



Published in final edited form as:

*J Subst Abuse Treat.* 2022 April ; 135: 108640. doi:10.1016/j.jsat.2021.108640.

## Reducing Tobacco Use in Substance Use Treatment: An Intervention to Promote Tobacco-Free Grounds

Caravella McCuistian, PhD<sup>a</sup>, Kwinoja Kapiteni, MPH<sup>a</sup>, Thao Le, MPH<sup>a</sup>, Jessica Safier, MA<sup>b</sup>, Kevin Delucchi, PhD<sup>c</sup>, Joseph Guydish, PhD<sup>a</sup>

<sup>a</sup>Philip R. Lee Institute for Health Policy Studies, University of California San Francisco, 3333 California St., Ste. 265, San Francisco, CA 94118

<sup>b</sup>Smoking Cessation Leadership Center, University of California San Francisco, 3333 California Street, Ste. 430, San Francisco, CA 94143

<sup>c</sup>Department of Psychiatry, University of California San Francisco, 401 Parnassus Ave, San Francisco CA 94143

### Abstract

**Background:** People in substance use disorder (SUD) treatment experience disproportionate rates of tobacco use. California has prioritized smoking cessation among these individuals through the Tobacco-Free for Recovery Initiative, which includes an intervention aimed at supporting programs in implementing tobacco-free grounds. The current study examined changes in client smoking prevalence, tobacco use behaviors, and receipt of cessation services among the first seven programs participating in the initiative.

**Methods:** Residential treatment program clients completed cross-sectional surveys at the start of the intervention (baseline:  $n = 249$ ), at an interim timepoint post-baseline (interim:  $n = 275$ ), and at the end of the intervention 15 months later (post-intervention:  $n = 219$ ). All participants reported smoking status. Current smokers reported tobacco use behaviors, and both current smokers and those who quit in treatment reported receipt of cessation services. Univariate analyses explored differences across the three timepoints and multivariate logistic regression assessed change from baseline to interim and baseline to post-intervention.

**Results:** Client smoking prevalence decreased from 54.2% at pre- to 26.6% at post-intervention (Adjusted Odds Ratio [AOR] = 0.25, 95% CI = 0.13, 0.45). Current smokers and those who quit while in treatment reported an increase in NRT/pharmacotherapy (11.9% vs. 25.2%; AOR = 3.02, CI = 1.24, 7.35). When comparing baseline to the interim timepoint (a timepoint before the COVID-19 pandemic), data analyses also demonstrated a significant decrease in smoking prevalence (54.2% vs. 41.8%; AOR = 0.62, CI = 0.42, 0.92) and increase in NRT/pharmacotherapy (11.9% vs. 24.5%; AOR = 3.68, CI = 1.11, 12.19).

**Conclusion:** An intervention to promote tobacco free grounds implemented in residential SUD programs was associated with a significant reduction in client smoking and an increase in NRT/pharmacotherapy. These associations were observed both before the COVID-19 pandemic and in

the early stages of the pandemic, suggesting that they may be due to the intervention rather than the pandemic.

## Keywords

tobacco cessation; substance use treatment; policy

---

## 1. Introduction

The disparate rates of tobacco use among people with substance use disorder (SUD) is well documented (Lasser et al., 2015; Schroeder & Morris, 2010), and smoking prevalence among persons who access SUD treatment is about three times that of the general population (Baca & Yahne, 2009; CDC, 2020a; Guydish et al., 2019; Hunt et al., 2013). Tobacco-related deaths among people who use SUD treatment also surpasses those among the general population (Bandiera et al., 2015) and SUD treatment outpatients who use tobacco experience more medical problems when compared to those who do not use tobacco (Patkar et al., 2002). Ongoing tobacco use is also associated with poorer SUD treatment outcomes (Baca & Yahne, 2009; Weinberger et al., 2017). Therefore, SUD treatment is well-positioned to reduce smoking by integrating tobacco-related services (Prochaska et al., 2004; Thurgood et al., 2016). However, access to tobacco services within SUD treatment remains low across the United States (Marynak et al., 2018).

Several states have implemented policies designed to integrate smoking cessation into SUD treatment. New York (Brown et al., 2012), New Jersey (Williams et al., 2005), Oregon (Drach et al., 2012), and Oklahoma (see Marynak et al., 2018) have employed state requirements that SUD treatment programs implement tobacco-free policies as a way to reduce tobacco use among those entering treatment. Utah's tobacco control program promoted the implementation of tobacco-free policies for mental health and SUD treatment programs (Marshall et al., 2015). Through a community/academic partnership, the Taking Texas Tobacco Free initiative supported 18 Local Mental Health Authorities in Texas to implement a multicomponent intervention supporting tobacco-free policies (Correa-Fernández et al., 2019).

While some literature reports on the efforts of these states, the implementation strategies that were used are not clearly defined. Powell and colleagues summarize several expert-identified implementation strategies (Powell et al., 2015). Some interventions supporting tobacco-free grounds seem to rely on several of these strategies. Tobacco-free policies in New York, New Jersey, Oregon, and Oklahoma were initiated following a statewide mandate and were associated with improved tobacco screening and increased access to smoking cessation services (Brown et al., 2012; Drach et al., 2012; Marynak et al., 2018; Williams et al., 2005). Other states have sought ways to implement tobacco free grounds interventions in the absence of a regulatory mandate. In Utah, programs received financial support for implementation (Marshall et al., 2015). In Texas, the intervention was supported through a community-academic partnership (Correa-Fernández et al., 2019) and was associated with increased staff education and staff report of increased provision of tobacco-related services to clients. However, there are few models for implementation of tobacco free policies in

the absence of state mandates and more information is needed on the impact of these interventions as reported by clients.

