



Impact of implementing a tobacco and recreational nicotine-free policy and enhanced treatments on programmatic and patient-level outcomes within a residential substance use disorder treatment program

Octaviana Hemmy Asamsama^{a,*}, Shannon C. Miller^{b,c,*}, Mark M. Silvestri^{d,*},
Christina Bonanno^{e,*}, Kostendena Krondilou^{a,*}

^a Veterans Affairs Medical Center, Cincinnati, OH, United States of America

^b Veterans Affairs Medical Center, Dayton/Middletown, OH, United States of America

^c Center for Interventions, Treatment, and Addictions Research, Departments of Psychiatry & Population and Public Health Sciences, Boonshoft School of Medicine, Wright State University, Dayton, OH, United States of America

^d University of Virginia, Charlottesville, VA, United States of America

^e Veterans Affairs Medical Center, Indianapolis/Ft. Wayne, IN, United States of America

ARTICLE INFO

Keywords:

Tobacco free
Residential substance use
Veterans

ABSTRACT

Background: Recent estimates are that 30% of military veterans use tobacco or recreational nicotine products, and rates significantly increase for veterans with co-occurring substance use disorder (SUD). Despite emerging literature that indicate better outcomes when SUD and tobacco use disorder (TUD) are treated simultaneously (in parallel), most SUD programs fail to address tobacco use. This can prove catastrophic, as perhaps the most likely cause of death lifetime for patients admitted to a SUD treatment program is tobacco/nicotine-related. Studies suggest that residential SUD treatment programs can improve the screening, diagnosis, documentation, and treatment of TUD. Perceived barriers among staff include fear of causing patients to leave early. There are few studies evaluating the accuracy of these perceived barriers to programmatic and patient-level outcomes in the residential SUD treatment setting when TUD services are provided along with a nicotine/tobacco-free therapeutic milieu.

Objective: In the fall of 2015, a SUD treatment program at a large midwestern Veteran.

Affairs Medical Center fully implemented a tobacco-free residential unit. The current study investigates the programmatic and patient-level outcomes among cohorts treated before versus after the tobacco-free policy was implemented.

Participants & Procedures: This study utilized archival data and all participants were enrolled in the residential program with 117 veterans enrolled pre and 92 post tobacco-free policy. The final sample consisted of 194 males (92.8%), 14 females (6.7%), and 1 transgendered (0.5%) with a mean age of 47.80 (SD = 12.65). Most of the participants were Caucasian (69.4%) and divorced (43.1%). The majority (167, 79.9%) reported current tobacco use, with cigarettes (118, 56.5%) being the most frequently reported type. In addition, 17.59 (SD = 6.51) years old is the average start age of tobacco use.

Results: Veterans in the pre-policy cohort did not differ from post-policy cohort on age, gender, ethnicity, and marital status. Preliminary results related to programmatic outcomes indicate improved rates of TUD diagnosis during intake (28.4% to 75.0%). Similar rates were observed in veterans who reported tobacco quit goal during treatment planning (37.4% to 56.8%). However, while there were no significant differences in the total rates of infractions; tobacco-related infractions significantly increased from one to eight. Finally, there were no significant differences in the number of against medical advice discharges or irregular discharges. Examination of patient-level outcomes revealed similar rates of veterans enrolling in the program as it relates to rates of current tobacco use, admission expired breath carbon monoxide (CO) measured in parts per million (ppm), longest period of tobacco abstinence, and self-reported primary preferred substance/drug. Of note, there were also no differences in reported importance and confidence of quitting tobacco. Rates of veterans prescribed nicotine replacement therapy during residential stay more than doubled.

Conclusions: Our data suggest that implementing a tobacco-free policy within a residential SUD treatment program would not deter veterans from staying engaged in the program as evident by similar rates of irregular

* Corresponding authors.

E-mail address: Octaviana.HemmyAsamsama@va.gov (O. Hemmy Asamsama).

and AMA discharges. In addition, the prevalence of Veterans wishing to quit tobacco was higher in the post-policy cohort, as was NRT utilization, and without the addition of staff. Specific treatment recommendations will be discussed along with other implications.

1. Introduction

Residential substance use disorder (SUD) treatment is among the costliest utilized levels of care for SUDs, and tobacco is perhaps the top cause of SUD-related mortality; yet while maintaining a drug-free environment of care is standard practice for residential SUD care, a tobacco and nicotine-free environment of care (including breaks) is not standard practice in residential SUD treatment within the Veterans Health Administration (VHA) (Hamlett-Berry, 2019). According to the World Health Organization (WHO, 2010), tobacco use claims five million lives annually. Tobacco control efforts have decreased overall adult use from 42% in 1965 (Giovino et al., 1994) to 14% in 2017 (Wang et al., 2018). Those with SUDs often use tobacco or nicotine products concomitantly. Prevalence estimates of smoking among persons receiving treatment for SUDs range from 61 to 88% (Guydish, Tajima et al., 2012; Guydish, Zeidonis et al., 2012). Typically, patients with SUDs tend to be heavy smokers (smoking greater than or equal to 1–1.25 packs of cigarettes per day) and, importantly, more often die from smoking-related causes than alcohol or other drug causes (Hser, Mccarthy, & Anglin, 1994; Hurt et al., 1996). Therefore, SUD treatment providers should aggressively address tobacco/nicotine use as a cornerstone issue for population health.

