

## Medication Treatment for Smoking Cessation in Patients with Comorbid Medical or Psychiatric Problems during Substance Use Rehabilitation

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### Abstract

**Introduction:** Patients with substance use disorders smoke a higher rate than the general population, and have more difficulties with smoking cessation. The purpose of this study was to determine whether the use of smoking cessation medications improved the rate of smoking reduction or cessation during substance use rehabilitation treatment.

**Methods:** A retrospective review of 643 medical records was conducted of patients admitted between 2009 and 2011 to a Veterans Administration residential substance use treatment program. All patients with nicotine use disorder patients (82%) were offered smoking cessation medications for nicotine use disorder and were referred to smoking cessation classes. Self-report of smoking reduction or cessation during treatment was charted. Bivariate statistics and binary logistic regression analysis were conducted using either smoking cessation or smoking reduction as the dependent variable and was performed in SPSS.

**Results:** Significantly more patients who used smoking cessation medications reported smoking reduction (72% vs. 11%),  $\chi^2$  (1, N=526)=201.3,  $p<0.000$  and smoking cessation (11% vs. 2%),  $\chi^2$  (1, N=526)=18.3,  $p<0.000$  during treatment. Factors associated with smoking reduction using binary logistic regression analysis with smoking cessation as the dependent variable included: Use of smoking cessation medications (OR=28.6,  $p<0.00$ ), treatment completion (OR=7.6,  $p<0.00$ ), presence of dental problems (OR=2.1,  $p=0.03$ ), and presence of back pain (OR=1.74,  $p=0.04$ ). Smoking cessation was associated with use of smoking cessation medications (OR=5.1,  $p<0.00$ ), older age (OR=1.1,  $p=0.01$ ), treatment completion (OR=6.3,  $p=0.02$ ), and the number of non-felony convictions (OR=1.1,  $p=0.01$ ) using smoking cessation as the dependent variable in binary logistic regression analysis.

**Conclusion:** Free access to smoking cessation medications appears to enhance smoking reduction and cessation during residential substance use treatment. Limitations of the study include the fact that reduction or cessation was based on self-report and that this was a retrospective record review, not a randomized, controlled trial.

**Keywords:** Comorbid; Substance use disorder; Smoking cessation; Veterans; Nicotine use disorder; Nicotine replacement; Bupropion

### Introduction

Individuals with substance use disorders smoke at rates nearly three times the general population [1]. Over 75% of those in early recovery from substance use disorders are heavy smokers [2]. Not only is tobacco use a predictor of tobacco related disease and death [3], but also a risk factor for substance disorder relapse [4,5]. The converse is also true; cessation of nicotine use appears to be protective of substance use relapse [6-8]. These facts emphasize the importance of addressing tobacco use while patients are in treatment for substance use disorders.

There is still some debate about the optimal timing of smoking cessation treatment and substance use disorder treatment, with conflicting hypotheses regarding the advisability of concurrent treatment versus consecutive treatment. Some researchers report that attitudes of treatment staff, lack of knowledge, relatively low priority

compared to other substance use disorder treatment and lack of availability of smoking cessation treatment modalities are barriers to concurrent treatment as well as concern over substance relapse [9,10]. While some of these factors may create difficulties in treatment, concurrent treatment in one study produced the highest nicotine abstinence rate [11]. In that study, tobacco cessation treatment was fully integrated with the substance use disorder treatment program. Additionally, several other studies have suggested treatment of nicotine dependence does not lead to an increase in substance use and may even support recovery [6-9,11,12]. Despite this evidence, some patients expect that smoking cessation will inhibit their recovery from other substances and may thus be less receptive to smoking cessation [13].

Other relative barriers to smoking cessation include individuals with a diagnosis of a serious mental illness, who smoke at a rate at least double the general population [1,14]. Ethnic disparities exist in tobacco use cessation rates, with African-Americans the least likely to report successful cessation of tobacco [15]. Women are less likely than men to maintain nicotine cessation in some studies [16]. Although similarly as motivated to quit as their more socio-economically

advantaged counterparts, homeless patients smoke at higher rates (70%) [17], and are significantly less likely to quit smoking [18]. Veterans have been shown to have higher rates of smoking compared to the general population with rates of nicotine use further increased in those deployed into combat areas [19-21].

This study examined some of these factors to determine the success of using smoking cessation medications to treat veterans while admitted to a residential rehabilitation treatment program.

