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Predictors of Medication Adherence and Smoking Cessation Among Smokers Under Community Corrections Supervision

Karen L. Cropsey, Psy.D.¹, C. Brendan Clark, Ph.D.², Erin N. Stevens, Ph.D.³, Samantha P. Schiavon, M.A.¹, Adrienne C. Lahti, M.D.¹, and Peter S. Hendricks, Ph.D.⁴

¹University of Alabama at Birmingham, Department of Psychiatry and Behavioral Neurobiology, Sparks Center 1016, 1720 2nd Ave. South, Birmingham, Alabama 35294 USA

²Wichita State University, Department of Psychology, Box 34, Wichita, Kansas 67260-0034 USA

³Auburn Psychology Group, LLC. 861-D North Dean Road, Auburn, Alabama 36830

⁴University of Alabama at Birmingham, School of Public Health, Department of Health Behavior, 227L Ryals Public Health Building, 1665 University Blvd., Birmingham, Alabama 35294 USA

Abstract

Introduction—Individuals in the U.S. criminal justice system now represent over 12% of all current U.S. smokers. With smoking banned in most U.S. jails and prisons, the cessation focus for this population has shifted to individuals who are under community correction supervision (e.g., probation, parole). The aim of this study was to examine predictors of successful smoking cessation among criminal justice individuals supervised in the community.

Methods—Five hundred participants under community corrections supervision were randomized to receive either four sessions of smoking cessation counseling or no counseling in conjunction with 12 weeks of bupropion treatment plus brief physician advice to quit. Logistic regression analyses examined associations of smoking variables with medication adherence and successful abstinence. Mediation analysis evaluated the indirect effects of medication adherence on smoking abstinence.

Results—The strongest associate of medication adherence was previous use of bupropion, while the strongest associate of smoking abstinence was medication adherence. Mediation analysis indicated that previous use of bupropion indirectly increased cessation rates through the pathway of increased medication adherence.

Conclusions—These results highlight the importance of medication adherence for smoking cessation among community corrections smokers. Providing exposure to medication may be a promising intervention to increase medication adherence and subsequent cessation rates in this population.

Keywords

smoking cessation; medication adherence; criminal justice

Introduction

Smoking rates have declined significantly from a high of 42.4% in 1965 to 16.4% in 2012, yet cigarette smoking remains the leading cause of death and disability in the United States (U.S; Centers for Disease Control [CDC] and Prevention, 2014). Individuals in the criminal justice system have one of the highest prevalence rates of smoking (70–80%) and this rate has remained unchanged since the 1960s (Cropsey, Jones-Whaley, Jackson & Hale, 2010; Cropsey et al., 2008). The U.S. also has the largest per capita incarceration rate in the world (3% of all U.S. adults are under criminal justice supervision) and with continued high rates of smoking, individuals in the U.S. criminal justice system now represent over 12% of all U.S. smokers (Cropsey et al., 2010; Carson & Sabol, 2012). Individuals under community corrections supervision (e.g., probation or parole) represent the largest segment of the criminal justice population (70%; Glaze & Parks, 2012). They also have similar rates of smoking compared to other correctional populations (i.e., 72%), but few smoking restrictions other than those encountered by the average smoker (Cropsey et al., 2010).

Not surprisingly, smokers in the criminal justice system tend to have high rates of smoking-related illnesses and chronic medical problems even though their average age is in the mid-30s (Cropsey, Binswanger, Clark & Taxman, 2012). These health issues may actually be more of a problem for those under community corrections supervision than those individuals confined in jail or prisons. This is because medical care is mandated in both prisons and jails; however, individuals under community supervision are not provided healthcare and have limited contact with the traditional health care system due to a lack of health insurance and poverty (U.S. Supreme Court: *Estelle v. Gamble*, 1976; Kaiser Family Foundation, 2014). Despite implementation of the Affordable Care Act, the majority of individuals under community corrections supervision will remain uninsured due to the high rates of unemployment, the frequent cycling between the community and incarceration, as well as the need to attend to more pressing concerns after release such as obtaining jobs and housing (Kaiser Family Foundation, 2014; Rich et al., 2014).

