PA15-3** DYSREGULATED STRESS RESPONSE AND  
 SMOKING RELAPSE IN MEN AND WOMEN

Mustafa al'Absi, Larry Wittmers, Dorothy Hatsukami, and Ruth Westra, University of Minnesota Medical School

We have completed a series of studies to examine the extent to which hormonal and mood changes during early smoking abstinence predict relapse in men and women. The design across studies included baseline measurement of diurnal salivary cortisol levels during ad libitum smoking and during the first 24 or 48 hours of abstinence. Measures of cardiovascular and adrenocortical responses to acute psychological stress (public speaking and mental arithmetic) were also collected. Our results have shown that: 1) Smoking abstinence reduced cortisol concentrations and increased negative affect; 2) participants who relapsed during the first week of abstinence exhibited exaggerated mood and cortisol changes during early abstinence; 3) attenuated adrenocorticotrophic hormone (ACTH) and cortisol responses to acute stress during the first day of a quit attempt predicted early relapse. Women showed greater declines in cortisol concentrations during abstinence than men, and changes in cortisol's area under the curve negatively correlated with intensity of physical symptoms, negative affect, and withdrawal symptoms reported by women (p < 0.05), but not by men. The ACTH association with relapse was more consistent in men (p < 0.01) than in women, while negative affect and intensity of withdrawal symptoms were more consistently associated with relapse in women (p < 0.05) than in men. These results were confirmed in a recent study that included 90 smokers (47 men and 43 women) who were interested in cessation. Participants were asked to abstain for 48 hours at the beginning of their quit attempt. During this period they collected saliva and self-report measures. The results showed that attenuated cortisol concentrations during the morning hours predicted number of days until relapse (p < 0.05), although this was significant in men only (p < 0.05). In combination these studies indicate that disruption of stress response systems may play a role in stress-related smoking and relapse. Our results reinforce the importance for developing sex-specific intervention strategies to combat tobacco use and addiction.

*Supported by NIDA grant # DA013435 and NCI grant # CA 88272.*

CORRESPONDING AUTHOR: Mustafa al'Absi, University of Minnesota Medical School, Duluth, MN 55812, United States; Phone: 218-726-8332; Email: malabsi@umn.edu

**PA15-4**

**HPA AXIS RESPONSE TO NALTREXONE AND CIGARETTE SMOKING IN NICOTINE DEPENDENT SUBJECTS**

A.C. King, University of Chicago

Sex differences have been demonstrated in nicotine sensitivity and discrimination, tobacco withdrawal symptoms, and smoking cessation outcomes. There may also be sex differences in psychophysiological responses to opioid antagonists, such as naltrexone, particularly in terms of disinhibition of the hypothalamic-pituitary-adrenal (HPA) axis. This presentation reviews two studies examining psychophysiological responses in men and women smokers: the first study was a laboratory challenge involving acute naltrexone administration and cigarette smoking, and the second study was a randomized, placebo-controlled pilot smoking cessation trial with adjunct treatment with naltrexone in addition to nicotine patch and counseling. In the laboratory study, 22 men and 20 women smokers, averaging 20.4 cigarettes daily, participated in two separate laboratory sessions after 12 hours of overnight smoking abstinence. Subjective measures and blood samples were obtained at various intervals before and after administration of 50 mg oral naltrexone or identical placebo (in random order). Participants also received a smoking cue and smoked a cigarette during the testing session. Results showed greater naltrexone-related subjective response (increases in negative mood/side effects) and greater increases in ACTH and cortisol levels to naltrexone in women versus men ( $p < .05$ ). Further, cigarette smoking tended to potentiate naltrexone-induced increases in both stress hormones ( $p < .06$ ). In the second study, 56 men and 54 women smokers, averaging 21.0 cigarettes daily and desiring to quit smoking, participated in an eight-week intervention. Results showed that naltrexone improved smoking cessation outcomes in women but not men; naltrexone improved women's quit rates and decreased their smoking urges and withdrawal symptoms ( $p < .05$ ). Taken together, the results provide further evidence for sex differences in the interaction between cigarette smoking and the endogenous opioid system, which may play a role in clinical course and outcome.