The approach to tobacco/nicotine use disorder (TUD) itself has historically been different than the approach to other SUDs. With 1–2 exceptions nationally (Hays et al., 2011; Hodgkin et al., 2013; Williams, Steinberg, Kenefake, & Burke, 2016), TUD is the only SUD for which a residential level of care is rarely offered despite the evidence that more tobacco counseling time results in better outcomes (Tobacco Use and Dependence Guideline Panel, 2008). Although the rate of relapse in TUD is among the highest of all SUDs, there are almost no stepped-care models for how to intervene with a higher level of care after lower levels of care fail (Williams et al., 2016). Thus, patients are often given the implicit message to simply re-try the same approach and level of care (outpatient) that failed previously.

Compared to outpatient TUD treatment, residential American Society of Addiction Medicine (ASAM) level of care specifically for TUD is associated with a higher odds ratio for tobacco/nicotine abstinence 6 months post-discharge, even though the residential group had a higher severity of TUD than the outpatient group (Hays et al., 2011). Despite the success rate for a residential TUD unit, its cost (\$5000 per episode of care of 8-days residential, typically out-of-pocket due to no insurance reimbursement) and availability (this program can only treat a few hundred patients annually over a 3-year period) currently do not offer enthusiasm. Hence, retrofitting pre-existing substance use disorder residential treatment programs to add-in TUD-specific services in parallel to general SUD treatment may be more cost-effective, accessible, and feasible.

Evidence supporting the benefits of stopping tobacco use continues to grow, especially among those patients with SUDs, like improving non-nicotine SUD relapse outcomes as well as positive expectancies for non-nicotine substances (Baca & Yahne, 2009; Cooney et al., 2015; Friend & Pagano, 2005; Frosch, Shoptaw, Nahom, & Jarvik, 2000; Ingram et al., 2017; Kohn, Tsoh, & Weisner, 2003; Lemon, Friedmann, & Stein, 2003; Prochaska, Delucchi, & Hall, 2004; Shoptaw, Jarvik, Ling, & Rawson, 1996; Weinberger et al., 2017). This may be a result of shared biological mechanisms and conditioned cues. For example, it has been known that increases in tobacco craving have been linked to subsequent craving for non-nicotine primary preferred substance/drug among people who use both tobacco and non-nicotine drugs such as cocaine, heroin, or marijuana (Taylor, Harris, Singleton, Moolchan, &

Heishman, 2000). Tsoh, Chi, Mertens, and Weisner (2010) concluded that self-reported stopping of tobacco or nicotine use during the first year after admission to a SUD treatment program was associated with improved alcohol and drug outcomes. Further, a 2017 analysis of data from the National Epidemiologic Survey on Alcohol and Related Conditions supported these findings. Smoking at Wave 2 (3 years later) among Wave 1 smokers was associated with significantly greater odds of non-nicotine substance use (OR = 1.56; 95% CI = 1.10–2.20) and non-nicotine SUD relapse (OR = 2.02; 95% CI = 1.65–2.47) (Weinberger et al., 2017). Reducing or stopping tobacco use alone may improve multiple medical and quality of life outcomes.

In addition, studies found that individuals with SUD are interested in co-occurring TUD treatment. For example, Williams et al. (2005) found that up to 62% of patients in residential SUD programs are also interested in nicotine-related treatment. Despite the suggested benefit of tobacco/nicotine use disorder treatment and interest in such treatment, many SUD treatment programs do not offer TUD-related services as part of SUD services (Williams et al., 2016). Perceived barriers to implementation of TUD-related services as part of a SUD treatment program include lack of staff training, lack of reimbursement for tobacco services, costs of nicotine replacement products and medications, and the prevalence of smoking among staff (Hurt, Croghan, Offord, Eberman, & Morse, 1995). Gifford, Tavakoli, Wisdom, and Hamlett-Berry (2015) suggest that the accessibility of patients in residential SUD programs is a potential benefit to the initiation of TUD-related treatment services, and that TUD treatment is appropriate and effective for patients in recovery from another SUDs.

Very few studies have been published on the implementation of TUD in-parallel with SUD residential services. In a small pilot trial of TUD services (10 tobacco treatment sessions over 6 months) combined with group physical fitness activities for women in a residential SUD service, only 7 of the 23 women enrolled for the intervention completed it (Fallin-Bennett et al., 2018), indicating a high drop-out rate when offered as an optional service. A pilot study of a TUD treatment group intervention was completed in 2 residential SUD programs serving women. The intervention demonstrated feasibility, reduction in cigarettes per day, decreased score on the Heaviness of Smoking Index, and predicted later use of TUD services post-discharge (Guydish et al., 2016). A study assessing census and tobacco-related outcomes one-year before versus after enacting a campus-wide tobacco-free policy in a for-profit residential SUD treatment center, policy implementation resulted in an increase in the number of tobacco users being admitted, no increase in early discharge of tobacco users, reduced smoking, and an increase in the number of patients reporting the intention to remain abstinent from smoking after discharge (Richey, Garver-Apgar, Martin, Morris, & Morris, 2017).

