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## Reducing tobacco use in substance use treatment: The California tobacco free initiative

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### Abstract

**Background:** People in substance use disorder (SUD) treatment have a smoking prevalence that is five times higher than the national average. California funded the Tobacco Free for Recovery Initiative, designed to support programs in implementing tobacco-free grounds and increasing smoking cessation services. In the first cohort of the initiative (2018–2020) client smoking prevalence decreased from 54.2% to 26.6%. The current study examined whether similar findings would be replicated with a later cohort of programs (2020–2022).

**Method:** Cross-sectional survey data were collected from clients in 11 residential SUD treatment programs at baseline ( $n = 185$ ) and at post intervention ( $n = 227$ ). Multivariate logistic regression assessed change over time in smoking prevalence, tobacco use behaviors, and receipt of cessation services across the two timepoints.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

**Caravella McCuistian:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing. **Nadra E. Lisha:** Formal analysis, Writing – review & editing. **Barbara Campbell:** Conceptualization, Methodology, Writing – review & editing. **Christine Cheng:** Writing – review & editing. **Jennifer Le:** Conceptualization, Investigation, Methodology, Project administration, Writing – review & editing. **Joseph Gudysh:** Conceptualization, Funding acquisition, Methodology, Supervision, Writing – review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.addbeh.2024.108025>.

**Results:** Client smoking prevalence decreased from 60.3 % to 40.5 % (Adjusted Odds Ratio [AOR] = 0.46, 95 % CI = 0.27, 0.78;  $p = 0.004$ ). Current smokers and those who quit while in treatment reported an increase in nicotine replacement therapy (NRT)/pharmacotherapy from baseline to post intervention (31.9 % vs 45.6 %; AOR = 2.22, 95 % CI = 1.08, 4.58;  $p = 0.031$ ).

**Conclusions:** Like the first cohort, the Tobacco Free for Recovery initiative was associated with decreased client smoking prevalence and an increase in NRT/pharmacotherapy. These findings strengthen the evidence that similar initiatives may be effective in reducing smoking prevalence among people in SUD treatment.

## Keywords

Substance use disorder treatment; Tobacco use; Cessation; Tobacco-free grounds; Health disparities

## 1. Introduction

The United States (U.S.) has experienced a substantial decline in tobacco use over the last decade, with national smoking prevalence decreasing from 16.8 % in 2014 to 11.5 % in 2021 (CDC, 2023; Jamal et al., 2014). However, declines in smoking prevalence are not experienced equally across the U.S., as marginalized communities continue to experience high smoking prevalence. One such population is people who are accessing substance use disorder (SUD) treatment. While recent literature suggests that smoking prevalence among people with SUD may be decreasing (from 46.5 % in 2006 to 35.8 % in 2019) (Han et al., 2022), these data still represent a smoking prevalence more than three times that of the national average. When considering smoking prevalence within SUD treatment settings, the smoking prevalence is higher, estimated at 53–85 %, (Baldassarri et al., 2019; Gass et al., 2018; Guydish et al., 2019; Hunt et al., 2013; Min et al., 2022; Smith et al., 2020) which represents a smoking prevalence more than five times that of the national average.

Smoking among people in SUD treatment is associated with higher rates of medical problems compared to SUD treatment seekers who are non-smokers (Patkar et al., 2002), and tobacco-related deaths among individuals who access SUD treatment surpass tobacco-related deaths of the general population (Bandiera et al., 2015). In addition to the health consequences of high smoking prevalence among individuals in SUD treatment, smoking is also related to poorer treatment outcomes. While causality cannot be determined, individuals who smoke are more likely to report an associated return to use three years after SUD remission (Weinberger et al., 2017).