Few smoking cessation intervention studies have been conducted with any criminal justice population although the studies that have been conducted have demonstrated promising results. Nicotine replacement therapy combined with 10 sessions of group therapy provided to an incarcerated female population demonstrated biochemically verified point prevalence quit rates of 12% up to the 12-Month Follow-Up compared to 3% or less at any of the time points for the wait-list control group (Cropsey et al., 2008; Cropsey, Eldridge, Weaver, Villalobos & Stitzer, 2006). Similar results were found with male inmates who received nortriptyline (Richmond et al., 2013). However, over half of state prisons, the Federal Bureau of Prisons, and most jails have now banned smoking in their facilities, rendering smoking cessation interventions with incarcerated populations largely unnecessary, while shifting the target to relapse prevention after release or cessation among those under community corrections supervision (Kauffman, Ferketice & Wewers, 2008; Lincoln et al., 2009; Clarke et al., 2013).

Smoking cessation trials conducted within criminal correctional systems have demonstrated low medication adherence and smoking abstinence rates close to 12% at one-year follow-up (Cropsey et al., 2008; Richmond et al., 2013). It has been shown that adherence to smoking cessation pharmacotherapies greatly improves the odds of subsequent smoking abstinence three-fold (Shiffman, Sweeney, Ferguson, Sembower, & Gitchell, 2008 2008). However, adherence to smoking cessation medications can be problematic as 69% of individuals quit pharmacotherapy use prematurely (Balmford et al., 2011), and these issues may be further magnified among criminal correctional smokers, who represent a particularly, disenfranchised and low-income population of smokers (Ferguson et al., 2011a; Shiffman et al., 2008).

With this rationale, our group was the first to test a smoking cessation intervention targeting individuals in community corrections supervision during their supervision appointments and randomized 500 participants to either four sessions of behavioral counseling to quit or no counseling with provision of 12-weeks of bupropion and brief physician advice to quit. Abstinence rates were low (9.3% at end-of-treatment) with no intervention group differences, although African Americans who had high rates of medication adherence had the highest cessation rates of any group (Cropsey et al., 2015). Following these results, the purpose of this secondary data analysis was to identify the most important characteristics associated with medication adherence and smoking abstinence for smokers under community corrections supervision. We examined variables previously found to be associated with successful cessation such as nicotine dependence (Hyland et al., 2004), motivation to quit (Boardman, Catley, Mayo, & Ahluwalie, 2005; Caponnetto and Polosa, 2008), medication adherence (Cropsey et al., 2015; Shiffman et al., 2008), receipt of behavioral counseling (Lancaster and Stead, 2005), and other smoking-related characteristics (e.g., years of smoking, etc.) and examined medication adherence as a mediator of these smoking-related characteristics and smoking abstinence.

Due to the strong association between medication adherence and higher likelihood of smoking abstinence (Shiffman et al., 2008), a mediational model was conceptualized as the optimal framework to determine if medication adherence could account for the association between various smoking-related characteristics and increased smoking abstinence. Previous cessation trials investigating pharmacotherapies (i.e., bupropion; Lerman et al., 2002), NRT combined with tailored cessation counseling (Stecher, Shiffman, & West, 2006) and withdrawal (Piper et al., 2008) as mediators on abstinence yielded small effect sizes; therefore we theorized that medication adherence may be a more accurate mediating variable on smoking cessation.

Method

Participants and Procedures

Participants (N=689) were recruited from a community corrections office and consented to participate in the study between October 2009 and February 2013. Participants completed baseline assessment measures and had blood drawn to determine if they were healthy enough to receive the study medication (bupropion). Within one week, participants returned to receive a physical exam and to determine final study eligibility. Study criteria included