Currently the VHA has 65 substance use disorder residential rehabilitation treatment programs (SARRTP). Although a drug-free policy is the standard approach in most SARRTPs, a tobacco/nicotine-free approach is not (Williams et al., 2016; Hamlett-Berry, 2019). Using VHA's national care database, Gifford, Tavakoli, Wang, Hagedorn, and Hamlett-Berry (2013) estimated that 79% of patients treated in SARRTPs used tobacco/nicotine products; however, barely over a third received any type of tobacco pharmacotherapy while admitted. In addition, the authors surmised that only 11% of veterans who reported tobacco use had a DSM-IV-TR tobacco dependence diagnosis and received treatment for their tobacco use. This suggests that TUD screening, diagnosis, documentation, and treatment could be improved within SARRTP's. Based on interviews with SARRTP staff, Gifford et al. (2015) noted that staff did not feel like they had adequate resources to

successfully implement a tobacco/nicotine free policy, and that this policy could cause patients to leave treatment prematurely if they were not motivated to stop using tobacco/nicotine products.

Despite SARRTPs providing a unique opportunity to intervene with tobacco/nicotine use, a leading cause of morbidity and mortality in substance use disorder treatment programs (Ziedonis, Guydish, Williams, Steinberg, & Foulds, 2006), little is known regarding tobacco-free SARRTPs. It is unclear if the concerns raised by Gifford et al. (2015) and Hurt et al. (1995) regarding staff training, premature discharges, and lack of patient motivation are valid, and if so the impact these may have on treatment outcomes in a SARRTP. Conrad, Bolte, Gaines, Avery, and Bodie (2018) described the process of implementing a tobacco-free policy in a SARRTP. During implementation, a task force met with staff to elicit and address their training concerns (e.g., providing clear procedures for tracking and addressing violations), potentially resolving a major barrier noted by Gifford et al., 2015 & Hurt et al., 1995. Effective January 2015, to our knowledge the Cincinnati Veterans Affairs Medical Center (CVAMC) SARRTP was the first VHA SARRTP nationally to transition to a completely tobacco/nicotine-free environment, including breaks, and to embed tobacco-related services in parallel with SUD treatment. According to VA Tobacco and Health Policy and Programs leadership, no other such program was known to exist in VA at that time, and few if any exist as of January 2019 (personal communication, Hamlet-Berry, 2019). The rationale and background supporting implementation of a tobacco-nicotine-free approach with embedded TUD treatment is outlined in a descriptive manner elsewhere (Conrad et al., 2018).

The current study is an exploratory study regarding the impact of a tobacco and recreational nicotine-free intervention (implemented in parallel with an existing SUD SARRTP) on (1) relevant programmatic level outcomes and (2) relevant patient level outcomes. The central hypothesis of this study was that the SARRTP tobacco-nicotine intervention would not be associated with a worsening of program level RRTTP outcomes (such as against medical advice discharges, etc.), while also being associated with an improvement in patient-specific outcomes.

2. Methods

2.1. Population and data sources

A retrospective cohort study was performed using chart reviews on veterans who previously admitted to CVAMC's SARRTP pre- and post-tobacco/nicotine free policy. Data were collected as part of routine clinical care. The local Instructional Review Board and the CVAMC Research and Development office approved a waiver of written consent and approved the use of data for archival analysis. All participants were evaluated by licensed mental health providers or supervised trainees and met diagnostic criteria for a non-nicotine/tobacco substance use disorder. Veterans were eligible for SARRTP treatment if they were psychiatrically (no active suicidal or homicidal ideation) and medically stable (able to perform activities of daily living).

During chart reviews, data collected included select demographic variables (age, gender, ethnicity, and marital status). Programmatic level data collected from the chart reviews included any infractions during SARRTP admission (defined as utilized illicit substances while in the unit, having contraband like tobacco, inappropriate/disrespectful behavior towards staff and other residents), tobacco-specific infractions during SARRTP stay (e.g., "utilized tobacco during hospital activities"), rates of enrollment into SARRTP, type of discharge (e.g., regular, against medical advice, irregular), and prescriptions for nicotine replacement therapy. Patient level data collected included current tobacco use (coded as a dichotomous variable, with current use being defined as self-report tobacco use in the past three months), type of tobacco product used (e.g., traditional cigarettes, dip, snuff, cigars, electronic cigarettes), tobacco use disorder diagnosis given at

admission, self-reported tobacco quit goals (coded as a dichotomous variable), self-report importance and confidence in quitting tobacco, breath carbon monoxide (CO) level measured in parts per million (ppm) at admission, self-reported longest period of tobacco abstinence at admission, and self-reported primary preferred substance/drug. Regarding the CO level taken at admission in the pre-policy group, as was previously outlined in Conrad et al. (2018), nicotine replacement therapy, and a 30-minute group counseling tobacco program (Clean Break) were available to all patients who elected to address their tobacco, and thus a baseline CO measurement was collected as a biomarker and for feedback to the patient. Clean Break was created in 2001; however, attendance was voluntary prior to the policy change. After everyone was required to attend even those without a history of tobacco use because tobacco cessation skills training can also be applied to substance use disorder goals.