Despite the disparately high rates of smoking in SUD treatment compared to the general population, few SUD treatment settings across the U.S. currently offer smoking cessation services (Marynak et al., 2018). In 2016, only 64 % of SUD treatment facilities screened for tobacco and fewer offered smoking cessation counseling (47 %) or nicotine replacement therapy (NRT; 26 %) (Marynak et al., 2018). This lack of smoking cessation services could be due to a combination of issues, including a culture that promotes smoking behavior, elevated smoking rates among program staff (Guydish et al., 2007), concern that smoking cessation will distract from other substance use reduction goals, or apprehension regarding

how implementing tobacco-free policies may impact the client census (Fokuo et al., 2022; Pagano et al., 2016).

One method of supporting SUD treatment programs to offer more smoking cessation services is through the implementation of tobacco-free grounds (TFG) policies (e.g., no smoking on program property). Several states (New York, New Jersey, Oregon, and Oklahoma) have implemented policies that require SUD treatment programs to be tobacco-free (Brown et al., 2012; Drach et al., 2012; Marynak et al., 2018; Williams et al., 2005). Utah extended their TFG policy to both mental health and SUD treatment programs (Marshall et al., 2015). Through an academic-community partnership, Texas also supported Local Mental Health Authorities to implement TFG via the Taking Texas Tobacco Free Initiative (Correa-Fernández et al., 2019). Several of these statewide efforts were associated with increased tobacco screening and access to cessation services (Brown et al., 2012; Correa-Fernández et al., 2019; Drach et al., 2012; Williams et al., 2005). These findings were based on program administrator report (Brown et al., 2012; Drach et al., 2012), changes in employee training, education, and practices (Correa-Fernández et al., 2019), and admission and discharge data (Williams et al., 2005). However, few studies have investigated whether such initiatives are associated with a reduction in client smoking prevalence.

In 2019, the California Tobacco Control Program (CTCP) launched the Tobacco Free for Recovery Initiative (CTCP, 2020a), which targeted smoking cessation among people in residential SUD treatment programs. The first cohort of the initiative included seven SUD treatment programs across California. The programs partnered with the Smoking Cessation Leadership Center (SCLC) (Schroeder et al., 2018) to receive targeted support in developing and implementing a TFG policy and to support other wellness activities. An evaluation including these 7 residential SUD treatment programs found that the initiative was associated with a significant decrease in client smoking prevalence (54.2 % to 26.6 %;  $p < 0.0001$ ) and an increase in client receipt of NRT (11.9 % to 25.2 %;  $p = 0.015$ ) from pre to post intervention (McCuistian et al., 2021). While these results are promising, additional research may support generalizability of findings and reinforce the potential benefit of this program-level intervention in reducing smoking prevalence among people accessing SUD treatment.

The current study examined data from 11 additional programs to assess whether the Tobacco Free for Recovery Initiative was associated with changes in client-level smoking prevalence, other tobacco use behaviors, or increased tobacco-cessation services, as was found in a previous study (McCuistian et al., 2021).

## 2. Method

### 2.1. Recruitment and Description of Cohorts

Programs were recruited to participate in the Tobacco Free for Recovery Initiative through a series of three online requests for applications posted by the California Tobacco Control Program (CTCP; CTCP, 2020b, 2020c, 2019). Programs were eligible to participate if they were: 1) licensed non-profit residential behavioral health facilities offering SUD or behavioral health treatment, 2) had a minimum of 15 beds, 3) were providing services for at

least two years and 4) did not have any affiliations or contractual relationships with tobacco, e-cigarette, or cannabis companies. Programs (N = 11) submitted applications and all were awarded contracts which included receiving \$36,000 to support policy implementation.

## 2.2. Tobacco Free for Recovery Description

The Tobacco Free for Recovery Initiative was designed to support programs in developing, implementing, or strengthening a policy that: 1) outlined how tobacco use among clients would be assessed and treated, 2) prevented tobacco use among clients, staff, and visitors within the facility and on program grounds (i.e., TFG policy) and 3) integrated activities that were aligned with state priorities in other areas (e.g., improving client nutrition, increasing physical exercise, reducing gambling) that could support a tobacco-free environment.