being age 19 or older and currently under community corrections supervision (e.g., parole, drug court, probation, etc.), smoking at least five cigarettes per day, a cotinine level above 200 mg/mL, living in an environment that allows smoking (e.g., not living in a substance abuse rehabilitation center that prohibited smoking), and willing to take bupropion and receive four sessions of behavioral counseling to quit smoking. Participants were excluded from the study if they had a history of mania, a seizure disorder, a history of an eating disorder, current suicidal ideation or a suicide attempt in the past six months, were pregnant or nursing a child, were non-English speaking, had cognitive impairment such that they were unable to provide informed consent, or were medically unstable (e.g., severe renal impairment, elevation of liver enzymes three times upper limit of normal, etc.). All participants who were otherwise medically or psychiatrically stable were included in the study. A total of 500 participants were randomized to either 12 weeks of bupropion and four 20–30 minute sessions of behavioral counseling for smoking cessation ($n = 248$), or 12 weeks of bupropion and brief physician advice to quit smoking ($n = 252$). Bupropion was chosen as the pharmacotherapy agent as many individuals in the criminal justice system have depressive symptoms and this medication would be able to target both smoking cessation and depressive symptoms. Retention in the study was 76% at one year follow-up.

All participants were recruited via flyers posted at the community corrections site, where the study took place. Participants were initially prescreened for inclusion and exclusion criteria and, if eligible, scheduled for a baseline assessment at the community corrections offices. During the baseline assessment, participants provided informed consent, completed study assessments, provided urine for pregnancy screening for women of childbearing potential, had blood drawn to assess for general health, and expired air to measure carbon monoxide (CO). Participants returned within a week and received a physical as well as a review of laboratory findings to determine final eligibility. All participants received a 12-week supply of bupropion, instructions on medication usage, and brief advice to quit provided by a physician. In addition, half of the participants received four weekly sessions of behavioral counseling focused on strategies to quit smoking (Counseling) while the other half received no additional counseling (No Counseling). All participants in the counseling intervention also received a 15-page client workbook based on the ACT Center for Tobacco Treatment, Education & Research (The University of Mississippi Medical Center, Jackson, Mississippi) that focused on behavioral strategies for smoking cessation including psychoeducation about the addiction process, identification of triggers, goal setting, setting a quit date, strategies to cope with cravings, and relapse prevention strategies.

The randomization scheme was blocked on self-reported race (White versus non-White) to ensure equal representation of racial groups in each intervention arm. After the medical visit and randomization, participants returned for weekly visits through Week 4 and then returned at Weeks 8 and 12 (End-of-Treatment). Participants were compensated at each study session for a total of \$270 for all visits over the one year study period. This study was registered with ClinicalTrials.gov (NCT01257490) and received approval by the University of Alabama at Birmingham Institutional Review Board.

Variables

Outcome Variables—Two primary outcomes of interest were examined. First, medication adherence, defined as taking at least 80% of prescribed doses at each time point (Cropsey et al., 2008; Demonceau et al., 2013), was examined across the 12 weeks of treatment. Second, smoking abstinence was examined at each time point and coded as a dichotomous variable, with abstinent coded as 1 and not abstinent coded as 0. Abstinence was defined by CO ₃ parts per million (ppm), at any time point during the 12 weeks of treatment (Cropsey et al., 2006; Cropsey et al., 2014; Perkins, Karelitz, & Jao, 2013).

Predictor variables—A large number of predictor variables were initially investigated for their relationship to the two outcomes. Multiple data sources were available for several of the independent predictors used in the current investigation (e.g., semi-structured clinical interviews, self-reported measures, biological measures) and any positive on any one measure was coded as a positive for that variable. For example, if a participant denied cocaine use in the past 30 days on the Addiction Severity Index (ASI) (Sheehan et al., 1998; McLellan, Luborsky, Woody & O'Brien, 1980), but the urine drug screen showed a positive result for cocaine use during that same visit, the participant was coded as positive for past 30 days use of cocaine.

Demographic characteristics—Participants completed questionnaires that assessed demographic information including age, gender, race, educational attainment (high school education or higher: yes/no), marital status, children (yes/no), and whether they had access to transportation. Additional information regarding legal history was assessed, including the number of person offenses (i.e., robbery, assault, rape, homicide, manslaughter), property offenses (i.e., shoplifting, forgery, burglary), drug offenses (i.e., drug charges, public intoxication, driving under the influence), court offenses (i.e., parole or probation violation, contempt of court), and “other offenses” (i.e., major traffic violations, prostitution, arson, weapon's offenses).