Other structural changes outlined in Conrad et al. (2018) were the elimination of daily smoke breaks, increasing access to tobacco specialists, immediately addressing nicotine cravings with nicotine replacement therapy (NRT) and other medications, and treating nicotine related violations like any other treatment interfering behavior. The policy implementation resulted in a cultural change for the veterans, staff, and hospital. For example, elimination of smoke breaks necessitated management of tobacco withdrawals and cravings with NRTs and other medications. Therefore, medical staff needed to ensure veterans were diagnosed with TUD to support prescription of medications.

This study utilized archival data and all participants were enrolled in the residential program with 117 (56.0%) veterans enrolled pre-policy and 92 (44.0%) post-policy. The final sample consisted of mostly males ($n = 194$, 92.8%) with a mean age of 47.80 ($SD = 12.65$). Most of the participants were Caucasians (69.4%) and divorced (43.1%). The majority ($n = 167$, 79.9%) reported current tobacco use with traditional cigarettes ($n = 118$, 56.5%) being the most frequently reported type of tobacco product.

2.2. Data analysis

Statistical analysis was performed using SPSS Version 20 (IBM SPSS, 2011). Descriptive statistics are reported for all measures. Baseline differences were analyzed using *t*-tests and chi-square tests. Pairwise deletion was utilized to address missing data.

3. Results

At baseline, there were no significant differences in age, gender, ethnicity, and marital status between the pre- and post-policy groups, please see Table 1. Please see Table 2 for baseline clinical characteristics of veterans pre- and post-policy. There were also no significant differences in rates of patients who endorsed current tobacco use, admission CO (ppm), longest period of tobacco abstinence, reported importance and confidence of quitting tobacco, and self-reported primary preferred substance/drug.

Chi-square test of independence was performed to examine the programmatic-level outcomes pre- and post-policy, please see Table 3. There were no significant differences in the rates of infractions, $\chi^2(1, N = 209) = 2.32, p = 0.13$. In addition, there were also no significant differences in the types of discharge (ex. regular, irregular, reach maximum benefit, against medical advice), $\chi^2(1, N = 209) = 0.80, p = 0.85$. However, more patients who endorsed current tobacco use in the post-policy group were diagnosed with tobacco use disorder ($n = 69$, 75.0%) during their history and physical (H&P) compared to those in the pre-policy group ($n = 33$, 28.4%), $\chi^2(2, N = 208) = 59.38, p < 0.001$. There was no significant difference in the rates of TUD diagnosis during treatment planning. Treatment plans are completed by the treatment team in comparison to the H&P which are completed by unit psychiatrist or nurse practitioner.

Similar patterns were observed in the examination of patient-level

Table 1
Sociodemographic characteristics of veterans enrolled in the residential treatment program pre and post tobacco-free policy (n = 209).

Characteristic, n (%)	Total (n = 209)	Pre-Policy (n = 117)	Post (n = 92)	p value
Age, mean (SD)	47.8 (12.6)	47.6 (12.9)	48.1 (12.4)	NS
Male	194 (92.8)	110 (94.0)	84 (91.3)	NS
Caucasian	145 (69.4)	84 (71.8)	61 (66.3)	NS
Marital status				NS
Never married	50 (23.9)	30 (25.6)	20 (21.7)	
Married	36 (17.2)	18 (15.5)	18 (19.6)	
Separated	23 (11.0)	15 (12.8)	8 (8.7)	
Divorced	90 (43.1)	49 (41.9)	41 (44.6)	
Widowed	9 (4.3)	4 (3.4)	5 (5.4)	
Unknown	1 (0.5)	1 (0.8)	0 (0.0)	
Self-reported primary preferred substance/drug				NS
Alcohol	92 (44.0)	51 (43.5)	41 (44.6)	
Cocaine	27 (12.9)	12 (10.3)	15 (16.3)	
Heroin	38 (18.2)	19 (16.2)	19 (20.7)	
Non-heroin opioid	14 (6.7)	10 (8.5)	4 (4.3)	
Other ^a	38 (18.2)	25 (21.4)	13 (14.1)	

^a Other includes cannabis, benzodiazepines, amphetamines, and individuals with multiple self-reported primary preferred substances/drugs.

outcomes where there was also a significant difference in the number of patients with TUD who reported tobacco quit goals post-policy compared to the pre-policy group (56.8% and 37.4%, respectively) $X^2 (2, N = 162) = 11.06, p = 0.004$. Rates of veterans prescribed nicotine replacement therapy during residential stay more than doubled, $X^2 (2, N = 209) = 43.81, p < 0.001$. Finally, given policy changes regarding attending Clean Break (tobacco support education group facilitated by nursing and pharmacy staff members), there were significant differences in the rates of patients referred during pre-policy compared to post-policy (35.9% and 100% respectively), $X^2 (2, N = 204) = 105.91, p < 0.001$.