## Methods

All study procedures were reviewed and approved by the Hampton Veterans Affairs Medical Center Institutional Review Board. As this was a retrospective records review, a waiver of informed consent was obtained. A retrospective review was conducted of 643 medical records from all patients admitted between 2009 and 2011 to a Veterans Administration residential substance use treatment program. At admission all patients were administered a self-report survey documenting amount of and type of nicotine used. Those that met criteria for nicotine dependence (n=527 or 82%) were offered smoking cessation medications during treatment and were administered a counseling session with the psychiatrist of at least 30 minutes duration. The patients that elected to use medication to aid in smoking cessation efforts were offered either nicotine patches (7, 14 or 21 mg/24 hours) nicotine gum (2 or 4 mg) or nicotine lozenges (2 mg) or bupropion alone or in combination. Self-report of smoking reduction or cessation during treatment was tracked. All patients were referred to smoking cessation classes, but attendance was not tracked. Bivariate statistics and binary logistic regression analysis was performed in SPSS, version 18.

## Results

### Demographics

All patients enrolled in the residential treatment program and this study were veterans. The majority were men (91.8%) and African Americans comprised the majority ethnicity (69.9%) compared to Caucasian (28.5%) or other minorities (1.5%). The mean age was 50 (range 21-67 years, standard deviation 8.7). Most patients were divorced (47%) with smaller percentages of single (21%), married (13%), separated (16%) and widowed (3%). Table 1 shows the sample characteristics with respect to legal status, dental problems, back pain, homelessness and military service era.

### Population characteristics

The average length of stay in the residential rehabilitation center was 76 days. Treatment completion was defined as regular discharge after 60 days or longer. Lack of treatment completion was defined as: failure to complete treatment, either due to leaving the program prematurely, discharge against medical advice or discharge by the treatment team for program infractions. The structure of the program is that all patients receive 60 days of psychoeducational and substance use therapy programming. Patients that are identified as homeless on admission and are able and willing to work may remain up to an additional 60 days to secure housing and employment. The majority of patients completed treatment (73.6%). Of substance use disorder diagnoses prevalent in this population (excluding nicotine use disorder), the primary diagnosis was alcohol use disorder (44.9%), followed by cocaine use disorder (42.1%), opiate use disorder (10.9%),

cannabis use disorder (0.9%), methamphetamine use disorder (0.2%) and other substance use disorder (0.2%). Over 80% of patients had more than one substance use disorder diagnosis.

		Number	%
<b>Marital Status</b>	Divorced	299	46.5
	Married	85	13.2
	Separated	104	16.2
	Single	132	20.5
	Widowed	20	3.1
<b>Ethnicity</b>	African-American	365	69.7
	Caucasian	156	28.5
	Hispanic	3	0.6
	Other	2	0.4
<b>Court-ordered</b>	No	512	97.2
	Yes	13	2.3
<b>Dental Problems</b>	No	415	77.9
	Yes	110	21.6
<b>Back Pain</b>	No	307	59.3
	Yes	218	40.3
<b>OEF/OIF Veteran</b>	No	496	94.2
	Yes	29	5.3
<b>Homeless on Admission</b>	No	199	37.9
	Yes	326	61.6

**Table 1:** Characteristics of the study population. A retrospective review was conducted of 643 medical records from all patients admitted between 2009 and 2011 to a Veterans Administration residential substance use treatment program. At admission all veterans were administered a self-report survey documenting amount of and type of nicotine used. Those that met criteria for nicotine dependence (N=527 or 82%) were offered smoking cessation medications consisting of nicotine replacement or bupropion during treatment and were administered a counseling session with the psychiatrist of at least 30 minutes duration.

### Bivariate analysis

More patients who used medications to reduce smoking reported smoking reduction (72% vs. 11%),  $\chi^2$  (1, N=526)=201.3,  $p<0.000$  and smoking cessation (11% vs. 2%),  $\chi^2$  (1, N=526)=18.3,  $p<0.000$  than those who did not use medication. More female veterans reported smoking reduction than men (81% vs. 71%,  $p<0.00$ ). A higher percentage of males who were homeless on admission reported reduction in smoking (69% vs. 60%,  $p=0.05$ ) and homeless females reported the same trend but it did not achieve statistical significance due to small sample size (57% vs. 41%).

There was no significant difference in smoking reduction by ethnicity between African-Americans and Caucasians (38% vs. 34%),

$\chi^2$  (1, N=526)=0.8, p=0.4. There was a statistically significant difference between the percentage of African-American veterans who quit compared to Caucasians, (8% vs. 3%),  $\chi^2$  (1, N=526)=5, p=0.03.