The intervention was conducted by the Smoking Cessation Leadership Center (SCLC) (Schroeder et al., 2018). Programs first completed a needs assessment with support from the SCLC to explore any potential barriers that could impact implementation. The SCLC then held an initial meeting with each program to develop a comprehensive action plan for designing and implementing their policy over the course of the 18-month intervention. During this meeting, SCLC provided examples of successful TFG policies and programs were encouraged to form committees that could support implementation. Following the initial meeting, SCLC members met with program representatives monthly to review progress on policy development, discuss challenges, and provide resources to support policy implementation. SCLC also provided smoking cessation training for staff members at each program via sending links to recorded webinars. One representative from each program attended quarterly learning collaboratives with representatives from all other programs in their cohort to receive didactic training and discuss challenges and brainstorm solutions. Over the course of the intervention, programs were encouraged to develop a TFG policy that was tailored to their unique needs and resources. Many programs also decided to create alternatives to smoking routines (e.g., providing gardening or yoga classes), hired additional staff members (e.g., nutritionists) or identified local resources such as the California smoker's helpline (Kick It California). While programs were required to design a TFG policy to fulfill contractual agreements, implementing a TFG policy by the end of the intervention was encouraged but not required.

## 2.3. Evaluation

A research team, independent of the SCLC intervention team, was contracted to conduct an evaluation of the Tobacco Free for Recovery Initiative.

**2.3.1. Participants**—All clients enrolled at the participating SUD treatment programs at the time of data collection were eligible to participate in two cross-sectional surveys conducted at baseline and a post intervention timepoint approximately 18 months after the beginning of the intervention. Residential SUD treatment in California is paid for by Medi-Cal, which covers up to 90 days of treatment. The current paper reports comparisons from baseline to post intervention only (average of 463 days) to ensure independent cross-sectional samples.

**2.3.2. Data collection procedures**—Cross-sectional data collection occurred at baseline and post intervention across 11 programs. Programs were recruited and began the intervention at different timepoints ranging from February 2020 to January 2021. Post intervention data was collected approximately 15.4 months after baseline. Due to state required shelter-in-place protocols for the COVID-19 pandemic (State of California, 2020), data collection was completed using several methods. Prior to the shelter-in-place mandate, one program completed baseline data collection in person via a site visit. Research team members met with small groups of approximately 10 clients at a time and handed each client an iPad displaying the IRB approved study information sheet. Research team members reviewed the information sheet with clients and allowed for any questions. Once the client agreed to participate via iPad, the survey would be displayed. Each survey was pre-populated with a unique research ID number to ensure anonymity. Participants then completed the 30-minute survey via iPad and received a \$20 gift card.

Following the state-wide shelter-in-place mandate in March 2020, data collection procedures were modified due to visitor restrictions. Data collection after this date was conducted remotely via paper or online surveys. Programs opting for paper surveys were mailed surveys with IRB approved information sheets which were distributed to clients by staff members. After reviewing, clients who agreed to participate completed the paper surveys. Each survey included a unique study ID number. The research team also mailed \$20 gift cards to the programs to distribute to participants after they finished the survey. Program staff mailed completed surveys back to the study team. Several programs preferred to complete surveys online in the absence of a site visit. These programs were emailed a link to the IRB-approved information sheet and survey. Program staff asked all clients to complete the survey via computers available for client use at their programs. Similar to paper data collection, programs were also mailed \$20 gift cards to distribute once participation was complete. As COVID-19 restrictions changed over time, one program opted for post data collection using on-site procedures described above.

At each data collection timepoint, program directors provided the number of currently enrolled clients. This information was used to calculate response rates. All study procedures were approved and performed in compliance with the UCSF Institutional Review Board (18–26126; Date Approved: 10/16/2018).

**2.3.3. Measures**—In addition to demographic characteristics, participants were asked whether they were in treatment for substance use, mental health, both substance use and mental health, or other reasons (e.g., as a condition of parole). Participants reporting mental health only or other reasons were collapsed into an “other” category. Participants were also asked to report on healthcare coverage.