4. Discussion

We examined the impact of a tobacco-free SARRTP on program and patient level treatment outcomes. Gifford et al. (2015) argued that there are “critical gaps in the provision of” (p. 295) TUD treatment in VHA SARRTPs; however, there are limited data regarding the impact of including TUD treatment into SARRTP programming. Although there are concerns regarding premature discharges and low patient motivation to change tobacco use during SARRTP admission, it is unclear if these concerns are valid (Gifford et al., 2015). The pre- and post-policy groups did not differ with respect to self-rated importance, confidence of quitting tobacco, and rates of AMA discharges. Both groups reported moderate rates of importance and confidence to quit tobacco and AMA discharges averaged at 9%.

In addition, the pre- and post-policy groups also did not differ from one another with respects to the number of behavioral infractions during admission and the number of irregular discharges. These findings may not support concerns regarding the risk of increased behavioral issues when a SARRTP transitions to being tobacco-free.

Table 2
Baseline clinical characteristics of veterans enrolled in the residential treatment program pre and post tobacco-free policy (n = 209).

Characteristic, mean (SD)	Total (n = 209)	Pre-Policy (n = 117)	Post (n = 92)	p value
Current tobacco use, n (%)	167 (79.9)	96 (82.1)	71 (77.2)	NS
CO (ppm)	7.7 (11.8)	8.7 (13.0)	6.6 (10.2)	NS
Number of quit attempts	2 (2.2)	2 (2.3)	1.9 (2.2)	NS
Longest period of abstinence (months)	14.0 (25.1)	15.1 (28.4)	12.5 (19.9)	NS
Importance to quit (0 to 10)	6.1 (3.7)	6.0 (3.4)	6.1 (4.1)	NS
Confidence to quit (0 to 10)	5.4 (3.7)	5.2 (3.4)	5.7 (4.0)	NS

Although the post-policy group had more tobacco-specific infractions than the pre-policy group, this may be due to an artificially low rate in the pre-policy group (i.e., tobacco use was allowed during pre-policy group and the rules were less restrictive compared to post-policy). Even so, < 10% on the post-policy group had a tobacco-related infraction. Moreover, the rate of participants utilizing nicotine replacement therapy more than doubled in the post-policy group. One may hypothesize that the increased intensity of tobacco-related treatment interventions (including nicotine replacement) in the post-policy group protected against increased behavioral infractions and irregular discharges. Taken together, these data suggest that a tobacco/nicotine-free approach in a residential setting, combined with embedded TUD treatment, may not result in significantly more behavioral problems during admission or more unplanned discharges.

In addition, the post-policy group had higher rates of reported tobacco quit goals, utilization of nicotine replacement therapy, and enrollment in Clean Break. Consistent with the literature (Richey et al., 2017), only 36.5% of individuals with TUD pre-policy utilized nicotine replacement and the rates increased to 62% post-policy. The increased utilization of the nicotine replacement could be attributed to the mandatory attendance to the Clean Break group. The group is facilitated by various nursing and pharmacy staff. The group topics include discussion of managing cravings, health benefits of quitting tobacco, and assessing if veterans needed additional support like changes in nicotine replacement therapy (ex. gum to lozenges). In addition, veterans' CO levels were also assessed. Any changes to CO admission levels were provided to help sustain motivation to quit tobacco use.

4.1. Limitations

The current study was an analysis of a single-site SARRTP and was limited with respects to sample size and characteristics. Our sample was predominantly white, middle age males selected at two separate points of time. The study did not use random assignment for treatment and participants self-selected into care, knowing the SARRTP's policy on tobacco before admission. We also examined infractions that were reported (i.e., documented in the medical chart). It is unknown if there were infractions that occurred without being reported and/or documented in the chart. Finally, the data were based on chart documentation of clinical interactions between staff and patient. These clinical interactions did not follow a standardized protocol, therefore there may be variance in how the interactions occurred and were charted.

Despite these limitations, this study has several strengths. Importantly, this SARRTP provided in-parallel medication and psychotherapy services to patients with co-occurring psychiatric disorders – an approach often provided in SARRTP care. This is an important population of people with TUD. Co-occurring psychiatric and substance use disorders in residential settings are associated with higher severity of TUD and earlier relapse back to smoking (de Leon, Becona, Gurpegui, Gonzalez-Pinto, & Diaz, 2002; Hagman, Delnevo, Hrywna, & Williams, 2008; Pratt & Brody, 2010). Tobacco users with co-occurring psychiatric disorders can benefit from more intensive TUD treatment that is integrated in parallel with SARRTP treatment (Das & Prochaska, 2017; Williams et al., 2016; Williams, Stroup, Brunette, & Raney, 2014),

Table 3
Programmatic and patient level outcomes for current smokers (n = 167).

Outcomes, n (%)	Total (n = 167)	Pre-Policy (n = 96)	Post (n = 71)	p value
Against medical advice discharge	15 (9.0)	10 (10.4)	5 (7.0)	NS
Infractions	28 (16.8)	15 (15.6)	13 (18.3)	NS
Utilized nicotine replacement	97 (58.1)	35 (36.5)	62 (87.3)	< 0.001
Undiagnosed TUD during history and physical	69 (41.6)	63 (66.3)	6 (8.5)	< 0.001
Undiagnosed TUD during treatment planning	5 (3.1)	4 (4.3)	1 (1.4)	NS
Stated quit goals during treatment planning	87 (53.7)	41 (43.6)	46 (67.6)	0.004
Refer to Clean Break	104 (63.8)	33 (35.9)	71 (100.0)	< 0.001

rather than provided in-series. Although we did not objectively measure the presence or severity of co-occurring psychiatric disorders, our data may be generalizable to SARRTP's providing co-occurring care.