*This study was supported by K08-AA00276-04, R01-DA016834, P30-CA14599-28, and M01-RR00055.*

CORRESPONDING AUTHOR: Mustafa al'Absi, University of Minnesota Medical School, Duluth, MN 55812, United States; Phone: 218-726-8332; Email: malabsi@umn.edu

**PA15-5**

**ATTENTION BIAS TOWARD SMOKING RELATED AND PLEASANT CUES IN WITHDRAWAL AND UNDER STRESS**

Danielle E. McCarthy, Ph.D.<sup>1</sup>, John J. Curtin, Ph.D.<sup>2</sup>, and Rebecca Gloria, M.S.<sup>2</sup>; <sup>1</sup>Rutgers, The State University of New Jersey; <sup>2</sup>University of Wisconsin-Madison

The present study used the modified Stroop paradigm to extend past research regarding attention biasing toward smoking, unpleasant, pleasant, and neutral words among adult nonsmokers and daily smokers. Color-naming reaction time data were used to test the hypothesis that smokers would show a narrowing of attention toward smoking-related cues when withdrawn from tobacco for 24 hours or under stress, particularly when anticipating a proximal opportunity to smoke. Nicotine withdrawal and anticipated smoking opportunities were manipulated between subjects and threat (electric shock) condition and word type were manipulated within subjects. Results indicated that both nonsmokers ( $N=22$ ) and smokers ( $N=85$ ) showed differential attention toward unpleasant, pleasant, and smoking-related cues, relative to neutral words, and a bias toward pleasant and smoking-related words relative to unpleasant words. Neither smokers nor nonsmokers showed a bias toward smoking-related stimuli when compared with other pleasant stimuli, however. Results also suggested that, among smokers, nicotine deprivation and exogenous stress (threat of electric shock) may have a non-additive effect on attention toward pleasant cues, but this effect did not appear to be specific to smoking cues, as reaction times were similar for smoking and pleasant words. Similarly, instructing smokers that they would have an opportunity to smoke did not significantly increase the bias of nicotine-deprived smokers' attention toward smoking-related cues, relative to arousing unpleasant and pleasant cues. Overall, results suggest that smokers' attention may be biased toward both smoking-related and other salient cues when deprived of nicotine and anticipating an opportunity to smoke. As such, results did not provide strong support for the predicted narrowing of smokers' attention toward smoking-related cues in the environment.

*This study was conducted while the first author was at the University of Wisconsin-Madison. Supported by a grant from the University of Wisconsin Transdisciplinary Tobacco Use Research Center and Marian Schwartz Fellowship at the University of Wisconsin-Madison.*

CORRESPONDING AUTHOR: Danielle McCarthy, Ph.D., Assistant Professor, Rutgers, The State University of New Jersey, Psychology, 152 Frelinghuysen Rd., Piscataway, NJ 08854, United States; Phone: 732-445-2418; Fax: 732-445-2263; Email: demccart@rui.rutgers.edu

**PA16-1**

**INHIBITION OF ANANDAMIDE HYDROLYSIS: A NOVEL STRATEGY TO REDUCE RELAPSE FOR NICOTINE**

Benoit Forget, Kathy Coen, and Bernard Le Foll\*, Translational Addiction Research Laboratory, Centre for Addiction and Mental Health and University of Toronto, Toronto, Canada

The cannabinoid CB1 antagonist rimonabant appears promising to treat nicotine dependence. However, its use is limited by psychiatric side effects. Here we explored the effects of enhancing anandamide (an endocannabinoid) transmission on motivation for nicotine and relapse for nicotine-seeking in rats. URB597, a selective inhibitor of the fatty acid amide hydrolase (FAAH) enzyme (which degrades anandamide) was used, and a comparison with Rimonabant was performed.

Results: We found that Rimonabant (0.3-3 mg/kg) dose-dependently reduced the breaking point for nicotine (0.03 mg/kg/infusion), a measure of motivation ( $F_{4,28} = 10.99, p < 0.0001$ ;  $p < 0.001$  and  $p < 0.0001$  vs. baseline for 1 and 3 mg/kg of rimonabant, respectively) and the effect of 1 mg/kg of rimonabant was stable over 3 consecutive sessions ( $p < 0.01$  vs. baseline at each test-session). In contrast, URB597 did not affect direct motivation for nicotine (NS). After extinction of the nicotine taking behaviour, the reintroduction of the cues previously paired with nicotine infusion or a priming injection of nicotine (0.15 mg/kg, s.c.) reinstated the behaviour of active lever pressing ( $p < 0.01$  and  $p < 0.001$  vs. baseline, respectively). Both rimonabant (1 mg/kg,  $p < 0.01$  vs. reinstatement under vehicle pretreatment for each kind of reinstatements) and URB597 (0.3 and 1 mg/kg,  $p < 0.05$  vs. reinstatement under vehicle pretreatment for each dose and each kind of reinstatements) significantly decreased these reinstatements.