All participants reported on smoking status via two questions: Are you a current smoker, and have you smoked at least 100 cigarettes in your lifetime. Current smokers were identified as individuals who said yes to both questions (CDC, 2017). Current smokers reported number of cigarettes per day (CPD). All clients (regardless of smoking status) were asked whether clients and staff smoke together and whether they had been screened for tobacco use while in the program. Current smokers and those who quit while in treatment were asked whether

they received any NRT (e.g., gum, patches, lozenges) or pharmacotherapy. Current smokers and those who quit while in treatment were asked whether they had received a referral to a smoking cessation specialist or the Kick It California help line. Receipt of either was coded as receiving “any referral” to tobacco-related services. Current smokers and those who quit while in treatment were also asked whether they had attended a support group for people trying to quit, received encouragement from their counselor to quit, or had scheduled a meeting with their counselor to discuss smoking cessation. Receipt of any of these services was categorized as receiving “any counseling” for tobacco-related services (Guydish et al., 2020). Finally, current smokers and those who quit while in treatment were asked whether smoking cessation was a part of their treatment plan.

**2.3.4. Data analysis**—Demographic and other characteristics were compared across time using Pearson’s chi-square tests and ANOVA. The eight outcome variables (current smoking prevalence, CPD, client/staff smoking together, screening, receipt of NRT, referral, counseling, and quitting in the treatment plan) were first examined across timepoints using unadjusted analyses (Pearson’s chi square and ANOVA). Variables significant at the  $p < 0.10$  level (Hosmer and Lemeshow, 2000) were examined further in multivariate logistic regression modeling with robust variance estimates models using PROC GENMOD with binomial distribution and logit link. Models were adjusted for demographic or other characteristics that were significantly different across time at  $p < 0.10$ . All models were adjusted for site effects for nesting of clients within clinics. SAS version 9.4 was used to conduct all analyses. For models fit with generalized estimating equations (GEEs), observations with missing values within a cluster are not used, and all available pairs are used in estimating the working correlation matrix. As there were few missing data (<7% on any outcome variable) we did not apply imputation strategies.

A series of sensitivity analyses were also conducted. At post intervention, only eight of the eleven programs had tobacco-free grounds, which includes three programs that had TFG policies at baseline but were accepted to participate in the initiative to strengthen these existing policies. The analyses described above were repeated including only the eight programs that successfully implemented a new policy or strengthened an existing TFG policy. Three programs did not implement a TFG policy over the course of the intervention. A second sensitivity analysis was conducted limited to these three programs to explore whether participation in the initiative (without implementation of the TFG policy) was associated with changes in smoking prevalence and services. Both sensitivity analyses were limited to outcome variables found significant in the main analyses.

### 3. Results

#### 3.1. Program level policies

Each program was encouraged to design a policy for TFG and smoking cessation, tailored to their needs. Programs designed unique policies including creating alternative activities to disrupt smoking routines (e.g., gardening), implementing other wellness-based activities to support cessation (e.g., yoga), or hiring additional staff to support wellness initiatives. SCLC staff who worked with each program were asked to report on TFG policies at baseline and



end of the intervention. At baseline, eight of the eleven programs had no TFG policies. By the end of the intervention, eight of the eleven programs had TFG policies (three of which had TFG policies at baseline).

### 3.2. Participant characteristics

Participation rates for the client surveys were 92 % ( $n = 185$ ) at baseline and 95 % ( $n = 225$ ) at post intervention. The average age was 36.7 (SD = 11.6) at baseline and 37.4 (SD = 10.7) at post-intervention. The sample was 67.9 % male (Table 1). Nearly half (41.5 %) of the sample identified as Latino/a, 37.1 % identified as White, and 8.7 % identified as Black/African American. The most common reason for treatment was SUD (59.9 %). Most of the participants were publicly insured through California's Medicaid program (83.3 %). Across the two timepoints, participants differed at the  $p < 0.10$  level in gender and reason in treatment (Table 1). These were included as covariates in subsequent multivariate analyses.