The mean age was higher among both those who reduced smoking (F[52,50]=5.4, p<0.01) and those who ceased smoking (F[55,50]=11, p=0.02) in bivariate analysis. In bivariate statistics, a higher percentage of those who were widowed reported smoking reduction (63% vs. 28-38%) for all other marital status,  $\chi^2=9.1$ , (1, N=526), p=0.05. There was no significant difference by marital status in reported smoking cessation.

Both males and females with dental problems showed a higher rate of smoking reduction than those of the same gender without dental problems (males: 49% vs. 33%),  $\chi^2$  (1, N=526)=8.1, p<0.01; (females: 80% vs. 28%),  $\chi^2$  (1, N=526)=5.3, p=0.02. Although there was no significant difference in the percentage of those with back pain who reduced or ceased smoking, a higher percentage of those with back pain who used smoking cessation medications reduced smoking than those with back pain who did not use smoking cessation medication (44% vs. 24%),  $\chi^2$  (1, N=526)=4.7, p<0.03.

There was no significant difference between the percentage of those who reduced or ceased smoking between patients with hypertension, hepatitis B or C or those with sexually transmitted diseases or who were positive for Human Immunodeficiency Virus (HIV).

Longer duration of residential treatment was associated with both successful smoking reduction (F[91,67]=57, p<0.00) and smoking cessation (F[91,74]=5.3, p=0.02) in bivariate analysis.

### Multivariate analysis

Binary logistic regression analysis was utilized to analyze variables associated with smoking reduction. The dependent binary outcome variable was defined as reported smoking reduction. The final model yielded statistical significantly greater likelihood of smoking reduction associated with the use of medications for smoking reduction, substance use treatment completion, back pain and in those with dental problems, as shown in Table 2. Those who were widowed were more likely to report reduced smoking compared to those with any other marital status, as shown in Table 2. Variables included in the model which were not significantly associated with smoking reduction included: gender, ethnicity, comorbid psychiatric diagnoses, number of felony or non-felony convictions, co-morbid Hepatitis B or C, presence of a sexually transmitted disease or HIV-positive status. This model correctly classified 88% of those who did not decrease smoking and 76% of those who decreased smoking or 84% overall, so it was a judged to be a good model.

	Wald	Signif.	Adjusted Odds Ratio (OR)	(95% CI) for OR Lower-Upper
<b>Smoking cessation medication</b>	150.94	0	28.6	20.8-50.0
<b>Completed treatment</b>	38.51	0	7.6	7.8-10.8
<b>Marital status</b>				
Widowed			Reference	
Divorced	9.09	0	0.1	0.04-0.54
Married	8.57	0.01	0.2	0.03-0.69
Separated	12.55	0	0.1	0.02-0.33
Single	9.81	0	0.1	0.03-0.48
<b>Presence of dental problems</b>	6.13	0.03	2.1	1.2-3.85
<b>Constant</b>	1.51	0.22	2.25	-

**Table 2:** Binary logistic regression analysis of factors associated with smoking reduction. Binary logistic regression analysis was utilized to analyze variables associated with smoking reduction. The dependent binary outcome variable was defined as self-reported smoking reduction. Dependent variables included; use of smoking cessation medications, treatment completion, marital status, presence of dental problems, age, gender, ethnicity, comorbid psychiatric diagnoses, number of felony or non-felony convictions, co-morbid Hepatitis B or C, presence of a sexually transmitted disease or HIV-positive status. The overall model fit well with  $\chi^2=3.83$ , p=0.87 using the Hosmer Lemeshow test, correctly classifying 89% of those who did not decrease smoking and 76% of those who decreased smoking.

Successful smoking cessation was associated with using medication therapy for smoking cessation, older age, treatment completion, and more non-felony convictions as shown in Table 3. This model predicted 3% of those who ceased smoking and 100% of those who did not cease smoking, so it was a poor model with respect to predicting who ceased smoking. Variables that were not significant in the model for smoking cessation included: ethnicity, gender, homelessness on

admission, number of years of education, comorbid Axis II diagnosis, number of felony convictions, number of DUIs, presence of dental problems or back pain, comorbid hypertension, hepatitis B or C, HIV positive status or presence of sexually transmitted diseases as shown in Table 3.