Discussion: Blockade of CB1 receptor by rimonabant and enhancement of anandamide levels by inhibition of FAAH activity produced similar reduction of reinstatements of nicotine-seeking. These results suggest that inhibition of anandamide hydrolysis could be a novel strategy to reduce relapse for nicotine. Since URB597 also possess anxiolytic and antidepressant effects, this compound should be devoid of the side effects of Rimonabant.

*Benoit Forget received a post-doctoral fellowship from CIHR Strategic training program in Tobacco Research and Bernard Le Foll a new investigator Fellowship from CIHR- Strategic training program in Tobacco Use in Special Population.*

CORRESPONDING AUTHOR: Bernard Le Foll, M.D., Ph.D., Head, Centre for Addiction and Mental Health, Translational Addiction Research Laboratory, 33 Russell Street, Toronto, ON M5S 2S1, Canada; Phone: 416-535-8501 x4772; Email: bernard\_lefoll@camh.net

**PA16-2**

**WHAT IS THE "REAL" PRICE OF CIGARETTES?**

Anne M. Hartman<sup>1</sup>, Frank J. Chaloupka<sup>2</sup>, John A. Tauras<sup>2</sup>, Sonja Stringer<sup>1</sup>, and James T. Gibson<sup>1</sup>; <sup>1</sup>National Cancer Institute; <sup>2</sup>University of Illinois at Chicago

Governments considering raising tobacco excise taxes need evidence on how price changes affect tobacco use; such proof depends on valid price data, which do not exist in many low and middle-income countries. We hypothesize that prices reported by tobacco users in surveys are valid measures of price. To test this, we compared state-level measures of cigarette prices derived from the 2003 and 2006/07 TUS-CPS (US probability samples of 240,000 each) with the retailer-reported price data from the Tax Burden on Tobacco (TBOT) used in most US research on cigarette demand. The TBOT data have several limitations, including exclusion of opportunities for tax avoidance; failure to account for price promotions/discounts; and limited inclusion of non-traditional outlets and brands. We hypothesize that the self-reported prices will be less subject to these weaknesses. The TUS-CPS prices were lower than TBOT in 2003 and in 2006/07. Furthermore, the TUS-CPS data showed an increase in prices over time, consistent with state excise tax increases, removal of loopholes in the Master Settlement Agreement that should raise prices, and state efforts to curb Internet/reservation sales and other tax avoidance during this period. In contrast, TBOT prices show almost no change over time. The TUS-CPS data show a decline in tax avoidance over time, from nearly 6% in 2003 to just over 5% in 2006/07, mostly accounted for by declines in forms of avoidance other than cross-border sales. Tax avoidance varies widely across states and is positively correlated with same-state cigarette prices (0.56 in 2003; 0.51 in 2006/07). Differences between TUS-CPS and TBOT prices were higher in states where the limitations of the TBOT were expected to be greatest (i.e., NY and WA). Observed state-level differences and changes over time are consistent with state tax and policy changes and suggest that measures based on self-report data accurately reflect the prices smokers actually face for cigarettes. Thus, self-reported price data like those collected in the Global Adult Tobacco Survey should be valid for use in international research assessing price impact on tobacco use.

*National Cancer Institute.*

CORRESPONDING AUTHOR: Frank Chaloupka, Ph.D., Professor, University of Illinois at Chicago, Economics, 1747 W. Roosevelt, Room 558, Chicago, IL 60608, United States; Phone: 312-413-2287; Email: fjc@uic.edu

**PA16-3 LACK OF REINFORCEMENT ENHANCING EFFECTS OF NICOTINE IN HUMANS**

K.A. Perkins<sup>\*1</sup>, A. Grottenthaler<sup>1</sup>, and A.S. Wilson<sup>2</sup>; <sup>1</sup>Department of Psychiatry, University of Pittsburgh, Pittsburgh, PA; <sup>2</sup>Department of Environmental and Occupational Health, University of Pittsburgh, Pittsburgh, PA