### 3.3. Baseline tobacco behaviors and cessation services

At baseline, 60.3 % of the clients identified as current smokers. The average number of cigarettes per day was 10.5 (SD = 8.8). Concurrent staff and client smoking was reported by 34.1 % of clients. Several smoking cessation services appeared to be commonly offered to clients including tobacco screening (72.1 %) and counseling (61.6 %). However, other services were less common including NRT/pharmacotherapy being offered (31.9 %), referrals to smoking cessation services (32.9 %), and inclusion of quitting in client treatment plans (34.8 %).

### 3.4. Change across Tobacco Free for Recovery Initiative

Table 2 displays unadjusted analyses exploring differences across baseline and post intervention timepoints. Seven of the eight outcome variables showed significant differences over time at the  $p < 0.10$  level. A significant decrease was found in smoking prevalence over time, decreasing from 60.3 % at baseline to 40.5 % at post. The report of concurrent client/staff smoking also decreased from 34.1 % to 10.7 %. Several tobacco related services also changed over time. Tobacco screening (72.1 % vs. 80.3 %), NRT/pharmacotherapy (31.9 % vs. 45.6 %), referral (32.9 % vs. 46.5 %), counseling (61.6 % vs. 73.8 %), and smoking cessation being in the treatment plan (34.8 % vs. 45.4 %) all increased from baseline to post intervention.

A series of seven multivariate models were employed to test the association between time and the seven outcome variables, adjusting for demographic variables that differed across time (gender and reason in treatment) and controlling for nesting of participants within clinics (Table 3). Among the full sample, smoking prevalence decreased from baseline (60.3 %) to post (40.5 %) intervention (AOR = 0.46, 95 % CI = 0.27, 0.78;  $p = 0.004$ ). Among current smokers and those who quit while in treatment, a significant increase was found in receipt of NRT/pharmacotherapy comparing baseline (31.9 %) to post intervention (45.6 %; AOR = 2.22, 95 % CI = 1.08, 4.58;  $p = 0.031$ ). No other outcome variables showed statistically significant changes over time.



### 3.5. Sensitivity analyses

**3.5.1. Programs with TFG policies at post intervention**—Analyses were repeated limiting the sample to the eight programs that had a tobacco-free grounds policy at the post intervention timepoint (Supplementary Table 1). Only outcome variables that were significant in the main analysis (smoking prevalence and receipt of NRT) were included in these analyses. A similar decrease in smoking prevalence was found among this subsample of programs, with smoking prevalence decreasing from baseline to post intervention (59.8 % vs 37.4 %; AOR = 0.38, 95 % CI = 0.17, 0.83;  $p = 0.015$ ). Receipt of NRT/pharmacotherapy also increased from 27.1 % at baseline to 46.7 % at post (AOR = 3.00, 95 % CI = 1.31, 6.88;  $p = 0.001$ ).

**3.5.2. Programs without TFG policies at post intervention**—A second sensitivity analysis was conducted limiting the sample to the three programs that had not implemented a TFG policy by the end of the intervention (Supplementary Table 1). The same pattern of decreased smoking prevalence emerged when comparing baseline (61.4 %) to post intervention (49.2 %; AOR = 0.59, 95 % CI = 0.42, 0.83;  $p = 0.003$ ). However, receipt of NRT/pharmacotherapy did not significantly increase from baseline (42.9 %) to post (41.7 %) in the unadjusted analyses and was thus not examined in a multivariate model.

## 4. Discussion

This paper describes the evaluation of the California Tobacco Free for Recovery Initiative. Eleven participating programs received monetary support and training to assist in the development of TFG policies and implementation of smoking cessation services and other wellness activities. At the end of the 18-month intervention, eight of the eleven programs reported TFG policies, including three programs that had TFG policies at baseline and five programs that implemented TFG policies during the intervention. Three programs did not implement TFG policies during the intervention.