Smoking history—Participants completed questionnaires that assessed smoking history including the number of years smoked, cigarettes smoked per day, use of other tobacco products (yes/no), and whether any cessation aids were used to help with previous quit attempts (i.e., nicotine replacement therapy, behavioral therapy, self-help materials, hypnosis, and bupropion; yes/no). They also provided information on whether they lived with a current smoker (yes/no), the percentage of family and friends who smoke and presence of personal or family medical problems associated with smoking (e.g., lung cancer, heart disease; yes/no). Furthermore, participants received standard and validated smoking questionnaires including the Fagerström Test of Cigarette Dependence (FTCD), the Questionnaire of Smoking Urges-Short Form (QSU-SF) and the Minnesota Nicotine Withdrawal Scale (MNWS) (Fagerstrom, 2012; Tiffany, 1992; Hughes & Hatsukami, 1986). The FTCD is a 6 item measure of nicotine dependence, which has been derived from the Fagerström Tolerance Questionnaire (Fagerström, 2012; Heatheron, Kozlowski, Frecker, & Fagerstrom, 1991). The QSU-SF is a 10-item, shortened version of the QSU to assess cravings associated with quitting smoking (Cox, Tiffany & Christen, 2001). Each item on the QSU-SF is rated on a 7-point Likert scale (Cox et al., 2001). The MNWS a 9-item, self-

reported measure of the physical and psychological symptoms associated with withdrawal (74). Items from the MNWS are rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extreme*).

Treatment characteristics—Treatment group (Counseling versus No Counseling) was included as a predictor variable. Motivation to quit and treatment self-efficacy [assessed via Likert scale 1 (not at all) to 7 (very much)], and the smoking Temptation Short Form, which described common situations in which individuals may be tempted to smoke (e.g., “with my spouse or a close friend who is smoking”) were also assessed (Velicer, DiClemente, Rossi & Prochaska, 1990). The Temptation Short Form has been shown to produce good reliability and internal validity (Velicer et al., 1990). Participant’s experiences and expectations regarding medication were assessed via The Drug Attitude Inventory (DAI-30), and their usage of experiential and behavioral processes for health behaviors were assessed with the Processes of Change Questionnaire, Short Form (POC-SF; Hogan, Awad, & Eastwood, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988). The POC-SF scale has four subscales including Experiential Processes, Reevaluation, Behavioral Processes, and Management. The POC-SF has demonstrated good external validity among smokers (Prochaska and DiClemente, 1983) and good predictions of smoking status at 6 month follow-up (Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985). Additionally, the DAI-30 has demonstrated high internal consistency and validity (Hogan et al., 1983). Finally, self-reported medication adherence during the treatment (i.e., at least 80% of all prescribed doses taken at each study visit which was collapsed into an overall medication adherence variable across the 12 weeks of the study; Cropsey et al., 2008; Demonceau et al., 2013) was used as a predictor (yes/no; Prochaska et al., 1988). Participants who missed their appointments or dropped out of the study were coded as non-adherent.

Clinical characteristics—During the baseline visit, semi-structured diagnostic interviews were conducted using both the Mini International Neuropsychiatric Interview (MINI) and the Addiction Severity Index (ASI) (Sheehan et al., 1998; McLellan et al., 1980). The MINI is a structured interview that can be delivered by a non-clinician with appropriate training to assess DSM-IV psychiatric disorders and provide a diagnosis (Sheehan et al., 1998). Similarly, the ASI is a semi-structured clinical interview used to characterize baseline drug and psychosocial status (McLellan et al., 1980). Because the aforementioned data sources (i.e., MINI and ASI) provided information relevant to several of the independent predictors used, all available data sources were used to determine participant classification on psychiatric and substance abuse outcomes in the interest of identifying all positive cases for a given predictor variable. Data for current, 30-day history, and lifetime history characteristics related to psychiatric status and substance use were used to classify participants on clinical predictor categories. The dichotomous (i.e., yes/no) clinical variable used for analyses included a current diagnosis of a psychiatric disorder, mood disorder, anxiety disorder, and alcohol abuse/dependence. Also used for prediction was illicit substance use (i.e., opiate, cocaine, and marijuana; yes/no) within the past 30 days. Lifetime history variables (yes/no) included a history of severe mental illness (i.e., self-reported history of hospitalization for mental illness, receiving pension for psychiatric reasons, and lifetime diagnosis of a psychotic disorder), mood disorder, and anxiety disorder. Baseline

scores on the Center for Epidemiological Studies Depression Scale (CES-D), a continuous self-report measure of depressive symptoms, were also used (Radloff, 1977). The CES-D has been shown to have good psychometric properties with reliable and valid scores (Radloff, 1977).