	Wald	Signif.	Adjusted Odds Ratio (OR)	(95% CI) for OR Lower-Upper
Smoking cessation medication	12.68	0	5.15	2.09-12.70
Completed treatment	5.88	0.02	6.32	1.31-26.32
Age	7.92	0.01	1.08	1.02-1.15
# Non-felony convictions	8.01	0.01	1.12	1.03-1.22
African-American Ethnicity	3.45	0.06	0.35	0.12-1.06
Constant	21.87	0	0	-

**Table 3:** Binary logistic regression analysis of factors associated with smoking cessation. Binary logistic regression analysis was utilized to analyze variables associated with smoking cessation. The dependent binary outcome variable was defined as self-reported smoking cessation. Dependent variables included; use of smoking cessation medications, treatment completion, marital status, presence of dental problems, age, gender, ethnicity, comorbid psychiatric diagnoses, number of felony or non-felony convictions, co-morbid Hepatitis B or C, presence of a sexually transmitted disease or HIV-positive status. The overall model fit acceptably, with  $\chi^2=4.9$ ,  $p=0.76$  using the Hosmer and Lemeshow test, correctly classifying 100% of those who did not cease smoking and 3% of those who ceased smoking.

## Discussion

This study demonstrated that the use of freely available smoking cessation medication therapy was significantly associated with smoking reduction and cessation. This supports research showing that nicotine replacement therapy is an effective treatment in those with substance use disorders [2,9]. Additionally it supports prior research that suggests treatment of nicotine dependence can occur concurrently and successfully with substance use disorder rehabilitation [6-9,11,12,22]. Prior studies have found that setting a quit date while using smoking cessation medication increases the likelihood of smoking cessation [23,24]. Our study does not examine the effect of setting a quit date while using smoking cessation medications, although veterans were encouraged to set a quit date during smoking cessation counseling.

One factor significantly associated with both reduction and cessation of nicotine use in this study was treatment completion. In addition, longer duration of residential treatment was associated with smoking reduction. A prior study showed that freely available nicotine replacement and longitudinal smoking cessation counseling improved both short and long-term nicotine abstinence [25]. In the current study, individuals with a longer length of stay and those who completed residential substance abuse treatment had both more counseling available and more freely available nicotine replacement. It is impossible to conclude if nicotine use predicted substance relapse as seen in other studies [4,5] or if cessation of nicotine use is protective from relapse as seen in other studies [6-8] as veterans who did not complete treatment were not contacted to establish their pattern of tobacco use after discharge. It thus remains to be determined whether individuals who completed treatment were more motivated to complete treatment as well as to reduce smoking or whether substance use programming and longer access to smoking cessation medications and/or classes enhanced ability to reduce or cease smoking.

### Age

This study replicates prior studies that older age is a significant variable in smoking cessation [26] but older age was not associated with smoking reduction in this study. One reason may be that the

mean age in this study was 50 with a fairly small range and standard deviation so that age differences were less pronounced than when comparing very young to very old. Another reason may be that the study sample was primarily African-American (70%) and the smoking cessation rate is lower in older African-Americans than in Caucasian-Americans [26].

### Marital status

Although they represented a small proportion of patients in this study (3%), those who were widowed were significantly more likely to report smoking reduction in the current study than any other marital status. In a large previous study in one country [27], widowed women were less likely to consume alcohol and smoke than those with other marital status. However, in a meta-analysis of trials across multiple countries, marital status was not consistently related to quit attempts or quit success [28].

### Ethnicity

Previous research showing non-Caucasians were less likely to report cessation of tobacco use but a higher number of quit attempts [29,30]. In an earlier study, African Americans were found to have received less counseling on tobacco cessation [31] but more recent studies have suggested the disparity may be due to different patterns of smoking behavior and lower utilization of evidence based cessation treatments due to access or distrust [32,33]. Our study found that ethnicity was neither associated with smoking reduction nor cessation. However, unlike many studies of substance use treatment programs, African Americans comprised the ethnic majority (70%) in this treatment program. Thus, the African American smokers in our study population may have experienced more peer support for smoking cessation as well as equal access to effective therapies and/or equal access to a trusted healthcare professional that counseled on the health benefits of smoking cessation and thus have had equal smoking reduction or cessation. Another recent study with veterans also found that African American veterans had a higher cessation rate at both 6 months and one year than did Caucasian veterans [34]. Those authors hypothesized that greater access to treatment may have accounted for the difference between prior studies and their results.