The research on these statewide efforts has evaluated the impact of these interventions based on program administrator report (Brown et al., 2012; Drach et al., 2012), changes in employee education, training, and practices (Correa-Fernández et al., 2019), and through examination of admission/discharge data (Williams et al., 2005). However, a missing piece of information is the self-report of clients. There is some evidence that tobacco-free interventions can be associated with client level changes in smoking prevalence. Gubner and colleagues found a decrease in smoking prevalence among clients that was associated with a tobacco-free grounds intervention occurring in three SUD treatment programs in San Francisco, CA (Gubner et al., 2019). In a single residential SUD treatment center in Colorado, Richey and colleagues used census data and surveys at admission to report that 100% of clients reported not using tobacco while in treatment following tobacco-free policy implementation (Richey et al., 2017). Guydish and colleagues also explored change in smoking outcomes in two residential programs before and after a tobacco free policy was implemented. Results of this study show a decrease in smoking prevalence (Guydish, Yip, et al., 2017). Another study examined client-level differences in smoking prevalence one year after the New York state mandate for tobacco free grounds in SUD treatment settings, but found no difference in smoking prevalence in residential SUD treatment programs before and after the intervention (Guydish et al., 2012).

Results from these studies provide evidence that the implementation of tobacco-free interventions can result in decreased client-reported smoking prevalence though these studies are not without limitation. Several of the studies represent findings from single-sites or regionally limited areas (Gubner et al., 2019; Richey et al., 2017). The research examining differences associated with the New York mandate was conducted within the context of a statewide mandate (Guydish et al., 2012). While Guydish and colleagues do explore client-level smoking prevalence in another study (Guydish, Yip, et al., 2017), more information is needed on how tobacco-free grounds interventions may influence smoking behaviors at the client level in order to address this gap.

Only a minority of SUD residential treatment programs in California report tobacco free grounds (10.8%; Guydish, Wahleithner, et al., 2020). The California Tobacco Control Program (CTCP) is a longstanding and robust tobacco control program (CTCP, 2020a). Since its inception in 1988, the smoking prevalence in California decreased from 22.7% to 11.2% (CDC, 2020b; Roeseler & Burns, 2010). The CTCP recently prioritized tobacco cessation among people receiving residential SUD treatment by launching the Tobacco-Free for Recovery Initiative (CTCP, 2020b). The initiative awarded funding to residential behavioral health treatment programs to participate in an intervention aimed at improving client wellness. This included encouraging the development of policies related to tobacco-free grounds and other wellness initiatives (e.g., nutrition, exercise, and gambling; CTCP, 2020b). The California Tobacco-Free for Recovery Initiative sought to incentivize tobacco-free policies through financial support and expert guidance and was not motivated by a statewide mandate. The aim of the current study was to examine if the initiative

was associated with decreased client smoking prevalence, changes in other tobacco use behaviors, or increased use of tobacco-related services in participating programs.

## 2. Method

### 2.1 Recruitment of SUD Programs

Residential treatment programs were invited to apply for the CTCP Tobacco-Free for Recovery Initiative through an online request for application. Residential treatment programs with a minimum 20-bed capacity were eligible. Interested treatment programs submitted a letter of intent followed by a full proposal, and selected programs then contracted with CTCP to participate in the intervention. The contracts specified activities required and provided participating programs with \$36,000 over the 18-month contract period. Six agencies completed the contracting procedures, however one agency included two residential programs, so we present all data for seven programs.

### 2.2 Intervention description

The intervention was conducted by the University of California San Francisco (UCSF) Smoking Cessation Leadership Center (SCLC; Schroeder et al., 2018). The SCLC supported each program in designing and implementing an individualized policy to become tobacco free. While the intervention addressed other wellness areas (nutrition, exercise, and gambling), our emphasis in this report is on tobacco policy and services.

The programs first completed a needs assessment to evaluate existing tobacco policies and identify any barriers and facilitators that could impact implementation. Representatives from each program then participated as a group in an initial meeting with their SCLC partners. During this meeting, program representatives began designing a comprehensive action plan for meeting project goals, including planning how to implement a tobacco-free policy. After the initial meeting, program representatives met individually monthly with their designated SCLC consultant to review current policies, discuss any challenges, learn about tobacco cessation techniques/resources, and problem-solve any issues. Programs were provided with examples of successful tobacco-free policies and were encouraged to form committees to spearhead policy implementation. The SCLC intervention team also provided smoking cessation training for key staff at each site. At least one representative from each treatment program also attended quarterly learning collaborative meetings with representatives from the other participating programs to discuss progress and learn from the experiences of other programs.

The aim of the intervention was for each program to develop and implement a written tobacco policy that outlined how the program would: 1) assess and treat client tobacco use, 2) implement tobacco-free grounds policies and 3) implement other wellness activities that support a tobacco-free environment. The definition of tobacco free grounds policies was no tobacco use by clients or staff within the facility or on program grounds. While programs were highly encouraged to implement tobacco-free policies, it was not required by the contract. Each program was encouraged to design a policy tailored to its own unique needs and resources. Some programs created alternative activities to replace smoking routines

(e.g., gardening, yoga, walking), hired additional staff to support wellness initiatives, repurposed designated smoking areas for wellness activities, and identified local resources such as the California Smokers' Helpline.

### 2.3 Participants

All clients currently enrolled in the participating programs at the time of data collection were eligible to participate in cross-sectional surveys. Residential SUD treatment in California is paid for by Medi-Cal, the California Medicaid program, which covers up to 90 days of residential SUD treatment. The time between baseline and the interim data collection timepoint was, on average 362 days, so participants at these two timepoints likely represented independent cross-sectional samples. The time between baseline and post-intervention data collection was, on average, 447 days, so participants in these two timepoints were also likely independent cross-sectional samples. However, the average time between interim data collection and post-intervention data collection was 85 days, allowing the possibility that the interim and post-intervention samples were not fully independent. In the current paper we report comparisons from baseline to interim and baseline to post-intervention only, to increase the likelihood of obtaining independent cross-sectional samples.