Data Analytic Approach

Initial participant characteristics were calculated using descriptive statistics. Univariate logistic regressions were conducted to determine the relationship of each independent variable to each of the two dependent variables (medication adherence and smoking abstinence). Fifty variables were examined including demographics, nicotine dependence, withdrawal, craving, motivation, and smoking history. Correlational analysis revealed no significant relationship between side effects of bupropion and medication adherence and therefore, side effects were excluded from subsequent analyses. Independent variables that were significant on initial testing ($p < 0.05$) were included in a multivariate logistic regression model of all significant independent variables to the each of the dependent variables. Mediation models using Sobel mediation methods were calculated to examine medication adherence as a potential mediator associated with abstinence.

Results

Overall, 44.4% of participants were classified as adherent to their medication. Table 1 presents the baseline demographic and descriptive characteristics of the participants, as well as predictors of medication adherence and smoking abstinence. Medication adherence was associated with being older, non-White, smoking for a longer period of time, prior use of bupropion, fewer friends who are current smokers, more personal medical problems due to smoking, and receiving only brief advice plus medication for cessation (no intensive counseling). Significant variables were simultaneously entered into a logistic regression model of medication adherence and prior use of bupropion remained a significant independent predictor of better medication adherence. Having more friends who smoked and being in the counseling group was associated with a lower odds of medication adherence (see Table 2). In addition, 23.0% of the sample ($n = 115$) had a CO ≥ 3 ppm at least once during follow-up. Smoking abstinence was associated with being non-White, older, smoking fewer cigarettes per day at their heaviest, lower nicotine dependence, greater motivation to quit, greater treatment self-efficacy, less temptation to smoke, fewer days of opioid use in the past 30 days, and greater medication adherence. When all significant variables were simultaneously entered into the model, only lower nicotine dependence and higher odds of medication adherence were significantly associated with smoking abstinence (see Table 2).

Given the significant associations that were evident between a) medication adherence and smoking abstinence, and b) prior use of bupropion and medication adherence, we were interested in testing a mediation model of these relationships to determine if there was a significant indirect effect of prior use of bupropion on smoking abstinence through medication adherence. In the mediation model, we found evidence of a significant indirect effect such that the relationship between previous use of bupropion and smoking abstinence was mediated by medication adherence (Figure 1). No other significant relationships were

found on mediational analyses examining medication adherence as a mediator between race, age, years smoking, friends as current smokers, medical problems due to smoking on smoking abstinence.

Discussion

Adherence to medication was the strongest predictor of smoking cessation. It has been well demonstrated that adherence to smoking cessation pharmacotherapy almost triples the rates of cessation (Shiffman et al., 2008; Fiore & Jaen, 2008; Raupach, Brown, Herec, Brose, & West, 2013). However, adherence to smoking cessation pharmacotherapies is generally poor as most people do not use pharmacotherapy when attempting to quit smoking, and among individuals who use smoking cessation medication, 69% prematurely quit use of medication (Centers for Disease Control [CDC] and Prevention, 2001–2010; Balmford, Borland, Hammond, & Cummings, 2011). These problems are not unique to smoking cessation; more than 75% of individuals prescribed medications for chronic diseases do not use them as prescribed and medication non-adherence costs the healthcare system more than \$300 billion annually in preventable hospitalizations (The National Consumers League, 2011).