Despite the variability in policy implementation, the Tobacco Free for Recovery Initiative was associated with a significant decrease in client level smoking prevalence from baseline (60.3 %) to post intervention (40.5 %). This change was accompanied by a significant increase in NRT/pharmacotherapy from baseline (31.9 %) to post intervention (45.6 %). These findings demonstrate the promise of the Tobacco Free for Recovery Initiative and support prior findings concerning this intervention. In a prior study involving a different set of programs (McCuistian et al., 2021), the initiative was associated with both a decrease in smoking prevalence (54.2 % vs. 26.6 %) and an increase in receipt of NRT/pharmacotherapy (11.9 % vs. 25.2 %).

However, unlike the programs included in the current paper, all but two of the programs in the first cohort implemented TFG policies. The strength of the findings from the first cohort brings to question whether full implementation of TFG policies among programs in the current paper may have resulted in even further decreases in smoking prevalence or increases in services. Among programs that implemented TFG policies, smoking prevalence decreased from 59.8 % – 37.4 %, which is a 22.4 % decrease. This is only approximately 3 percentage points higher than the decrease seen in the full sample (19.8 %). Programs who

did not implement TFG policies also experienced a decrease in smoking prevalence over the intervention (from 61.4 % to 49.2 %), but they only experienced a 12.2 % decrease. However, the current study was not designed to statistically compare the differences in these two decreases, so this should be interpreted with caution.

Sensitivity analyses also revealed a potential difference in NRT/pharmacotherapy across programs that did vs. did not implement TFG policies. Among programs that did implement a policy, NRT/pharmacotherapy increased from 27.1 % – 46.7 %. Among programs that did not implement TFG policies, NRT/pharmacotherapy showed no change (42.9 % baseline v. 41.7 % post-intervention). These findings could suggest that while implementation of TFG may not be necessary for reducing smoking prevalence in SUD treatment programs, it may contribute to program-level culture changes (including increasing access to services) which support smoking cessation.

Although new TFG policies were implemented in 5 programs (3 programs had such policies in place at baseline), tobacco-cessation services increased over time in all programs, with 45–74 % of clients who smoke or recently quit smoking reporting that they received some form of cessation service while in treatment. This could represent a culture change regarding the acceptance of cessation services within the participating SUD treatment programs, as previous literature suggests that few Californian SUD treatment facilities offer NRT/pharmacotherapy (19.6 %), counseling (42.3 %) or even screen for tobacco (51.5 %; (Marynak et al., 2018).

One factor that should be considered when interpreting results between programs that did vs. did not implement TFG policies is the potential implication of how TFG policies may influence client census. It is feasible that an individual who currently smokes may choose against seeking treatment in a program that has a TFG policy, which could artificially impact the decrease in smoking prevalence at post intervention. This could also impact treatment seeking more broadly. This issue has been reported variably in qualitative interviews, with some residential SUD treatment program directors reporting a negative impact on census and others denying any long-term negative impact (Pagano et al., 2016). Other evidence suggests that TFG policies do not affect program utilization, including the smoking status of clients at admission (Asamsama et al., 2019; Callaghan et al., 2007; Conrad et al., 2018). There are also multiple contractual, funding, and COVID-pandemic reasons that may have influenced client census in the present study, which suggests this question warrants future research.

Some literature also suggests that integrating smoking cessation services in SUD treatment may present treatment complications for some individuals who rely on smoking to cope with cravings (Gulliver et al., 2006) and may not always be warranted due to an overlap in theory-based treatment approaches between existing SUD treatment interventions (Moos, 2007). This issue warrants further exploration.