Recent studies have implicated variants of several genes related to the serotonin transporter and receptor, which appear to play a significant role in nicotine dependence through a genetic epistatic effect [35]. There are also differences in genetic interactions between African American and European American families, so this may have confounded differences by ethnicity in smoking reduction or cessation in our study population. However, assessing potential genetic or epigenetic differences in our study was not possible due to the retrospective nature of our study.

## Gender

Women face different challenges than men with respect to smoking cessation according to some studies, which report that female gender is associated with smoking relapse [36,37]. In some studies, more abstinence symptoms were described in women than men [38]. A meta-analysis showed nicotine replacement therapy was less successful at early follow-up (3-6 months) and women showed no benefit of nicotine replacement therapy at 12 months [16]. This meta-analysis suggests that although women are less successful long term in smoking cessation with nicotine replacement therapy, comprehensive psychological interventions that address many variables that influence smoking in women are more important for women than men for long term success.

Recent studies of smoking cessation in patients with psychosis did not show major differences by gender on a number of baseline variables nor for smoking cessation outcomes at any of several time points although, as in earlier studies, more women than men cited smoking to prevent weight gain [39].

Although a higher proportion of women than men reduced smoking in our study, gender difference disappeared when homelessness and use of smoking cessation medications were included in the final model for both smoking reduction and cessation. In this treatment program, all patients enrolled in smoking cessation received at least 30 minutes of individual cessation counseling from a psychiatrist and were referred to smoking cessation classes. The inclusion of an education intervention may explain the lack of gender difference in smoking reduction in this study, as all patients in this study were provided education as well as medication and prior studies suggest that education is more important for successful smoking cessation in women than men [16,39].

## Comorbid psychiatric disorders

Patients with mental illness smoke at a higher rate and smoke more cigarettes than the general population [40]. Rates as high as 50-85% have been cited for patients with schizophrenia and serious mood disorders and patients with serious mental illness have lower cessation rates [41]. This finding was not replicated in this study, as the presence of an Axis I disorder was not negatively associated with nicotine reduction or cessation. One possible explanation of this finding is that the severity of the Axis I disorders was not assessed in this study so many of the patients with an Axis I diagnosis in this study had anxiety disorders or major depression, very few had psychotic disorders (data not shown). Another reason for similar reduction and cessation rates between those with and without Axis I diagnoses may be due to concurrent treatment by a psychiatrist. Perhaps concurrent treatment of their mental illness improved patients' ability to reduce nicotine consumption. A previous study has shown that patients receiving

treatment for mental illness have higher quit rates than those who have mental illness but are not in psychiatric treatment [42].

Presence of an Axis II disorder was not significantly associated with either smoking reduction or cessation in this study. In previous studies, nicotine dependence was significantly associated with diagnoses of narcissistic or borderline personality disorders [43].

One explanation for the lack of difference between those with Axis II diagnoses and those without such diagnoses may be that this facility had implemented a substance use treatment program component with specific interventions to ameliorate dysfunctional behaviors associated with personality disorders [44]. It is possible that this concurrent treatment of Axis II disorders enhanced nicotine cessation efforts in some patients with personality disorders. Another explanation for the lack of significant difference is that clinical diagnoses, rather than structured clinical interviews, were used to define personality disorders so diagnoses may have been missed in some individuals.

## Homelessness

Homeless patients smoke at higher rates and are significantly less likely to quit smoking [17]. A focus group of homeless smokers in a Midwestern U.S. city identified unique barriers to cessation. One factor they identified is that tobacco use is pervasive and socially acceptable in homeless settings. High levels of boredom and stress have been reported to contribute to cigarette smoking, and smoking is often used with other substances to achieve a substitute 'high' [45]. This focus group identified that the ability to obtain cigarettes is considered a contribution to the underground economy and can be used as a means of enhancing social networks. This behavior has also been observed in the residential treatment program utilized in this study [first author, unpublished observations]. On the other hand, knowing others who have quit smoking has been associated with a higher rate of smoking cessation, so social support for quitting may be important in this population [46].

Homelessness was not associated with a lower rate of smoking reduction in the final logistic regression model which differs from prior studies, nor was it associated with a lower rate of cessation. A large randomized, controlled study on smoking cessation examined long-term treatment outcomes in those with low socioeconomic status demonstrated that those who receive both medication and counseling freely for smoking cessation were more likely to quit [47]. This is consistent with our findings that homeless veterans were more likely to reduce smoking in our study.