### 2.4 Evaluation procedures

Cross-sectional data collection occurred at three timepoints, with baseline data collected January through March 2019. Interim data were collected approximately 12 months later, from January to February 2020. Post-intervention data were collected in April 2020 (see Figure 1), giving an average intervention period of 15 months. Data collection for both the baseline and interim timepoints was conducted in person via site visits. To track response rates, program directors reported the number of clients enrolled in each program at the time of the site visit. Most visits were completed in one day, but larger sites required multiple-day visits. Data collection occurred within small groups of approximately 10 clients at a time. In each small group, a research staff member reviewed the study information sheet with participants and allowed for questions. The participants were then handed an iPad survey pre-populated with a unique ID number. The iPad first displayed the study information sheet and asked participants to consent using a check box. The iPad then displayed the study survey, and participants completed the 30-minute survey, with study staff available to answer questions. Participants then received a \$20 gift card.

Due to the COVID-19 pandemic, California residents were ordered to shelter-in-place on March 19<sup>th</sup>, 2020, (State of California, 2020). In place of on-site data collection by the study team, five programs completed paper copies of the survey sent via mail and two programs completed the surveys by phone. Like baseline and interim data collection timepoints, program directors reported the number of clients enrolled in the program for use in calculating response rates. Programs completing paper surveys had staff distribute the surveys to clients, including the study information sheet where clients consented using a check box, and mailed completed surveys back to the study team. For programs completing the surveys by phone, research staff reviewed the study information sheet with clients and obtained the client's verbal consent, and then read out the questions to participants. The

research team then mailed \$20 gift cards to the programs for distribution to participants. The UCSF Institutional Review Board approved all study procedures, including modified procedures used for post intervention data collection.

## 2.5 Measures

In addition to demographic characteristics, participants reported whether they were enrolled in treatment mainly for substance use, mental health, both substance use and mental health, or for some other reason (e.g., as a condition of parole). Clients reporting treatment for mental health reasons, or for both substance use and mental health reasons, were collapsed into one category. Participants also reported on healthcare coverage in four categories: Medi-Cal, Medicare, other insurance, or no health insurance.

All participants reported lifetime and current use of cigarettes. Current smokers were identified as individuals who smoked at least 100 cigarettes in their lifetime and who self-reported as a smoker (CDC, 2017). Current smokers reported on tobacco use behaviors including number of cigarettes smoked per day (CPD) and whether staff and clients smoked together within their program.

All participants reported if they were screened for smoking status (“Did any staff member ask whether you smoke?”). Because tobacco-free grounds policies may also increase the number of clients who quit smoking while in treatment, both current smokers and former smokers who said they quit while in treatment reported receipt of other tobacco-related services. Both current smokers and former smokers who quit while in treatment reported whether they had received any referral to a smoking cessation specialist or to the California Smokers’ Helpline. Receiving either one of these services was classified as receiving a referral for tobacco cessation services. Current smokers and former smokers who quit while in treatment also reported whether quitting was a part of their personal treatment plan and if they had received any nicotine replacement therapy (NRT; gum, patches, lozenges) or other cessation pharmacotherapy (bupropion or varenicline) while in treatment. The same group of current and former smokers reported whether they had attended a support group for people trying to quit, how often they had received encouragement from their counselor to quit, or had scheduled a follow-up meeting with their counselor to further discuss smoking cessation. Receiving one of these services at least occasionally was classified as receiving any tobacco-related counseling (Guydish, Kapiteni, et al., 2020).

## 2.6 Analysis

Demographic characteristics, reason for treatment, and healthcare coverage were compared across timepoints using Pearson’s chi-square test for categorical variables and analysis of variance (ANOVA) for continuous variables.

There were eight outcome variables, including current smoking status, two variables for tobacco use behaviors (CPD, concurrent client/staff smoking), and five variables for tobacco cessation services (tobacco screening, receiving any referral, any smoking cessation counseling, any NRT/pharmacotherapy, and smoking cessation included in the treatment plan). Two variables (current smoking status and tobacco screening) were evaluated for all participants, two variables (CPD and concurrent client/staff smoking) were evaluated

for current smokers only, and the remaining four tobacco service variables (any NRT/ pharmacotherapy, referral, counseling, or quitting in the treatment plan) were evaluated among current smokers and former smokers who reported quitting while in treatment.

Changes in smoking prevalence, tobacco use behaviors and tobacco related services across the three timepoints were first assessed using Pearson's chi-square tests for categorical variables and ANOVA for continuous variables. Variables significant at  $p < 0.10$  (Hosmer & Lemeshow, 2000) were further examined in multivariate logistic regression models using generalized estimating equation. Due to differences in when programs implemented tobacco free grounds (Figure 1), and to increase the likelihood of independence of cross-sectional samples, multivariate logistic regression models were employed only to compare baseline to interim and baseline to post-intervention. One model was conducted for each outcome, with time (e.g., baseline- to post intervention) as the predictor. The models were adjusted for demographic variables that were significant at a  $p < 0.10$  across the timepoints as well as the site effects. The models also accounted for nesting of clients within treatment program. Generalized estimating equation (GEE) method was applied for correlated data. The GEE method was conducted in the SAS GENMOD procedure with a logit link function and repeated statement.

While both baseline and interim data were collected prior to the COVID pandemic, post-intervention data were collected within two months after California entered pandemic restrictions. The multivariate regression analyses comparing the baseline (January 2019) to the interim timepoint (January – February 2020) represents a time frame that is free from the possible effect that COVID-19 may have on smoking behavior.

### 3. Results

#### 3.1 Program level policy outcomes

By the end of the intervention (April 30, 2020), five of the seven programs had implemented tobacco-free grounds policies, as reported to the SCLC intervention team. The timeline of policy implementation varied across the different programs (see Figure 1).

#### 3.2 Participant characteristics

Client survey participation rates reflect the number of clients participating in the survey divided by the number of clients in the program at the time of data collection. Client survey participation rates were 76% ( $n = 249$ ) at baseline, 88% ( $n = 275$ ) at interim data collection, and 91% ( $n = 219$ ) at post intervention. At baseline, clients had a mean age of 39.1 (11.6) and were 82.3% male (Table 1). The sample was racially diverse, with 46.6% identifying as Latino/a, 24.5% identifying as White, and 20.1% identifying as Black/ African American. Most had at least a high school diploma or GED (73.9%), and 64.3% had Medi-Cal insurance. Nearly three-fourths (73.5%) gave SUD, or both SUD and mental health, as the reason for treatment. Demographic characteristics were similar across the three timepoints. However, there were significant differences meeting the  $p < 0.10$  criteria in age ( $p = 0.027$ ), healthcare coverage ( $p < 0.001$ ) and reason in treatment ( $p = 0.029$ ), and these were adjusted for in later multivariate analyses.