4.2. Future directions

Residential care for TUD as a primary focus may be more effective than outpatient care. A comparison study of outpatient versus residential delivery of TUD services (where residential treatment was primarily for TUD and for 8 days in duration) demonstrated that, while the residential-treated population smoked more cigarettes per day and had more severe physical dependence and had more co-occurring alcohol use disorder or depression, their 6-month abstinence rate was significantly higher both before and after adjusting for baseline characteristics (Hays et al., 2011) thus demonstrating the utility of residential care for TUD. Our study is one of few known, however, to assess the embedding of TUD services in parallel with traditional SUD services.

However, enacting TUD treatment services in residential SUD programs can be very challenging. After New York enacted a state-wide policy requiring all publicly-funded SUD programs to be completely smoke-free (including staff) and to make TUD treatment available to all patients, 1 year later they found that residential patients had less favorable attitudes towards TUD treatment and that they received fewer TUD-related services (Guydish, Tajima, et al., 2012). However, those that received a specialized six-month organizational change intervention realized far more favorable staff and patient-level outcomes (Guydish, Ziedonis, et al., 2012), highlighting the importance of such a strategy for change. It has been our experience that such an approach should enhance the likelihood that any staff barriers to change are constructively identified and managed.

This study lends support to the feasibility of making SARRTP treatment completely free of recreational nicotine/tobacco without causing negative impact to defined programmatic and patient-level outcomes above. Given that the VA put forward a major policy change in March 2019 for all VA medical sites to be tobacco and nicotine-free, including elimination of designated smoking areas and shelters; the timing of this study and its findings may have added potential for impact to VA policy-makers and treatment communities, in addition to any non-VA RRTP's moving towards a tobacco/nicotine-free environment of care (Department of Veterans Affairs, 2019). As such, we recommend that all programs start first with assessing staff attitudes about this national VA policy change and any resultant changes it may have on their local treatment milieu, patient attitudes, and staff attitudes. We also recommend the implementation a specialized structured organizational change intervention when it is felt to be indicated (Guydish, Ziedonis, et al., 2012).” As nicotine/tobacco use is a leading cause of morbidity and mortality in SUD treatment (Ziedonis et al., 2006), and nearly all VHA (and many non-VHA) SARRTP's continue to allow the use of recreational nicotine/tobacco during SARRTP treatment, the potential for impact to population health among patients with SUDs is substantial.

Disclaimer

This study was conducted in accordance with all applicable federal regulations governing the protection of human subjects in research as approved by the University of Cincinnati/CVAMC Institutional Review Board. The statements herein do not necessarily reflect the opinions of the authors or their institutions. The VA had no other role in study design; in the collection analysis and interpretation of data; in the writing of the report; nor does the views expressed in this paper necessarily reflect those of the US government or the VA.

Acknowledgements

We would like to thank the staff of the Cincinnati VA Medical Center Residential Substance Abuse Residential Rehabilitation Treatment Program for contributing to the development of this project.