While adherence was quite low (44% adherence overall) in this disadvantaged sample of smokers, this is consistent with previous research that has demonstrated particularly low adherence among individuals from disadvantaged communities. Adherence is believed to be low in these groups due to negative perceptions of the healthcare system including less trust in medical providers, lower belief about the efficacy of medication, difficulty accessing services, and lower health literacy (Pieh-Holder, Callahan, & Young, 2012 ; Sewell, Andreae, Luke, & Safford, 2012). In particular, African Americans report less lifetime use of smoking cessation pharmacotherapy, hold less positive attitudes about the use of pharmacotherapy for cessation, report more concerns about the addiction potential, efficacy, potential for interactions with other medications and harms of pharmacotherapy, and are uncertain about the need for pharmacotherapy for cessation relative to White, non-Hispanic smokers (Carpenter, Ford, Cartmell, & Alberg, 2011; Ryan, Garrett-Mayer, Alberg, Cartmell, & Carpenter, 2011). However, in our study, African Americans had higher cessation rates as well as significantly higher adherence compared to their White smokers, which was consistent with a recent finding from smokers at the Veterans Administration (Burgess et al., 2014). Our findings suggest that when participants are given equal access to smoking cessation pharmacotherapy and counseling, these racial differences disappear.

Importantly, when examining factors related to medication adherence, previous use of bupropion was found to be the most significant predictor of increased adherence. Previous interventions developed to boost medication adherence have been primarily educational in nature and while they have established improvements in attitudes toward smoking cessation medication and intentions to use medications, they have not been shown to increase in smoking cessation rates (Juliano & Brandon, 2004; Mooney, Leventhal, & Hatsukami, 2006; Ferguson et al., 2011b). These findings mirror results from adherence interventions with chronic diseases noting that while self-reported medication adherence improved with educational and similar interventions, only 8 out of 57 studies demonstrated improvements in measurable clinical outcomes (e.g., a decrease in blood pressure. etc.) (McDonald, Garg,

& Hayes, 2002; Van Camp, Van Rompaey, & ELseviens, 2013; Viswanathan, Golin, Jones, & Ashok, 2013; Halpern, Lopen, Grimes, Stockton, & Gallo, 2013; Demonceau, Ruppar, Kristanto, Hughes, Fargher, & Kardas, 2013; DeFulio & Silvermen, 2012). Thus, psychoeducation on the advantages of medication use appear to change attitudes and beliefs about the medication, but these changes have not translated into measurable clinical success. However, our mediation analysis indicated that previous exposure to bupropion indirectly increased cessation by increasing adherence to medication. This finding suggests that exposure to medication could be provided as an intervention to increase adherence and enhance clinical outcomes. Examples of exposure to medication have demonstrated that nicotine sampling (providing 1–2 weeks of nicotine replacement therapy to conduct practice quit attempts among smokers uninterested in quitting) increases use of NRT, quit attempts, and cessation (Carpenter, Hughes, Gray, Wahlquist, Saladin, Alberg, 2011). Future work should be conducted to determine if providing a 1–2 week sample of medications such as bupropion or varenicline combined with psychoeducation on the value of adherence could translate into changes in clinical outcomes.

Our study had limitations on the generalizability of our results. First, this study included smokers under criminal justice supervision in the community (e.g., probation, parole, etc.). While these smokers are similar to our prior studies of smokers in the criminal justice system, these smokers have higher prevalence rates of smoking and are over-represented by African Americans and low income smokers compared to smokers in the general community. Thus, while we believe our findings may be representative of community corrections and the broader criminal justice system, they may not adequately represent the more general population of smokers. Further, our measure of medication adherence was based on self-report and may be susceptible to misreporting, although many cessation studies often do not measure or report medication adherence at all, making this study somewhat unique. However, our self-reported adherence rate was consistent with other studies with similar populations, which mitigates concern of misreporting. Strengths of this approach include a large and racially diverse sample, examination of medication adherence among a disadvantaged population of smokers, and strong criteria for biochemical verification of smoking status. Future studies should focus on developing interventions to increase medication adherence among smokers as an important strategy to increase smoking cessation and reduce disparities among disenfranchised populations.

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Figure 1.

Mediational analysis of indirect effect of prior use of bupropion on smoking abstinence through medication adherence.

Note: Sobel test: 2.13 (0.49), $p = .033$. ^ $p < .10$. ** $p < .01$. *** $p < .001$.