### 3.3 Tobacco behaviors and smoking cessation services at baseline

At baseline, 54.2% identified as current smokers, smoking on average 8.8 CPD (SD = 7.1). A subset of current smokers (28.3%) also reported that, in their program, staff and clients sometimes smoked together (Table 2).

The majority of participants reported being screened for smoking status (60.2%) at baseline. Among current smokers and former smokers who quit while in treatment, 31.6% had received a tobacco-related referral, and 62.3% had received some tobacco-related counseling. Receipt of NRT or other pharmacotherapy was less common (11.9%), and only 29.9% said that smoking cessation was included in their treatment plan.

### 3.4 Change over time

In unadjusted comparisons across all three timepoints, three variables (smoking prevalence, receiving NRT/pharmacotherapy, and quitting in the treatment plan) showed differences over time at the  $p < 0.10$  level (see Table 2). Multivariate logistic regression models tested the association between time and these three outcomes, while adjusting for characteristics that differed across the time (age, reason for treatment, healthcare coverage) and controlling for site effects as well as nesting of clients within site (Table 3).

Among all clients, the odds of being a current smoker were lower at post-intervention as compared to baseline (AOR = 0.25, 95% CI = 0.13, 0.45;  $p < 0.0001$ ). Among current smokers and those who quit while in treatment, the odds of receiving NRT/pharmacotherapy was higher at post-intervention compared to baseline (AOR = 3.02, 95% CI = 1.24, 7.35;  $p = 0.015$ ). However, for current and former smokers who quit in treatment, the odds of having quitting smoking as part of the treatment plan were unchanged (AOR = 0.90, 95% CI = 0.49, 1.63;  $p = 0.719$ ).

The finding that smoking prevalence decreased significantly from baseline to post-intervention could be confounded if clients changed their smoking behavior in response to the COVID pandemic. In that case, observed decreases in smoking may be attributable to client concerns about COVID-19 rather than the Tobacco-Free for Recovery intervention. The comparison between baseline and interim data collection offers a timepoint free of the possible effect of COVID-19 on smoking behaviors. When comparing baseline to interim data collection, the findings are similar; a decrease in smoking prevalence (AOR = 0.62, 95% CI = 0.42, 0.92;  $p = 0.017$ ) and an increase in NRT/pharmacotherapy (AOR = 3.68, 95% CI = 1.11, 12.19;  $p = 0.015$ ) were observed. As with the comparison of baseline to post, the odds of quitting being in the treatment plan remained unchanged.

## 4. Discussion

This paper reports the outcomes of an intervention that supported residential SUD treatment facilities in implementing tobacco-free grounds policies. During the 15-month intervention period, 5 of the 7 participating programs implemented tobacco free-grounds policies. Approximately half (54.2%) of participants self-identified as current smokers at baseline. While this smoking rate is lower than that found in other literature (Baca & Yahne, 2009; Hunt et al., 2013), and lower than that reported for a recent sample of 20 California



residential SUD programs (69%; Guydish, Kapiteni, et al., 2020), it is nearly five times that of the Californian general population (11.2%; CDC, 2020b). From baseline to post-intervention, client smoking prevalence decreased from 54.2% to 26.6%. Results comparing baseline to interim data collection timepoints (both occurring prior to COVID-19) also displayed a significant decrease in smoking prevalence from 54.2% to 41.8%. This significant difference in smoking prevalence, in the absence of COVID-19, supports an association between decreased smoking prevalence and the Tobacco-Free for Recovery intervention. These findings are consistent with another study that measured changes in client smoking prevalence during an intervention to implement tobacco free grounds (Guydish, Yip, et al., 2017) as well as other tobacco-free grounds policy interventions that were conducted in single site or regionally limited samples (Gubner et al., 2019; Richey et al., 2017).

The decrease in smoking prevalence was accompanied by a significant increase in NRT/pharmacotherapy, from 11.9% at baseline to 25.2% at post intervention. These findings are similar to those found in other state-wide efforts (Brown et al., 2012; Correa-Fernández et al., 2019; Williams et al., 2005). The provision of NRT/pharmacotherapy is an evidence-based approach for reducing tobacco use (Hartmann-Boyce et al., 2018), so the increase in this service is consistent with the observed decrease in smoking prevalence.

In unadjusted comparisons, inclusion of smoking in the client treatment plan increased from baseline (29.9%) to the interim timepoint (41.8%) but decreased at post intervention (27.8%). The reason for the initial increase then subsequent return to baseline is unknown. It is possible that as SUD treatment programs pivoted to address public health mandates required during the COVID-19 pandemic (Oesterle et al., 2020), providing tobacco treatment became a lower priority. In California, tobacco cessation is a Medi-Cal billable service only for primary care providers and not for residential SUD treatment providers. The California State Department of Healthcare Services, the licensing and regulatory authority for SUD services, offers no guidance to licensed programs with respect to tobacco use or intervention. Consequently, there neither regulatory nor financial incentives for programs to address tobacco use. Nevertheless, increased use of NRT was sustained to post-intervention while increased inclusion of quitting in the treatment plan was not. Inclusion of tobacco use in treatment planning may further encourage smoking clients, even those not ready to quit, to engage in strategies designed to build quit motivation (Ziedonis et al., 2006) or increase readiness to quit (Guydish et al., 2016).