Due to the negative impact that clients and staff smoking together can have on client smoking cessation (Guydish et al., 2017), this variable was explored in the current analysis. There were no pre-post differences in concurrent staff/client smoking. However,

a separate analysis of staff and director surveys from the same programs in this cohort indicated that offering smoking cessation services for staff increased from one program at pre-implementation to nine programs at post-implementation. Additionally, there was a significant pre-post decrease in staff smoking (Campbell et al., 2024). This represents another important area for future research that may have implication for client smoking cessation. Future TFG interventions may be modified to include more of an emphasis on reducing staff level smoking.

The current study is not without limitation. California implemented a shelter in place policy due to the COVID-19 pandemic in March 2020, which resulted in many treatment programs across California quickly pivoting their practices to remain open while implementing COVID-19 protocols (McCuistian et al., 2023). The COVID-19 related disruptions in SUD treatment programs may have affected programs in their ability to implement a TFG policy.

COVID-19 also resulted in modified data collection protocols to allow for remote data collection procedures that were implemented flexibly across different programs (e.g., via in person site visits, paper surveys, and online surveys). While client response rates were high using all of these procedures, the potential bias associated with this change is unknown. Another limitation due to COVID-19 was the inability to collect biological verification of smoking status. Under-reporting of tobacco use via self-report is uncommon (Yeager and Krosnick, 2010), although the risk of under-reporting may be elevated in programs having TFG policies.

Generalizability of the findings is limited to California residential SUD treatment programs, and more information is needed about whether similar initiatives would be feasible in other states. Although replication is crucial for strengthening existing evidence, it may not offer the same degree of novelty as original research. This study also uses a pre-post design, suggesting that future research designs which are inclusive of a control group are warranted to examine the impact of a TFG policy intervention on smoking prevalence. Finally, the study employed a cross-sectional survey design, so causality cannot be determined.

In the context of these limitations, study results replicate findings from a prior study of the Tobacco Free for Recovery Initiative, increasing confidence that this intervention (or similar interventions) can be effective in reducing tobacco use among clients in SUD treatment. In the current study, the intervention was associated with a significant decrease in smoking prevalence (60.3 % vs. 40.5 %) and an increase in NRT/pharmacotherapy (31.9 % vs. 45.6 %). These findings suggest that providing dedicated funds, expert training and consultation, and community learning opportunities to SUD treatment programs can support the development of policies that decrease smoking prevalence and increase cessation services for a population disparately impacted by smoking.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Role of funding source

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## Data availability

Data will be made available on request.

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**Table 1**

Demographic characteristics for clients across two timepoints.

|                                                | Mean (SD) or n (%) |                             |              |  |
|------------------------------------------------|--------------------|-----------------------------|--------------|--|
|                                                | Baseline (n = 185) | Post Intervention (n = 227) | p-value      |  |
| <b>Age</b>                                     | 36.7 (11.6)        | 37.4 (10.7)                 | 0.544        |  |
| <b>Gender</b>                                  |                    |                             | <b>0.015</b> |  |
| Male                                           | 113 (61.8 %)       | 167 (74.2 %)                |              |  |
| Female                                         | 68 (37.2 %)        | 54 (24.0 %)                 |              |  |
| Other                                          | 2 (1.1 %)          | 4 (1.8 %)                   |              |  |
| <b>Race/ethnicity</b>                          |                    |                             | 0.391        |  |
| Latino/a                                       | 75 (40.8 %)        | 96 (42.3 %)                 |              |  |
| Black/African American                         | 20 (10.9 %)        | 16 (7.1 %)                  |              |  |
| White                                          | 65 (35.3 %)        | 88 (38.8 %)                 |              |  |
| American Indian/Alaskan Native                 | 6 (3.3 %)          | 2 (0.9 %)                   |              |  |
| Asian/Pacific Islander                         | 4 (2.2 %)          | 5 (2.2 %)                   |              |  |
| Other                                          | 14 (7.6 %)         | 20 (8.8 %)                  |              |  |
| <b>Education level</b>                         |                    |                             | 0.662        |  |
| <HS                                            | 51 (27.6 %)        | 71 (31.7 %)                 |              |  |
| HS/GED                                         | 62 (33.5 %)        | 71 (31.7 %)                 |              |  |
| >HS                                            | 72 (38.9 %)        | 82 (36.6 %)                 |              |  |
| <b>In treatment for</b>                        |                    |                             | <b>0.013</b> |  |
| Substance use disorder                         | 101 (54.6 %)       | 146 (65.5 %)                |              |  |
| Both substance use and mental health disorders | 63 (34.1 %)        | 47 (21.1 %)                 |              |  |
| Other                                          | 21 (11.4 %)        | 30 (13.5 %)                 |              |  |
| <b>Healthcare coverage</b>                     |                    |                             | 0.141        |  |
| Medi-Cal/Medicare                              | 151 (81.6 %)       | 192 (86.0 %)                |              |  |
| Other insurance                                | 30 (16.2 %)        | 25 (11.2 %)                 |              |  |