## Chronic pain

Another interesting finding is that patients with back pain who used smoking cessation medications were more likely to reduce smoking than those with back pain who did not use smoking cessation medications. The presence of back pain was also significantly associated with smoking reduction in the final logistic regression model. Smokers with chronic pain have previously been shown to have lower rates of cessation [48]. This is not surprising as smoking a cigarette can blunt pain perception, and when deprived of nicotine, chronic pain smokers perceive pain stimuli earlier and have reduced tolerance for pain [49]. One hypothesis for our finding is that patients with back pain in this study had more access to a psychiatrist and primary care physician who worked in conjunction to reduce chronic pain. Therefore, many of these patients were prescribed effective medications to reduce back pain such as gabapentin, pregabalin,

tramadol, venlafaxine, and amitriptyline. It may be that as their pain was better controlled than in some previous studies, they were able to reduce smoking. This is consistent with a recent study which showed that patients with chronic pain who received treatment for their chronic pain in a pain clinic rated themselves as more motivated to quit smoking [50]. Another study showed that smokers with chronic pain were more likely to use smoking cessation medications [51]. In the current study a higher proportion of those with back pain used smoking cessation medications although it did not achieve statistical significance. Since all patients had the same access to smoking cessation medications in this study, it may reflect higher motivation to quit smoking in those with chronic pain.

### Dental problems

Presence of dental problems was significantly associated with smoking in the overall model for smoking reduction but not cessation. This is consistent with previous studies that have shown that people educated about dental problems associated with smoking are more likely to reduce smoking [52]. In addition, smokers have a higher incidence of oral pain, which lessened when they ceased smoking [53].

### Legal history

In this study, veterans with more non-felony convictions were more likely to report smoking cessation but neither the number of non-felony nor felony convictions was significant in the final model for smoking reduction. No prior study was discovered in which there were differences in smoking reduction or cessation rates by type of conviction. Individuals with antisocial personality disorder are more likely to smoke [54] and one study reported that individuals with antisocial personality disorder have more difficulty with nicotine withdrawal symptoms [55]. However, our treatment program utilized motivational enhancement components, which may explain why our patients with more convictions were more likely to reduce smoking, as previous studies have shown that smoking bans do not result in enhanced smoking cessation, but that motivational enhancement increases smoking cessation in criminals [56,57].

### Major medical problems

A number of studies show patients with medical problems may be more amenable to smoking cessation. In early studies, the development of coronary artery disease has been shown to be predictive of smoking cessation [58] and patients who have received treatment for cardiovascular diseases including hypertension were more likely to cease smoking [59,60]. We therefore examined whether patients with specific medical problems were more likely to reduce or quit smoking. Hypertension was neither associated with smoking reduction nor cessation in this study. The presence of other medical conditions that were neither associated with neither smoking reduction nor cessation included; co-morbid Hepatitis B or C, presence of sexually transmitted disease or HIV positive status.

### Veteran status

Despite higher rates of smoking than in the general population, over 70% of veterans state they wish to quit smoking [19]. Findings suggest that veterans use smoking as a means to modulate depressed mood, anxiety and boredom after returning home from active duty, where these behaviors were learned and the perceived benefits reinforced [61-63]. In veterans, substance use disorders [64], military

service [19], and homelessness are risk factors for nicotine dependence [63] as well as PTSD and other mental health diagnoses, with rates as high as 37% of all OEF/OIF veterans in VA facilities [64,65].

### Limitations

Limitations of the study include the fact that smoking reduction or cessation was based on self-report and thus may represent an overestimate of actual reduction or cessation. Future research may include verification of smoking cessation using exhaled carbon monoxide and/or urine cotinine levels. Another limitation of this study is that all the patients were veterans, so some conclusions may not apply to non-veteran populations. Finally, this study employed self-reported reduction or cessation over a short-term (60-120 days) and was retrospective. Future randomized, controlled trials will be useful to delineate the role of medications compared to education or motivational enhancement for smoking cessation.

### Conclusion

Free access to smoking cessation medications appeared to enhance smoking reduction and cessation during residential substance use treatment. This is encouraging considering multiple dimensions of illness with which patients with comorbid substance use disorders present. The results are consistent with prior studies that smoking reduction and/or cessation may be an achievable goal during substance use rehabilitation.

### Declaration of Interests

None of the authors have either financial or ethical conflict of interest. The opinions and conclusions herein are strictly those of the authors and do not represent those of the Department of Veterans Affairs nor the United States Government.

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