We observed no increase in screening for smoking, receipt of tobacco-related referral, or counseling across the three timepoints. The baseline rates screening (60.2%) and counseling (62.3%) among this subset of programs were higher than that reported statewide in California (51.5% for screening and 42.3% for counseling; Marynak et al., 2018). Given that the intervention allowed for individualized use of the contract funds, programs may have been more likely to use funds to increase other types of services that could be offered with a limited staff burden. In our sample at baseline, smoking prevalence remained high even in the presence of elevated baseline rates of screening and counseling. In programs where tobacco screening and counseling are moderately high (at or above 50%), the implementation of tobacco free policies may offer additional incentive for clients to quit

smoking. Research on tobacco free workplace settings suggests that such policies encourage workers to quit smoking (Fichtenberg & Glantz, 2002). It is also possible that even programs with high rates of tobacco screening and counseling could benefit from staff training to ensure that these services are being offered. The combination of NRT/pharmacotherapy and counseling is likely to be most effective in supporting smoking cessation (Leas et al., 2018).

A key study limitation concerns reliance on client self-report of current smoking status. While under-reporting of tobacco use via self-report is infrequent (Yeager & Krosnick, 2010), the degree to whether this may bias results depends not only on potential under-reporting of current smoking status, but whether such under-reporting was systematically higher across the timepoints. Future similar research would be strengthened by biochemical verification of self-report smoking status. However, supporting the observed lower smoking prevalence is the finding that NRT/pharmacotherapy statistically increased. Another limitation is the use of an observational cross-sectional study design, which precludes causal interpretation.

Changes in client smoking prevalence could be associated with client or program concerns about the health effects of smoking during the COVID pandemic. Data on COVID-related smoking behavior suggest that approximately half of smokers report no change in smoking behavior, one quarter report smoking more, and one quarter report smoking less, suggesting no overall change from April – June 2020 (Klemperer et al., 2020; Yingst et al., 2021). While it is possible that COVID-19 influenced client smoking or even access to tobacco, the analyses comparing baseline to interim data suggest that smoking prevalence was dropping significantly in participating programs prior to pandemic restrictions. Study findings suggest that implementation of tobacco free grounds policies was associated with a significant decrease in smoking prevalence among clients in SUD treatment. This is consistent with limited available research (Gubner et al., 2019; Guldish, Yip, et al., 2017; Richey et al., 2017). If this association is replicated in further research, then sustainability becomes a relevant question.

Generalizability is limited to California residential SUD programs that expressed interest in addressing tobacco use by applying to participate in the intervention. A recent phone survey of all California state licensed residential SUD programs found that 35.1% of programs expressed interest in addressing client smoking by implementing tobacco free policies (Guldish, Wahleithner, et al., 2020). It is likely that study findings would generalize to approximately 1/3 of California's 308 residential SUD programs at this point. Efforts should be made to improve organizational interest in implementing tobacco free policies in SUD treatment. These may include specific guidance from licensing and regulating bodies to assess and treat tobacco use in SUD treatment programs, state (Brown et al., 2012) or county mandates requiring SUD programs to assess and treat tobacco use, interventions designed to reduce staff smoking (Guldish, Le, et al., 2017), or staff training programs designed to increase provision of tobacco-related services to clients (Correa-Fernández et al., 2019). In addition to regulatory, licensing, contractual and training approaches, fiscal incentives to provide tobacco-related services could be used. Medi-Cal pays a negotiated fee for bundled residential SUD treatment services, and reimbursement requires documented hours of eligible clinical services. However, tobacco-related services are not included as an eligible

reimbursement service in residential SUD treatment. Including tobacco related services as a reimbursable activity would ensure that providing such services met reimbursement criteria. Future research should investigate intervention characteristics and other factors that may support scaling up efforts like the Tobacco Free for Recovery Initiative, extending similar interventions to all California SUD treatment programs.

Another factor to consider is when programs implemented tobacco-free policies. Overall, five of the seven programs implemented tobacco-free policies and two programs implemented their policies near the end of the intervention period (in April 2020). The goal of the intervention was to promote implementation of tobacco-free grounds policies, and most programs did implement such policies by the end of the intervention period. Future research should be conducted to explore the sustainability and long-term effects of policy implementation in these programs.

In context of these limitations, the study findings have public health implications. Previous research has reported on state-wide efforts to implement tobacco-free grounds in SUD treatment programs within the context of regulatory mandates (Brown et al., 2012; Drach et al., 2012; Marynak et al., 2018; Williams et al., 2005), financial support (Marshall et al., 2015) or community/academic partnership (Correa-Fernández et al., 2019). However, less is known about how interventions occurring in the absence of state-wide mandates influence client-level smoking prevalence. The Tobacco-Free for Recovery initiative was sponsored by the CTCP and included financial support and expert-level guidance from the SCLC. In this context, SUD treatment programs developed individualized tobacco-free policies that were associated with significant reductions in client smoking prevalence and increased receipt of NRT/pharmacotherapy. This suggests that, by supporting programs to develop tailored policies, reductions in tobacco-related health inequities are possible. However, the lack of increase in cessation services other than NRT suggests that programs need additional support, such as guidance from licensing and regulatory authorities or fiscal incentives, to provide tobacco-cessation services.

In conclusion, these findings highlight the benefit of supporting the development of tobacco-free policies for SUD treatment programs. The findings suggest that by providing programs with monetary support, education, and resources, SUD treatment programs developed individualized policy interventions that demonstrated promise for reducing smoking prevalence among individuals with SUD.

## **Funding:**

This work was supported by the California Tobacco Control Program (CTCP 18-10025) and a NIDA training grant (T32DA007250). The content is solely the responsibility of the authors and does not represent the official views of the State of California or the National Institutes of Health.