Recent animal research has shown that, aside from its primary reinforcing effects, nicotine may have reinforcement enhancing effects, in that it appears to increase the reinforcing effects of other reinforcers in the environment that are unrelated to nicotine. To our knowledge, no human studies have directly examined this potentially important influence of nicotine. We report two studies examining the influence of nicotine, via nasal spray (study 1) and cigarettes (study 2), on the positive reinforcing effects of money and music, as well as the negative reinforcing effects of aversive auditory stimuli. Participants in both studies were young adults with some past smoking exposure but who never were nicotine dependent (to better match animal study designs and to rule out withdrawal relief as an explanation for nicotine effects). Reinforcement was assessed by responses on a computer task that were immediately reinforced by small amounts of money, the playing of preferred music, or the termination of aversive loud stimuli, on separate 15-min trials in counter-balanced order. A fourth trial, involving no reward, served as a control. In study 1, 17 subjects (10 M, 7 F) responded for the reinforcers on three separate sessions, involving intermittent dosing with 0, 5, or 10 ug/kg nicotine via nasal spray. In study 2, 30 subjects (14 M, 16 F) responded for the reinforcers on three separate sessions, involving intermittent controlled smoking of 0.05 mg or 0.6 mg nicotine cigarettes or no smoking. Results showed no effects of nicotine, whether by nasal spray or cigarette smoking, on responses reinforced by any of the three rewards. There also was no difference between the smoking and no smoking conditions in study 2. These results suggest that any reinforcement enhancing effects of nicotine in humans may be specific to dependent smokers or may be relatively narrow and dependent upon procedural conditions different from those in the current studies.

*Supported by NIDA Grant DA19478.*

CORRESPONDING AUTHOR: Kenneth Perkins, Ph.D., Prof of Psychiatry, University of Pittsburgh, Psychiatry, WPIC, 3811 O'Hara Street, University of Pittsburgh, Pittsburgh, PA 15213, United States; Phone: 412-246-5395; Email: perkinska@upmc.edu

**PA16-5 THE EFFECTS OF PURE NICOTINE, DENICOTINIZED TOBACCO AND NICOTINE-CONTAINING TOBACCO ON CIGARETTE CRAVING, WITHDRAWAL, AND SELF-ADMINISTRATION**

Sean P. Barrett, Ph.D., Christine Darredeau, Ph.D.\*, Kirsten Temporale, B.Sc., Depts. of Psychiatry & Psychology, Dalhousie University, Halifax, Canada

Although nicotine is widely believed to be the primary addictive component in tobacco, nicotine-specific treatments are not effective for most smokers, and the administration of non-nicotine tobacco constituents via denicotinized cigarettes has been shown to reduce symptoms of craving and withdrawal. In order to begin to clarify the relative roles of nicotine and non-nicotine tobacco constituents in smoking reinforcement, the present study directly compared the effects of the acute administration of pure nicotine (via nicotine and placebo inhalers), nicotine-containing tobacco, and denicotinized tobacco, on smokers' subjective responses and motivation to self-administer their own preferred brand of tobacco. 17 smokers (10 male) completed four randomized blinded laboratory sessions following overnight abstinence. After a baseline subjective assessment, participants administered puffs from a nicotine inhaler, placebo inhaler, nicotine-containing cigarettes (Quest 1), or denicotinized cigarettes (Quest 3), over a twenty-minute period. They then completed a second subjective assessment and were given the opportunity to self-administer their preferred brand of cigarettes over the next 90 minutes. Participants rated the nicotine-containing inhaler as being less pleasant, and the nicotine-containing cigarettes as more satisfying, relative to each of the other conditions. Both nicotine-containing and denicotinized cigarettes attenuated symptoms of craving and withdrawal to a significantly greater extent than either of the inhaler conditions. In addition, while both nicotine-containing and denicotinized cigarettes were found to delay the onset of preferred tobacco self-administration relative to the inhaler conditions, only nicotine-containing cigarettes reduced overall levels of self-administration during the session. Findings suggest that while a combination of nicotine and non-nicotine tobacco constituents may be necessary to fully satisfy a smoker's urge to smoke, tobacco in the absence of nicotine may be more effective in acutely reducing symptoms of craving and withdrawal than nicotine in the absence of tobacco.