**Table 2**

Unadjusted smoking behavior and services across two timepoints.

|                                  | Mean (SD) or n (%) |                   |                 |
|----------------------------------|--------------------|-------------------|-----------------|
|                                  | Baseline           | Post Intervention | p-value         |
| <b>Smoking Prevalence</b>        |                    |                   |                 |
| Current Smoking                  | 111 (60.3 %)       | 92 (40.5 %)       | < <b>0.001</b>  |
| <b>Tobacco Related Behaviors</b> |                    |                   |                 |
| Cigarettes per day               | 10.5 (8.8)         | 9.4 (7.3)         | 0.335           |
| Concurrent client/staff smoking  | 63 (34.1 %)        | 24 (10.7 %)       | < <b>0.0001</b> |
| <b>Tobacco Related Services</b>  |                    |                   |                 |
| Tobacco screening                | 132 (72.1 %)       | 179 (80.3 %)      | <b>0.054</b>    |
| NRT/Pharmacotherapy              | 44 (31.9 %)        | 77 (45.6 %)       | <b>0.015</b>    |
| Referral                         | 45 (32.9 %)        | 79 (46.5 %)       | <b>0.016</b>    |
| Counseling                       | 85 (61.6 %)        | 124 (73.8 %)      | <b>0.022</b>    |
| Quitting in Treatment Plan       | 48 (34.8 %)        | 79 (45.4 %)       | <b>0.058</b>    |

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**Table 3**

Regression models of changes in tobacco prevalence, tobacco use behaviors and tobacco services over time <sup>1</sup>.

|                                            | Post Intervention vs. Baseline <sup>1</sup> |              |
|--------------------------------------------|---------------------------------------------|--------------|
|                                            | OR (95 % CI)                                | p value      |
| <b>Smoking prevalence</b>                  |                                             |              |
| Current smoking <sup>2</sup>               | 0.46 (0.27, 0.78)                           | <b>0.004</b> |
| <b>Tobacco Related Behaviors</b>           |                                             |              |
| Client/Staff smoking together <sup>2</sup> | 0.19 (0.01, 3.89)                           | 0.284        |
| <b>Tobacco Related Services</b>            |                                             |              |
| Tobacco screening <sup>2</sup>             | 0.49 (0.75–2.83)                            | 0.270        |
| NRT/ pharmacotherapy <sup>4</sup>          | 2.22 (1.08, 4.58)                           | <b>0.031</b> |
| Referral <sup>4</sup>                      | 2.07 (0.97, 4.41)                           | 0.059        |
| Counseling <sup>4</sup>                    | 2.17 (0.88, 5.38)                           | 0.094        |
| Quitting in Treatment Plan <sup>4</sup>    | 0.65 (0.37, 1.16)                           | 0.146        |

<sup>3</sup>Current smokers; presented mean ratio.

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

<sup>2</sup>Full sample.

<sup>4</sup>Current smokers and former smokers who quit while in treatment.

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