## **Disclosure Statement:**

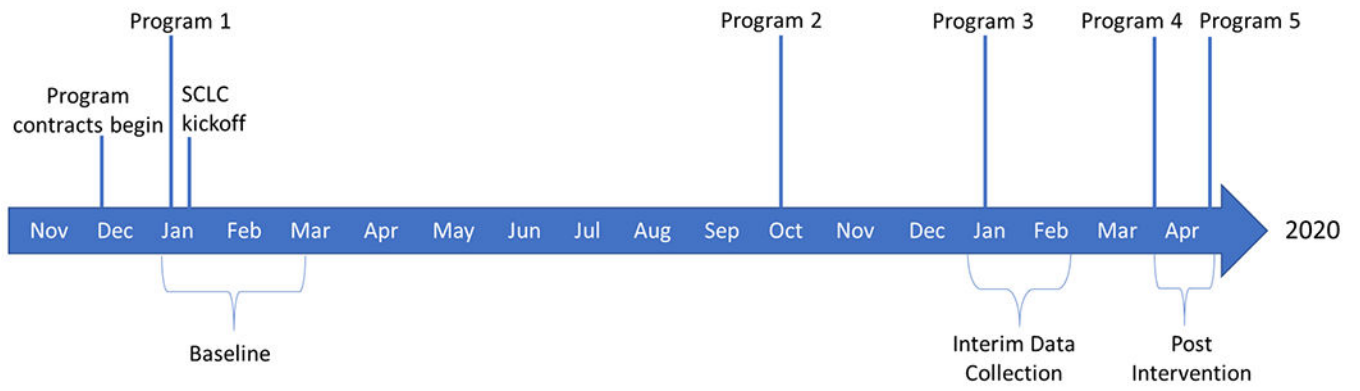
This work was supported by a contract from the California Tobacco Control Program (CTCP 18-10025) to the University of California San Francisco, for the purpose of implementation (JS) and evaluation (all other authors) of the Tobacco-Free for Recovery initiative.

## References

- Baca CT, & Yahne CE (2009). Smoking cessation during substance abuse treatment: What you need to know. *Journal of Substance Abuse Treatment*, 36(2), 205–219. 10.1016/j.jsat.2008.06.003 [PubMed: 18715746]
- Bandiera FC, Anteneh B, Le T, Delucchi K, & Guydish J (2015). Tobacco-related mortality among persons with mental health and substance abuse problems. *PLoS ONE*, 10(3). 10.1371/journal.pone.0120581
- Brown E, Nonnemaker J, Federman EB, Farrelly M, & Kipnis S (2012). Implementation of a tobacco-free regulation in substance use disorder treatment facilities. *Journal of Substance Abuse Treatment*, 42(3), 319–327. 10.1016/j.jsat.2011.08.006 [PubMed: 22000325]
- CDC. (2017). National Health Interview Survey: Glossary. [https://www.cdc.gov/nchs/nhis/tobacco/tobacco\\_glossary.htm#:~:text=Current\\_smoker%3A\\_An\\_adult\\_who,and\\_who\\_currently\\_smokes\\_cigarettes](https://www.cdc.gov/nchs/nhis/tobacco/tobacco_glossary.htm#:~:text=Current_smoker%3A_An_adult_who,and_who_currently_smokes_cigarettes).
- CDC. (2020a). Current Cigarette Smoking Among Adults in the United States. [https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/adult\\_data/cig\\_smoking/index.htm#:~:text=](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm#:~:text=)
- CDC. (2020b). State Tobacco Activities Tracking and Evaluation (STATE) System: Map of Current Cigarette Use Among Adults. <https://www.cdc.gov/statesystem/cigaretteuseadult.html>
- Correa-Fernández V, Wilson WT, Kyburz B, O'Connor DP, Stacey T, Williams T, Lam CY, & Reitzel LR (2019). Evaluation of the taking Texas Tobacco free workplace program within behavioral health centers. *Translational Behavioral Medicine*, 9(2), 319–327. 10.1093/tbm/iby067 [PubMed: 29955886]
- CTCP. (2020a). California Tobacco Control Branch. <https://www.cdph.ca.gov/Programs/CCDPPP/DCDIC/CTCB/Pages/CaliforniaTobaccoControlBranch.aspx>
- CTCP. (2020b). CG 18-10137 Initiative to Reduce Tobacco-Related Disparities at Residential Behavioral Health Facilities. <https://tcfor.catcp.org/index.cfm?fuseaction=opportunities.viewOpp&oppID=83>
- Drach LL, Morris D, Cushing C, Romoli C, & Harris RL (2012). Promoting smoke-free environments and tobacco cessation in residential treatment facilities for mental health and substance addictions, Oregon, 2010. *Preventing Chronic Disease*, 9(1). 10.5888/pcd9.110080
- Fichtenberg CM, & Glantz SA (2002). Effect of smoking-free workplaces on smoking behaviour: Systematic review. *BMJ*, 325(188), 1–7. 10.1136/bmj.325.7357.188 [PubMed: 12098707]
- Gubner NR, Williams DD, Le T, Garcia W, Vijayaraghavan M, & Guydish J (2019). Smoking related outcomes before and after implementation of tobacco-free grounds in residential substance use disorder treatment programs. *Drug and Alcohol Dependence*, April 01(197), 8–14. 10.1016/j.drugalcdep.2019.01.001.
- Guydish J, Gruber VA, Le T, Tajima B, Andrews, Blakely K, Leo H, Zura S, Miller R, & Tsoh JY (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. 10.1016/j.jsat.2015.12.002 [PubMed: 26825975]
- Guydish J, Kapiteni K, Le T, Campbell B, Pinsker E, & Delucchi K (2020). Tobacco use and tobacco services in California substance use treatment programs. *Drug and Alcohol Dependence*, 214(May), 108173. 10.1016/j.drugalcdep.2020.108173 [PubMed: 32693199]
- Guydish J, Le T, Campbell B, Yip D, Ji S, & Delucchi K (2017). Drug abuse staff and clients smoking together: A shared addiction. *Journal of Substance Abuse Treatment*, 76, 64–68. 10.1016/j.jsat.2017.01.014 [PubMed: 28143680]
- Guydish J, Tajima B, Kulaga A, Zavala R, Brown LS, Bostrom A, Ziedonis D, & Chan M (2012). The New York policy on smoking in addiction treatment: Findings after 1 year. *American Journal of Public Health*, 102(5), 17–27. 10.2105/AJPH.2011.300590 [PubMed: 22095349]
- Guydish J, Wahleithner J, Williams D, & Yip D (2020). Tobacco-free grounds implementation in California residential substance use disorder (SUD) treatment programs. *Journal of Addictive Diseases*, 38(1), 55–63. 10.1080/10550887.2020.1713687 [PubMed: 32186480]