*This research was supported by a grant from the Canadian Tobacco Control Research Initiative to SPB.*

CORRESPONDING AUTHOR: Sean Barrett, Ph.D., Assistant Professor, Dalhousie University, Psychology, 1355 Oxford Street, Life Science Centre, Halifax, NS B3H4J1, Canada; Phone: 902-494-2956; Fax: 902-494-6585; Email: sean.barrett@dal.ca

**PA16-4 EVALUATION OF SAFETY OF VARENICLINE IN SCHIZOPHRENIA**

A. Eden Evins, M.D., M.P.H.\*, Tsafirir Loebel, M.D., Gladys Pachas, M.D., Johanna Nino, M.D., Annie Shawn, and Max Tedaldi, Massachusetts General Hospital and Harvard Medical School

**Background:** Varenicline is a highly effective pharmacotherapy for nicotine dependence. The prevalence of smoking and smoking-related morbidity and mortality is high in schizophrenia. While there have been case reports of mood disturbance and behavioral dyscontrol with varenicline, there have been no systematic studies of the effect of varenicline on mood and behavior in smokers at high risk for these symptoms.

**Method:** We are conducting a 40-week, double-blind, placebo-controlled trial of the efficacy of extended-duration varenicline for prevention of relapse to smoking in clinically stable adult smokers with schizophrenia. Here we report safety results from the 13-week, open-label varenicline lead-in treatment period in the first 50 participants. Clinical and cognitive assessments at baseline were compared with assessments made after 13 weeks of varenicline treatment using paired t tests.

**Results:** There was no change from baseline in scores on the Brief Psychiatric Rating Scale (BPRS) (baseline 55.9 (19.9), 59.0 (14.9) week 13),  $t=-0.70$ , BPRS Psychosis subscale score (baseline 9.73 (5.8), 11.0 (5.6) week 13),  $t=-0.17$ , Calgary Depression Rating Scale (baseline 4.1 (3.2) 3.6 (2.3) week 13),  $t=0.58$ , Schedule for Assessment of Negative Symptoms (SANS) (baseline: 36.6 (9.3) and 36.3 (14.4) week 13),  $t=0.09$ . There was a trend for reaction time and variability in reaction time to be improved at week 13 compared with baseline for 3- and 4- digit tasks on the Continuous Performance Task, Identical Pairs Version (CPT-IP).

**Conclusion:** In this systematic, open-label study, varenicline was not associated with worsened clinical symptoms of schizophrenia and shows a trend toward improving cognitive dysfunction associated with the disorder.

*NID R01 DA021245-01. Smoking Cessation and Relapse Prevention in Patients with Schizophrenia Pfizer has provided product support in the form of drug and placebo at no cost for the study.*

CORRESPONDING AUTHOR: Eden Evins, M.D., M.P.H., Director, Center for Addiction Medicine, Massachusetts General Hospital, Psychiatry, 60 Staniford Street, Boston, MA 02114, United States; Phone: 617-643-1990; Fax: 617-643-1998; Email: a\_eden\_evins@hms.harvard.edu

**NEW  
 INVESTIGATORS**

**NIPA-1**      **COTININE LEVELS AND MENTHOL CIGARETTE USE  
 (Former PA6-2)      AMONG BLACK AND WHITE SMOKERS IN NHANES  
 2003-2006**

Benjamin J. Apelberg, Ph.D., M.H.S.\*, Lisa M. Hepp, M.P.H., Erika Avila-Tang, Ph.D., M.H.S., Sungroul Kim, Ph.D., and Jonathan M. Samet, M.D., M.S., Institute for Global Tobacco Control, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health