References

- Baca, C., & Yahne, C. (2009). Smoking cessation during substance abuse treatment: What you need to know. *Journal of Substance Abuse Treatment*, 36(2), 205–219. <https://doi.org/10.1016/j.jsat.2008.06.003>.
- Conrad, M., Bolte, T., Gaines, L., Avery, Z., & Bodie, L. (2018). The untreated addiction: Going tobacco-free in a VA Substance Abuse Residential Rehabilitation Treatment Program (SARRTP). *The Journal of Behavioral Health Services & Research*, 45(4), 659–667. <https://doi.org/10.1007/s11414-018-9610-2>.
- Cooney, N., Litt, M., Sevarino, K., Levy, L., Kranitz, L., Sackler, H., & Cooney, J. (2015). Concurrent alcohol and tobacco treatment: Effect on daily process measures of alcohol relapse risk. *Journal of Consulting and Clinical Psychology*, 83(2), 346–358. <https://doi.org/10.1037/a0038633>.
- Das, S., & Prochaska, J. (2017). Innovative approaches to support smoking cessation for individuals with mental illness and co-occurring substance use disorders. *Expert Review of Respiratory Medicine*, 11(10), 841–850. <https://doi.org/10.1080/17476348.2017.1361823>.
- de Leon, J., Becona, E., Gurpegui, M., Gonzalez-Pinto, A., & Diaz, F. (2002). The association between high nicotine dependence and severe mental illness may be consistent across countries. *The Journal of Clinical Psychiatry*, 63(9), 812–816. <https://doi.org/10.4088/jcp.v63n0911>.
- Department of Veterans Affairs (2019). Smoke-free policy for patients, visitors, contractors, volunteers, and vendors at VA health care facilities. VHA Directive 1085 Transmittal Sheet. Retrieved April 22, 2019, from <https://www.va.gov/vhapublications/publications.cfm?Pub=1>.
- Fallin-Bennett, A., Barnett, J., Ducas, L., Wiggins, A., McCubbin, A., & Ashford, K. (2018). Pilot tobacco treatment intervention for women in residential treatment for substance use disorder. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 47(6), 749–759. <https://doi.org/10.1016/j.jogn.2018.08.004>.
- Friend, K., & Pagano, M. (2005). Changes in cigarette consumption and drinking outcomes: Findings from project MATCH. *Journal of Substance Abuse Treatment*, 29(3), 221–229. <https://doi.org/10.1016/j.jsat.2005.07.001>.
- Frosch, D., Shoptaw, S., Nahom, D., & Jarvik, M. (2000). Associations between tobacco smoking and illicit drug use among methadone-maintained opiate-dependent individuals. *Experimental and Clinical Psychopharmacology*, 8(1), 97–103. <https://doi.org/10.1037/1064-1297.8.1.97>.
- Gifford, E., Tavakoli, S., Wang, R., Hagedorn, H., & Hamlett-Berry, K. (2013). Tobacco dependence diagnosis and treatment in Veterans Health Administration residential substance use disorder treatment programs. *Addiction*, 108(6), 1127–1135. <https://doi.org/10.1111/add.12105>.
- Gifford, E., Tavakoli, S., Wisdom, J., & Hamlett-Berry, K. (2015). Implementation of smoking cessation treatment in VHA substance use disorder residential treatment programs. *Psychiatric Services*, 66(3), 295–302. <https://doi.org/10.1176/appi.ps.201400008>.
- Giovino, G. A., Schooley, M. W., Zhu, B. P., Chrismon, J. H., Tomar, S. L., Peddicord, J. P., & Eriksen, M. P. (1994). Surveillance for selected tobacco-use behaviors - United States, 1990–1994. *Morbidity and Mortality Weekly Report*, 43(SS-3), 1–50.
- Guydish, J., Gruber, V., Le, T., Tajima, B., Andrews, K., Leo, H., & Tsoh, J. Y. (2016). A

- pilot study of a readiness group to increase initiation of smoking cessation services among women in residential addiction treatment. *Journal of Substance Abuse Treatment*, 63, 39–45. <https://doi.org/10.1016/j.jsat.2015.12.002>.
- Guydish, J., Tajima, B., Kulaga, A., Zavala, R., Brown, L., Bostrom, A., & Chan, M. (2012). The New York policy on smoking in addiction treatment: Findings after 1 year. *American Journal of Public Health*, 102(5), e17–e25. <https://doi.org/10.2105/ajph.2011.300590>.
- Guydish, J., Ziedonis, D., Tajima, B., Seward, G., Passalacqua, E., Chan, M., & Brigham, G. (2012). Addressing tobacco through organizational change (ATTOC) in residential addiction treatment settings. *Drug and Alcohol Dependence*, 121(1–2), 30–37. <https://doi.org/10.1016/j.drugalcdep.2011.08.003>.
- Hagman, B., Delnevo, C., Hrywna, M., & Williams, J. (2008). Tobacco use among those with serious psychological distress: Results from the national survey of drug use and health, 2002. *Addictive Behaviors*, 33(4), 582–592. <https://doi.org/10.1016/j.addbeh.2007.11.007>.
- Hamlett-Berry, K. W. (2019). National Program Director, VA Office of Tobacco and Health Policy and Programs. *Personal communication* (January 31).
- Hays, J., Croghan, I., Schroeder, D., Burke, M., Ebbert, J., McFadden, D., & Hurt, R. (2011). Residential treatment compared with outpatient treatment for tobacco use and dependence. *Mayo Clinic Proceedings*, 86(3), 203–209. <https://doi.org/10.4065/mcp.2010.0703>.
- Hodgkin, J., Sachs, D., Swan, G., Jack, L., Titus, B., Waldron, S., ... Bringham, J. (2013). Outcomes from a patient-centered residential treatment plan for tobacco dependence. *Mayo Clinic Proceedings*, 88(9), 970–976. <https://doi.org/10.1016/j.mayocp.2013.05.027>.
- Hser, Y., McCarthy, W., & Anglin, M. (1994). Tobacco use as a distal predictor of mortality among long-term narcotics addicts. *Preventive Medicine*, 23(1), 61–69. <https://doi.org/10.1006/pmed.1994.1009>.
- Hurt, R., Croghan, I., Offord, K., Eberman, K., & Morse, R. (1995). Attitudes toward nicotine dependence among chemical dependency unit staff — Before and after a smoking cessation trial. *Journal of Substance Abuse Treatment*, 12(4), 247–252. [https://doi.org/10.1016/0740-5472\(95\)00024-y](https://doi.org/10.1016/0740-5472(95)00024-y).
- Hurt, R. D., Offord, K. P., Croghan, I. T., Gomez-Dahl, L., Kottke, T. E., Morse, R. M., & Melton, L. J. (1996). Mortality following inpatient addictions treatment: Role of tobacco use in a community-based cohort. *JAMA*, 275(14), 1097. <https://doi.org/10.1001/jama.1996.03530380039029>.
- IBM Corp (2011). *IBM SPSS statistics for windows, version 20.0*. Armonk, NY: IBM Corp.
- Ingram, I., Kelly, P., Deane, F., Baker, A., Lyons, G., & Blackman, R. (2017). An exploration of smoking among people attending residential substance abuse treatment: Prevalence and outcomes at three months post-discharge. *Journal of Dual Diagnosis*, 13(1), 67–72. <https://doi.org/10.1080/15504263.2017.1287456>.
- Kohn, C. S., Tsoh, J. Y., & Weisner, C. M. (2003). Changes in smoking status among substance abusers: Baseline characteristics and abstinence from alcohol and drugs at 12-month follow-up. *Drug and Alcohol Dependence*, 69(1), 61–71. [https://doi.org/10.1016/s0376-8716\(02\)00256-9](https://doi.org/10.1016/s0376-8716(02)00256-9).
- Lemon, S., Friedmann, P., & Stein, M. (2003). The impact of smoking cessation on drug abuse treatment outcome. *Addictive Behaviors*, 28(7), 1323–1331. [https://doi.org/10.1016/s0306-4603\(02\)00259-9](https://doi.org/10.1016/s0306-4603(02)00259-9).
- Pratt, L. A., & Brody, D. J. (2010). *Depression and smoking in the U.S. household population aged 20 and over, 2005–2008* (Vol. 34, pp. 1–8). National Center for Health Statistics Data Brief Retrieved from <https://www.cdc.gov/nchs/data/databriefs/db34.pdf>.
- Prochaska, J., Delucchi, K., & Hall, S. (2004). A meta-analysis of smoking cessation interventions with individuals in substance abuse treatment or recovery. *Journal of Consulting and Clinical Psychology*, 72(6), 1144–1156. <https://doi.org/10.1037/0022-006x.72.6.1144>.
- Richey, R., Garver-Apgar, C., Martin, L., Morris, C., & Morris, C. (2017). Tobacco-free policy outcomes for an inpatient substance abuse treatment center. *Health Promotion Practice*, 18(4), 554–560. <https://doi.org/10.1177/1524839916687542>.
- Shoptaw, S., Jarvik, M., Ling, W., & Rawson, R. (1996). Contingency management for tobacco smoking in methadone-maintained opiate addicts. *Addictive Behaviors*, 21(3), 409–412. [https://doi.org/10.1016/0306-4603\(95\)00066-6](https://doi.org/10.1016/0306-4603(95)00066-6).
- Taylor, R., Harris, N., Singleton, E., Moolchan, E., & Heishman, S. (2000). Tobacco craving: Intensity-related effects of imagery scripts in drug abusers. *Experimental and Clinical Psychopharmacology*, 8(1), 75–87. <https://doi.org/10.1037/1064-1297.8.1.75>.
- Tobacco Use and Dependence Guideline Panel (2008). *Treating tobacco use and dependence: 2008 update. Clinical practice guideline*. Rockville, MD: US Department of Health and Human Services.
- Tsoh, J., Chi, F., Mertens, J., & Weisner, C. (2010). Stopping smoking during first year of substance use treatment predicted 9-year alcohol and drug treatment outcomes. *Drug and Alcohol Dependence*, 114(2–3), 110–118. <https://doi.org/10.1016/j.drugalcdep.2010.09.008>.
- Wang, T. W., Asman, K., Gentzke, A. S., Cullen, K. A., Holder-Hayes, E., Reyes-Guzman, C., & King, B. A. (2018). Tobacco product use among adults — United States, 2017. *Morbidity and Mortality Weekly Report*, 67(44), 1225–1232.
- Weinberger, A., Platt, J., Esan, H., Galea, S., Erlich, D., & Goodwin, R. (2017). Cigarette smoking is associated with increased risk of substance use disorder relapse. *The Journal of Clinical Psychiatry*, 78(02), e152–e160. <https://doi.org/10.4088/jcp.15m10062>.
- Williams, J., Foulds, J., Dwyer, M., Orderconnors, B., Springer, M., Gadde, P., & Ziedonis, D. (2005). The integration of tobacco dependence treatment and tobacco-free standards into residential addictions treatment in New Jersey. *Journal of Substance Abuse Treatment*, 28(4), 331–340. <https://doi.org/10.1016/j.jsat.2005.02.010>.
- Williams, J., Steinberg, M., Kenefake, A., & Burke, M. (2016). An argument for change in tobacco treatment options guided by the ASAM criteria for patient placement. *Journal of Addiction Medicine*, 10(5), 291–299. <https://doi.org/10.1097/adm.0000000000000239>.
- Williams, J., Stroup, T., Brunette, M., & Raney, L. (2014). Integrated care: Tobacco use and mental illness: A wake-up call for psychiatrists. *Psychiatric Services*, 65(12), 1406–1408. <https://doi.org/10.1176/appi.ps.201400235>.
- World Health Organization (2010). Tobacco key facts. Retrieved August 30, 2016 <http://www.who.int/topics/tobacco/facts/en/index.html>.
- Ziedonis, D. M., Guydish, J., Williams, J., Steinberg, M., & Foulds, J. (2006). Barriers and solutions to addressing tobacco dependence in addiction treatment programs. *Alcohol Research and Health*, 29(3), 228–235.