- Guydish J, Yip D, Le T, Gubner NR, Delucchi K, & Roman P (2017). Smoking-related outcomes and associations with tobacco-free policy in addiction treatment, 2015–2016. *Drug and Alcohol Dependence*, 179(August), 355–361. 10.1016/j.drugalcdep.2017.06.041 [PubMed: 28844012]
- Guydish J, Yip D, Le T, Gubner NR, Williams DD, & Delucchi KL (2019). Tobacco Cessation Services in Addiction Treatment: What Do Clients Say? *Psychiatric Services*, 70, 229–232. 10.1176/appi.ps.201700565 [PubMed: 30630403]
- Hartmann-Boyce J, Chepkin SC, Ye W, Bullen C, & Lancaster T (2018). Nicotine replacement therapy versus control for smoking cessation ( Review ). *Cochrane Database of Systematic Reviews*, 1–174. 10.1002/14651858.CD000146.pub5.www.cochranelibrary.com
- Hosmer DW, & Lemeshow S (2000). *Applied logistic regression* (2nd ed.). Wiley.
- Hunt JJ, Gajewski BJ, Jiang Y, Cupertino AP, & Richter KP (2013). Capacity of US drug treatment facilities to provide evidence-based tobacco treatment. *American Journal of Public Health*, 103(10), 1799–1801. 10.2105/AJPH.2013.301427 [PubMed: 23948006]
- Klemperer EM, Ba JCW, Peasley-miklus C, & Villanti AC (2020). Letter Change in Tobacco and Electronic Cigarette Use and Motivation to Quit in Response to COVID-19. 1662–1663. 10.1093/ntr/ntaa072
- Lasser K, Boyd JW, Woolhandler S, Himmelstein DU, McCormick D, & Bor DH (2015). Smoking and mental illness. *Australasian Psychiatry: Bulletin of Royal Australian and New Zealand College of Psychiatrists*, 23(1), 2606–2610. 10.1177/1039856214565568
- Leas EC, Pierce JP, Benmarhnia T, White MM, Noble ML, Trinidad DR, & Strong DR (2018). Effectiveness of pharmaceutical smoking cessation AIDS in a nationally representative cohort of American smokers. *Journal of the National Cancer Institute*, 110(6), 581–587. 10.1093/jnci/djx240 [PubMed: 29281040]
- Marshall LTL, Kuiper NM, & Rene Lavinghouze S (2015). Strategies to support tobacco cessation and tobacco-free environments in mental health and substance abuse facilities. *Preventing Chronic Disease*, 12(10), 140585. 10.5888/pcd12.140585
- Marynak K, VanFrank B, Tetlow S, Mahoney M, Phillips E, Jamal A, Schechter A, Tipperman D, & Babb S (2018). Tobacco Cessation Interventions and Smoke-Free Policies in Mental Health and Substance Abuse Treatment Facilities — United States, 2016. *Morbidity and Mortality Weekly Report*, 67(18), 519–523. 10.1146/annurev-publhealth-031816-044618 [PubMed: 29746451]
- Oesterle TS, Kolla B, Risma CJ, Breiting SA, Rakocevic DB, Loukianova LL, Hall-Flavin DK, Gentry MT, Rummans TA, Chauhan M, & Gold MS (2020). Substance Use Disorders and Telehealth in the COVID-19 Pandemic Era: A New Outlook. *Mayo Clinic Proceedings*, 95(12), 2709–2718. 10.1016/j.mayocp.2020.10.011 [PubMed: 33276843]
- Patkar AA, Sterling RC, Leone FT, Lundy A, & Weinstein SP (2002). Relationship Between Tobacco Smoking and Medical Symptoms Among Cocaine-, Alcohol-, and Opiate-Dependent Patients. *American Journal on Addictions*, 11(3), 209–218. 10.1080/10550490290087974
- Powell BJ, Waltz TJ, Chinman MJ, Damschroder LJ, Smith JL, Matthieu MM, Proctor EK, & Kirchner JAE (2015). A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*, 10(1), 1–14. 10.1186/s13012-015-0209-1 [PubMed: 25567289]
- Prochaska JJ, Delucchi K, & Hall SM (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. 10.1037/0022-006X.72.6.1144 [PubMed: 15612860]
- 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. 10.1177/1524839916687542 [PubMed: 28125916]
- Roeseler A, & Burns D (2010). The quarter that changed the world. In *Tobacco Control* (Vol. 19, Issue SUPPL. 1, pp. 3–15). 10.1136/tc.2009.030809
- Schroeder SA, Clark B, Cheng C, & Saucedo CB (2018). Helping Smokers Quit: The Smoking Cessation Leadership Center Engages Behavioral Health by Challenging Old Myths and Traditions. *Journal of Psychoactive Drugs*, 50(2), 151–158. 10.1080/02791072.2017.1412547 [PubMed: 29279028]

- Schroeder SA, & Morris CD (2010). Confronting a Neglected Epidemic: Tobacco Cessation for Persons with Mental Illnesses and Substance Abuse Problems. *Annual Review of Public Health*, 31(1), 297–314. 10.1146/annurev.publhealth.012809.103701
- State of California. (2020). Executive Order N-33-20. <https://www.gov.ca.gov/wp-content/uploads/2020/03/3.19.20-attested-EO-N-33-20-COVID-19-HEALTH-ORDER.pdf>
- Thurgood SL, McNeill A, Clark-Carter D, & Brose LS (2016). A systematic review of smoking cessation interventions for adults in substance abuse treatment or recovery. *Nicotine and Tobacco Research*, 18(5), 993–1001. 10.1093/ntr/ntv127 [PubMed: 26069036]
- Weinberger AH, Platt J, Esan H, Galea S, Erlich D, & Goodwin RD (2017). Cigarette smoking is associated with increased risk of substance use disorder relapse: A nationally representative, prospective longitudinal investigation HHS Public Access. *J Clin Psychiatry*, 78(2), 152–160. 10.4088/JCP.15m10062
- Williams JM, Foulds J, Dwyer M, Order-Connors B, Springer M, Gadde P, & Ziedonis DM (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. 10.1016/j.jsat.2005.02.010 [PubMed: 15925267]
- Yeager DS, & Krosnick JA (2010). The Validity of Self-Reported Nicotine Product Use in the 2001–2008 National Health and Nutrition Examination Survey. *Medical Care*, 48(12), 1128–1132. 10.1097/MLR.0b013e3181ef9948 [PubMed: 20940652]
- Yingst JM, Krebs NM, Bordner CR, Hobkirk AL, Allen SI, & Foulds J (2021). Tobacco Use Changes and Perceived Health Risks among Current Tobacco Users during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 18(4), 1795. 10.3390/ijerph18041795 [PubMed: 33673207]
- Ziedonis DM, 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. [PubMed: 17373414]