In the U.S., it has been widely reported that non-Hispanic black smokers have higher levels of serum cotinine than non-Hispanic white smokers, even though they smoke less, on average. We examined whether the differences in serum cotinine could be attributed to the use of menthol cigarettes. We obtained data from NHANES 2003-2006 for all smokers ages 20 and older who self-report as non-Hispanic black or white. Individuals who reported smoking cigarettes in the past 5 days were considered current smokers. Those who used other tobacco/nicotine products in the past 5 days and those without cotinine measurements were excluded. Multiple linear regression was used to model log-transformed cotinine, using survey weights and complex survey variance estimates. A total of 1,299 smokers (922 white, 377 black) met the inclusion criteria and provided information on mentholation of their usual brand of cigarettes. Approximately 77% of blacks were menthol users compared with 21% of whites. Black smokers had higher cotinine concentrations than white smokers, after controlling for cigarettes smoked per day. Among blacks, similar cotinine concentrations were observed among menthol (geometric mean: 206 ng/mL, std error: 9 ng/mL) and non-menthol smokers (GM: 201 ng/mL, SE: 23 ng/mL). Among whites, there were also no differences in cotinine concentrations by menthol use (Menthol—GM: 175 ng/mL, SE: 11 ng/mL; Non-menthol—GM: 177 ng/mL, SE: 8 ng/mL). There were no statistical differences in the number of cigarettes smoked between these groups among blacks or whites. Consequently, menthol use was not associated with cotinine levels among black or white smokers after controlling for cigarettes per day. Nor was there evidence for an interaction between cigarettes smoked per day and menthol use on cotinine concentrations. In multivariate models, cigarettes smoked per day and earlier time to first cigarette were predictive of higher cotinine concentrations among black and white smokers. These data suggest that menthol use is not responsible for the differences in cotinine concentrations observed among black and white smokers in the U.S.

*Bloomberg Initiative to Reduce Tobacco Use.*

CORRESPONDING AUTHOR: Benjamin Apelberg, Ph.D., Assistant Scientist, Johns Hopkins Bloomberg School of Public Health, Epidemiology, 627 N. Washington St., 2nd Floor, Baltimore, MD 21205, United States; Phone: 410-614-4962; Email: bapelber@jhsph.edu

**NIPA-2**      **DOPAMINE AND SEROTONIN TRANSPORTER  
 (Former PA12-5)      AVAILABILITY DURING ACUTE ALCOHOL  
 WITHDRAWAL: EFFECTS OF COMORBID  
 TOBACCO SMOKING**

Kelly P. Cosgrove, Ph.D.\*<sup>1,2</sup>, Erica Krantzler<sup>1,2</sup>, Erin B. Frohlich, M.S.<sup>1,2</sup>, Stephanie Stiklus, B.A.<sup>1,2</sup>, Brian Pittman, M.S.<sup>1</sup>, Gilles D. Tamagnan, Ph.D.<sup>1,3</sup>, Ronald M. Baldwin, Ph.D.<sup>1,2</sup>, Frederic Bois, Ph.D.<sup>1,2</sup>, John P. Seibyl, M.D.<sup>1,3</sup>, John H. Krystal, M.D.<sup>1,2</sup>, Stephanie S. O'Malley, Ph.D.<sup>1</sup>, and Julie K. Staley, Ph.D.<sup>1,2</sup>; <sup>1</sup>Yale University School of Medicine; <sup>2</sup>The VA Connecticut Healthcare System; <sup>3</sup>The Institute for Neurodegenerative Disorders

Tobacco smoking is highly comorbid with heavy alcohol drinking, yet the interactions of tobacco smoking and alcohol drinking on brain catecholaminergic synaptic markers is unexplored. Here we evaluate the effects of alcohol drinking alone from comorbid alcohol drinking and tobacco smoking on dopamine (DA) and serotonin (5-HT) transporter availability. Fourteen heavy alcohol drinking smokers (n=6) and nonsmokers (n=8) and 14 age-matched control smokers (n=6) and nonsmokers (n=8) were imaged with [<sup>123</sup>I]beta-CIT SPECT. Alcohol drinking smokers and nonsmokers consumed 134+100 and 197+140 drinks, respectively over the previous month and were imaged during acute withdrawal, e.g., within 5 days of their last drink. Overall, striatal DA transporter availability was significantly higher (16%, P=0.04) in alcohol drinkers compared to controls. 5-HT transporter availability was also significantly higher in alcohol drinkers versus controls in the brainstem (25%, P=0.001) and the diencephalon (8%, P=0.01). However, this elevation was restricted to alcohol drinking nonsmokers, with higher DA transporter availability in the striatum (26%, P=0.003), and higher 5-HT transporter availability in the diencephalon (26%, P=0.02) and brainstem (42%, P<0.001) compared to control nonsmokers. There was no significant difference in DA or 5-HT transporter availability between alcohol drinking smokers and control smokers. There was a significant positive correlation between days since last drink and 5-HT transporter availability in the diencephalon (r=0.60, P=0.023) and brainstem (r=0.54, P=0.047), in the total group of alcohol drinkers and specifically in the alcohol drinking nonsmokers, but not alcohol drinking smokers. Thus, during the first week of abstinence, DA and 5-HT transporter availability is higher in alcohol drinking nonsmokers but not in alcohol drinking smokers. Smoking appears to suppress neuroadaptive changes in DA and 5-HT transporters during acute withdrawal from alcohol.

*Department of Veterans Affairs (via support for the Alcohol Research Center), U.S. Veterans Affairs VISN 1 Mental Illness Research Education and Clinical Center (MIRECC), National Institute of Alcohol and Alcoholism (KO1AA00288; RO1 AA-11321; KO5 AA-14906-01; I-P50 AA-12870-03), and National Institute of Drug Abuse (KO1DA02065; KO2DA21863).*

CORRESPONDING AUTHOR: Kelly Cosgrove, Ph.D., Assistant Professor, Yale University School of Medicine and the VACHS, Psychiatry, 950 Campbell Ave., 116A6, West Haven, CT 06516, United States; Phone: 203-932-5711x3329; Email: kelly.cosgrove@yale.edu

**NIPA-3**      **INTERNET-BASED ABSTINENCE REINFORCEMENT  
 (Former PA14-5)      IN RURAL KENTUCKY SMOKERS**

William Stoops<sup>\*1</sup>, Jesse Dallery<sup>2</sup>, Nancy Schoenberg<sup>1</sup>, Nell Fields<sup>1</sup>, Catherine Martin<sup>1</sup>, Baretta Casey<sup>1</sup>, and Conrad Wong<sup>3</sup>; <sup>1</sup>University of Kentucky; <sup>2</sup>University of Florida; <sup>3</sup>Eli Lilly and Company

The high burden placed on patients and treatment providers to participate in traditional voucher-based reinforcement of smoking cessation may limit its efficacy. Specifically, attending the clinic daily to verify smoking abstinence makes it difficult to comply with treatment demands. The use of remote monitoring and reinforcement of smoking abstinence may enhance the accessibility and acceptability of this intervention, particularly in rural areas where transportation can be unreliable and treatment providers distant. In the present study, rural Kentucky smokers (>9 cigs/day) were enrolled in a randomized trial to evaluate the efficacy of an Internet-based smoking cessation program. During the 6-week intervention period, all subjects were asked to record 2 videos of themselves providing breath carbon monoxide (CO) samples daily. Subjects also typed the numerical value of their CO readings into web-based software that provided feedback and reinforcement based on their smoking status. Videos were uploaded from a secure website to a server at the University of Kentucky where research technicians reviewed and approved or declined approval of the breath sample as evidencing abstinence. Subjects in the Abstinence Contingent (AC) group received monetary incentives contingent on recent smoking abstinence (i.e., CO below 5 PPM). Subjects in the Yoked Control (YC) group received monetary incentives independent of their smoking status. Outcome assessments were conducted at weeks 2, 4, 6 and 12 of the study period. Analyses indicate that nearly 30% of breath samples from the 6-week intervention were negative for those in the AC whereas only 10% of samples were negative for those in the YC. In addition, nearly 25% of individuals in the AC achieved at least 2 weeks of continuous abstinence whereas no individuals in the YC did so. Post-intervention data indicate that this effect on smoking is sustained. These results demonstrate the efficacy, acceptability and feasibility of delivering reinforcement for smoking abstinence over the Internet to rural individuals. Future studies should determine if increasing reinforcer value or reducing the CO cutoff enhances abstinence rates.

*This research was funded by NCI grant R21CA124881.*

CORRESPONDING AUTHOR: William Stoops, Ph.D., Assistant Professor, University of Kentucky College of Medicine, Behavioral Science, 140 College of Medicine Office Building, Lexington, KY 40536, United States; Phone: 859-257-5383; Fax: 859-257-7684; Email: william.stoops@uky.edu

**NIPA-4**

**WHY DO SMOKERS RELAPSE?**

Joseph McClernon, Ph.D., Duke University Medical Center

This year's recipient of the 2009 Jarvik-Russell Award (formerly the SRNT Young Investigator Award) is Dr. Joseph McClernon. Dr. McClernon will deliver a 25-minute lecture on his emerging program of research. Dr. McClernon's award will be presented to him at the Welcome and Awards Ceremony, which will be held on Monday, April 27 from 5:30 p.m. - 7:00 p.m.