Table 1
Descriptive Statistics and Univariate Predictors of Medication Adherence and Smoking Abstinence

Predictor	Medication Adherence					Smoking Cessation		
	M/%	SD	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
Demographic/Legal Predictors								
Gender (female)	33.0%	--	1.23	0.85–1.79	0.27	1.00	0.64–1.56	0.99
Non-White	68.0%	--	1.52	1.03–2.23	0.03	2.07	1.26–3.40	0.004
HS education or greater	62.2%	--	1.21	0.82–1.79	0.35	1.27	0.79–2.05	0.32
Age	37.40	11.30	1.02	1.01–1.04	0.01	1.02	1.00–1.04	0.02
Married/Widowed	84.0%	--	1.24	0.76–2.03	0.40	1.06	0.59–1.90	0.85
Children	70.4%	--	1.20	0.82–1.77	0.35	1.00	0.64–1.58	0.99
Access to transportation	24.4%	--	1.04	0.69–1.56	0.86	1.12	0.70–1.81	0.63
Number of person offenses	0.57	1.84	0.99	0.90–1.10	0.87	1.03	0.92–1.15	0.61
Number of property offenses	1.48	3.19	1.01	0.96–1.07	0.69	1.03	0.97–1.10	0.32
Number of substance offenses	3.15	5.55	1.01	0.97–1.04	0.71	0.99	0.96–1.04	0.82
Number of court offenses	1.50	3.57	0.99	0.93–1.04	0.60	0.99	0.93–1.06	0.80
Number of “other” offenses	2.69	5.11	0.99	0.95–1.03	0.55	0.99	0.94–1.03	0.61
Smoking Predictors								
Number of years smoked	20.13	11.51	1.02	1.00–1.03	0.03	0.99	0.98–1.02	0.91
Most cigarettes smoked	20.71	12.55	1.00	0.98–1.00	0.17	0.98	0.96–0.99	0.02
Use of other tobacco	15.8%	--	0.86	0.53–1.40	0.55	1.40	0.81–2.41	0.23
Prior Use of NRT	24.6%	--	1.29	0.37–4.53	0.69	0.95	0.58–1.55	0.95
Prior Use of Therapy	2.0%	--	1.30	0.42–1.01	0.65	0.00	0.00–0.01	0.99
Prior use of Self-Help	13.2%	--	1.44	0.85–2.42	0.17	1.74	0.99–3.07	0.06
Prior use of hypnosis	0.4%	--	1.29	0.08–20.7	0.86	3.45	0.21–55.6	0.38
Prior use of bupropion	5.2%	--	3.07	1.31–7.20	0.01	1.56	0.66–3.70	0.31
Lives with a smoker	59.4%	--	0.72	0.49–1.06	0.09	0.95	0.60–1.51	0.84
% family who smoke	38.91%	34.08	1.00	0.99–1.00	0.41	0.99	0.99–1.01	0.41
% friends who smoke	66.05%	33.75	0.99	0.99–1.00	0.01	0.99	0.99–1.00	0.06
Personal med problems	1.91	6.38	1.04	1.00–1.06	0.04	1.31	0.72–2.39	0.38
Family med problems	0.64	3.75	1.01	0.97–1.06	0.59	0.69	0.41–1.19	0.18

Predictor	Medication Adherence				Smoking Cessation			
	M/%	SD	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
FTCD total score	5.79	2.17	0.95	0.88–1.04	0.26	0.83	0.75–0.91	0.001
QSU-SF total score	28.80	16.15	0.99	0.98–1.00	0.04	0.99	0.98–1.00	0.08
MNWS total score	11.38	6.93	1.00	0.98–1.03	0.85	0.99	0.97–1.03	0.87
Treatment Predictors								
No counseling group	51.4%	--	1.48	1.04–2.11	0.03	1.51	0.99–2.30	0.06
Motivation to quit ^a	3.93	1.29	1.08	0.94–1.24	0.29	1.40	1.15–1.71	0.001
Abstinence self-efficacy ^a	3.62	1.51	1.06	0.94–1.20	0.32	1.40	1.15–1.71	0.001
Temptation total score	32.41	9.29	0.99	0.97–1.01	0.58	0.96	0.94–0.99	0.003
DAI-30 total score	3.97	6.91	1.01	0.99–1.02	0.60	0.99	0.97–1.02	0.76
POC-Experiential	25.04	8.95	1.01	0.99–1.03	0.31	1.01	0.98–1.03	0.65
POC-Behavioral	22.37	7.98	1.02	0.99–1.04	0.19	1.02	0.99–1.05	0.09
Clinical Predictors								
Current psychiatric disorder	27.6%	--	0.95	0.64–1.14	0.80	0.81	0.50–1.30	0.38
Current mood disorder	14.2%	--	1.22	0.73–2.01	0.49	1.57	0.90–2.73	0.11
Current anxiety disorder	17.6%	--	1.18	0.74–1.87	0.49	1.23	0.73–2.09	0.44
Current alcohol use disorder	26.2%	--	0.95	0.63–1.42	0.79	0.84	0.52–1.37	0.49
Past 30 days opiate use	8.0%	--	0.65	0.33–1.28	0.22	0.21	0.05–0.90	0.04
Past 30 days cocaine use	9.6%	--	1.54	0.85–2.81	0.15	1.01	0.47–2.17	0.98
Past 30 days marijuana use	21.0%	--	0.72	0.46–1.12	0.14	0.62	0.33–1.14	0.12
Lifetime severe mental illness	17.6%	--	0.80	0.50–1.27	0.34	0.84	0.47–1.47	0.53
Lifetime mood disorder	17.0%	--	1.35	0.84–2.16	0.21	1.68	1.00–2.83	0.05
Lifetime anxiety disorder	19.0%	--	1.05	0.67–1.64	0.83	1.13	0.67–1.89	0.65
CES-D (current symptoms)	15.35	10.40	1.01	0.99–1.03	0.27	1.00	0.98–1.03	0.72
Medication Adherent	44.4%	--	--	--	--	2.75	1.72–4.39	0.001

Note. As vary due to missing data for some variables, FTCD = Fagerström Test of Cigarette Dependence (range = 0–10); QSU-SF = Questionnaire of Smoking Urges-Short Form (range = 0–60); MNWS = Minnesota Nicotine Withdrawal Scale (range = 0–32); Temptation = Smoking Temptation/Self-Efficacy (range = 0–36); DAI-30 = Drug Attitude Inventory (range = –30–30); POC = Process of Change Questionnaire, smoking version (subscale range = 10–50); SAQ = Smoking Abstinence Questionnaire (subscale range = 0–6); CES-D = Center for Epidemiologic Studies Depression Scale (range = 0–60); WTAR = Wechsler Test of Adult Reading; BIS-11 = Barratt Impulsiveness Scale (range = 30–120).

^a Assessed using the Readiness Rulers (adapted from Miller & Rollnick, 1991); range = 1–7.

Table 2
Logistic regression Predictors of Medication Adherence and Smoking Abstinence

Predictor	Medication Adherence			Smoking Cessation		
	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
Race (White)	0.58	0.38–0.90	0.02	0.86	0.47–1.59	0.64
Age	1.01	0.98–1.04	0.49	1.01	0.99–1.03	0.48
Number of years smoked	1.01	0.98–1.04	0.60	--	--	--
Most cigarettes smoked	--	--	--	0.99	0.97–1.02	0.69
Prior use of bupropion	4.08	1.50–11.10	0.006	--	--	--
% friends who smoke	0.99	0.99–1.00	0.049	--	--	--
Personal med problems	0.75	0.45–1.25	0.27	--	--	--
FTCD ^a	--	--	--	0.84	0.74–0.96	0.010
Counseling group	0.67	0.45–0.99	0.045	--	--	--
Motivation to quit	--	--	--	1.17	0.90–1.52	0.25
Abstinence self-efficacy	--	--	--	1.24	0.99–1.56	0.06
Temptation total score	--	--	--	0.99	0.96–1.02	0.39
Past 30 day opioid use	--	--	--	2.38	0.53–10.79	0.26
Medication adherence	--	--	--	2.61	1.58–4.32	0.001

Note: CI = confidence interval;

^aFTCD = Fagerström Test of Cigarette Dependence