\* Two programs did not implement tobacco free policies due to county directives requiring a designated smoking area

**Figure 1:**  
Timeline for data collection and tobacco-free policy implementation

**Table 1.**

Demographic characteristics for clients in California residential substance use treatment programs across three timepoints

	Mean (SD) or n (%)			p-value
	Baseline (N=249)	Interim (N = 275)	Post Intervention (N=219)	
<b>Age</b>	39.1 (11.6)	37.3 (10.8)	40.0 (11.9)	<b>0.027</b>
<b>Gender</b>				0.501
Male	205 (82.3%)	236 (86.1%)	182 (83.5%)	
Female	42 (16.9%)	36 (13.1%)	36 (16.5%)	
Other	2 (0.8%)	2 (0.7%)		
<b>Race/ethnicity</b>				0.909
Latino/a	116 (46.6%)	127 (46.5%)	104 (47.7%)	
Black/African American	50 (20.1%)	63 (23.1%)	55 (25.2%)	
White	61 (24.5%)	61 (22.3%)	41 (18.8%)	
American Indian/Alaska	4 (1.6%)	4 (1.5%)	4 (1.8%)	
Asian/Pacific Islander	7 (2.8%)	7 (2.6%)	3 (1.4%)	
Other	11 (4.4%)	11 (4.0%)	11 (5.0%)	
<b>Education level</b>				0.225
<HS	65 (26.1%)	77 (28.1%)	75 (34.4%)	
HS/GED	94 (37.8%)	94 (34.3%)	78 (35.8%)	
>HS	90 (36.1%)	103 (37.6%)	65 (29.8%)	
<b>In treatment for</b>				<b>0.029</b>
Substance use disorder	121 (49.4%)	133 (49.3%)	111 (51.9%)	
Both substance use and mental health disorders	59 (24.1%)	40 (14.8%)	34 (15.9%)	
Others	65 (26.5%)	97 (35.9%)	69 (32.2%)	
<b>Healthcare coverage</b>				<b>&lt;0.001</b>
Medi-Cal	160 (64.3%)	146 (53.1%)	155 (72.1%)	
Medicare	10 (4.0%)	8 (2.9%)	11 (5.1%)	
Other insurance	14 (5.6%)	24 (8.7%)	44 (20.5%)	
No health insurance	65 (26.1%)	97 (35.3%)	5 (2.3%)	



**Table 2:**

Unadjusted analyses of changes in tobacco prevalence, tobacco use behaviors, and tobacco services over time

	Mean (SD) or n (%)			p-value <sup>a</sup>
<b>Full Sample</b>	<b>Baseline (N=249)</b>	<b>Interim (N = 275)</b>	<b>Post Intervention (N=219)</b>	
<b>Smoking Prevalence</b>				<b>&lt;0.001</b>
Current Smoker	135 (54.2%)	115 (41.8%)	58 (26.6%)	
<b>Tobacco Related Services <sup>b</sup></b>				0.648
Tobacco Screening	150 (60.2%)	153 (56.3%)	125 (57.6%)	
<b>Current Smokers</b>	<b>Baseline (N=135)</b>	<b>Interim (N = 115)</b>	<b>Post Intervention (N=58)</b>	
<b>Tobacco Use Behaviors</b>				
Cigarettes per day	8.8 (7.1)	8.6 (6.9)	8.1 (5.6)	0.842
Clients and staff smoking together	36 (28.3%)	21 (19.6%)	9 (16.7%)	0.137
<b>Current Smokers and Former Smokers who Quit in Treatment</b>	<b>Baseline (N= 168)</b>	<b>Interim (N = 161)</b>	<b>Post Intervention (N= 110)</b>	
<b>Tobacco Related Services <sup>b</sup></b>				
Any NRT/pharmacotherapy	20 (11.9%)	39 (24.5%)	27 (25.2%)	<b>0.004</b>
Any referral	53 (31.6%)	54 (34.4%)	35 (34.0%)	0.845
Any counseling	104 (62.3%)	96 (60.4%)	57 (54.8%)	0.466
Quitting in Treatment Plan	50 (29.9%)	66 (41.8%)	30 (27.8%)	<b>0.025</b>

<sup>a</sup>From Chi-square tests for categorical variables and the ANOVAs for continuous variables

<sup>b</sup>The tobacco related service of tobacco screening was assessed among all participants, not current smokers and former smokers who quit in treatment

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 3.**

Logistic regression models of changes in tobacco prevalence, tobacco use behaviors and tobacco services over time

	<u>Interim vs. Baseline <sup>1</sup></u>		<u>Post intervention vs. Baseline <sup>1</sup></u>	
	OR (95% CI)	p value	OR (95% CI)	p value
Current smoking <sup>2</sup>	0.62 (0.42, 0.92)	<b>0.017</b>	0.25 (0.13, 0.45)	<b>&lt;0.0001</b>
Any NRT/pharmacotherapy <sup>3</sup>	3.68 (1.11, 12.19)	<b>0.033</b>	3.02 (1.24, 7.35)	<b>0.015</b>
Quitting in Treatment Plan <sup>3</sup>	1.61 (0.95, 2.71)	0.075	0.90 (0.49, 1.63)	0.719

<sup>1</sup>Adjusted for age, reason in treatment, healthcare coverage, and site effects. Also controlled for nesting of participants within clinics.

<sup>2</sup>Full sample.

<sup>3</sup>Current smokers and former smokers who quit while in treatment.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript