



Tobacco use among substance use disorder (SUD) treatment staff is associated with tobacco-related services received by clients

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ABSTRACT

Background: Despite disproportionately high rates of smoking among people in residential substance use disorder (SUD) treatment, few receive tobacco cessation services. Little is known about how smoking among treatment staff may impact this disparity. We explored the relationship between staff tobacco use and client tobacco use. Additionally, we examined the relationship between staff tobacco use and tobacco-related services reported by staff and clients.

Methods: Staff ($n = 363$) and clients ($n = 639$) in 24 California publicly-funded residential SUD treatment programs were surveyed in 2019–20. Staff self-reported current tobacco use, as well as their beliefs, self-efficacy, and practices regarding smoking cessation. Clients reported their tobacco use and the services received while in treatment. Regression analyses examined the adjusted and unadjusted associations between staff and client tobacco use and other outcomes.

Results: Use of any tobacco product by staff ranged from 0% to 100% by program, with an average of 32% across programs. Adjusted analyses found that higher rates of staff tobacco use were associated with higher rates of client tobacco use, and with fewer clients receiving tobacco-related counseling. In programs that had higher rates of staff tobacco use, staff were less likely to believe that clients should quit smoking in treatment and had lower self-efficacy to address smoking.

Conclusion: Higher rates of tobacco use among staff are associated with higher rates of client tobacco use and fewer clients receiving cessation counseling. Efforts to reduce tobacco use among SUD clients should be supported by efforts to reduce tobacco use among staff. SUD treatment programs, and agencies that fund and regulate those programs, should aim to reduce the use of tobacco products among staff.

1. Introduction

Smoking rates among persons with substance use disorders (SUD) are higher than in the general population (Richter, Ahluwalia, Mosier, Nazir, & Ahluwalia, 2002; Smith, Mazure, & McKee, 2014), and showed no decline from 2002 to 2014 (Weinberger et al., 2018). This disparity suggests that population level tobacco control strategies such as education and taxation have limited effect among people with SUDs (Warner, 2006). Smokers with SUDs smoke more heavily (Ward, Kedia,

Webb, & Relyea, 2012), have a harder time quitting smoking (Weinberger, Funk, & Goodwin, 2016), and experience both excess and premature tobacco-related mortality (Bandiera, Anteneh, Le, Delucchi, & Gudysh, 2015).

About 2.4 million Americans enter SUD specialty treatment annually (SAMHSA, 2017), and among those the smoking prevalence is about 70% (Gudysh, Le, Gubner, Williams, & Delucchi, 2019). Receiving smoking cessation services while in SUD treatment is associated with improvement in SUD outcomes (Baca & Yahne, 2009; Prochaska,

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Delucchi, & Hall, 2004) and continued smoking is associated with relapse to substance use (Weinberger et al., 2017). However, in one review only 40% of SUD programs offered cessation counseling and only 26% offered cessation medication (Knudsen, 2017). Resource limitations, such as lack of staff time or training, are commonly cited to explain this discrepancy (Sheals, Tombor, McNeill, & Shahab, 2016). Some staff believe that quitting smoking poses a risk to sobriety, or that clients are not interested in quitting (Guydish, Passalacqua, Tajima, & Manser, 2007), although such beliefs have been debunked (Prochaska, 2011).

One reason why tobacco services are not delivered in SUD programs may be the level of tobacco use among staff (Cookson et al., 2014; Guydish et al., 2007). Several papers report SUD staff smoking rates 10% higher than that of the U.S. general population (Bobo & Davis, 1993; Gill & Bennett, 2000; Olsen, Alford, Horton, & Saitz, 2005; Rothrauff & Eby, 2011). Other papers report staff smoking rates only slightly higher than population rates (Chisolm et al., 2010; Laschober, Muilenburg, & Eby, 2015; Muilenburg, Laschober, Eby, & Moore, 2016; Pagano, Guydish, Le, et al., 2016). Knudsen, Studts, and Studts (2012), surveying counselors from over 400 programs, reported a staff smoking rate (20%) very close to the population rate at that time. Laschober et al. (2015) surveyed counselors from over 200 programs, and reported a 21% staff smoking rate. Reports from the UK and Australia found staff smoking rates 10–25% higher than the general population (Cookson et al., 2014; Skelton et al., 2017).

Related questions are whether staff smoking is associated with client smoking rates, and whether staff smoking rates are associated with client receipt of tobacco-related services. While we found no studies for the former question, several papers have explored the latter. Early studies of staff suggest that those who smoke, as compared to non-smokers, have more resistant views towards smoking as a treatment issue (Bobo, Slade, & Hoffman, 1995; Campbell, Krumenacker, & Stark, 1998). Staff who smoke less often provided tobacco-related services to clients (Knudsen & Studts, 2010), and more often believed that clients are not interested in quitting smoking (Laschober et al., 2015; Skelton et al., 2017). One study found that counselor smoking status was not associated with providing cessation counseling to clients (Knudsen et al., 2012).

Studies of both staff and clients, in the same program, may illuminate any relationship between staff smoking and providing tobacco-related services to clients. Bernstein and Stoduto (1999) surveyed staff and clients after initiating a choice-based smoking program within a treatment facility. While 38% of the clients had a counselor who smoked, staff smoking was not associated with client participation in the smoking program. Olsen et al. (2005) found that 97% of counselors reported providing smoking cessation counseling to clients, but only 48% of clients reported receiving such counseling. Counselor smoking status was not associated with client receipt of cessation counseling.

While prior literature has focused on smoking combustible cigarettes, it may be helpful to consider use of other tobacco products since, among SUD clients, recent use of any tobacco product is 4–5% higher than use of combustible cigarettes alone (Guydish et al., 2016; Guydish et al., 2020). Assessing the relationship between tobacco use among staff and among clients, and between staff tobacco use and client receipt of tobacco-related services, requires data collection among staff and clients in the same program. It also requires data collection in a number of programs because the program becomes the unit of analysis. For these reasons, studies using client level variables aggregated to the program level, such as the association between staff and client tobacco use, are infrequent in the SUD treatment literature.

Such studies may be important, however, with respect to tobacco use in SUD treatment. High rates of tobacco use among staff may normalize tobacco use, hinder tobacco policy development or enforcement and, where tobacco using staff are reluctant to counsel clients about tobacco use, limit the level of tobacco-related services provided. In that case, reducing tobacco use among staff may be necessary in order to reduce

tobacco use among clients. To assess the association between staff tobacco use and client tobacco use we surveyed both staff and clients in 24 California publicly-funded residential SUD treatment programs. As a secondary aim, we examined whether tobacco use among staff was associated with measures of tobacco-related services as reported by both staff and clients.

2. Methods

2.1. Program recruitment

We collected data between January 2019 and July 2020 from 24 California licensed residential SUD programs recruited in the course of three studies designed to improve tobacco-related policies and services. Program inclusion criteria were for California state-licensed residential SUD programs, where the Program Director indicated willingness to participate in a tobacco-related intervention. The 24 programs were located in 12 of California's 58 counties, ranging from Lake County in the North to San Diego County in the South. Additional information about program selection and recruitment is reported in Guydish et al. (2020).

2.2. Participants

Participants included program clients, staff, and directors. Eligible clients were all those enrolled in the program at the time of data collection. Eligible staff were all full and part time paid staff working in the program. As three program directors led more than one program, 20 directors represented the 24 programs.

2.3. Procedures

Site visits to collect client surveys were generally completed in one day. Program directors reported the number of clients enrolled in the program, for use in calculating response rates. Research staff reviewed a study information sheet with clients in small groups, and gave each client a computer tablet survey with a pre-populated ID number. The client reviewed the study information sheet on the tablet and used a button to consent or to decline participation. The anonymous survey took about 30 min. After the survey, research staff assessed clients' expired carbon monoxide (CO) was using a Bedfont piCO™ hand-held monitor (Bedfont Scientific Ltd., 2018). At four programs where no site visit occurred due to COVID restrictions, clients completed the same procedures on a computer provided by their program, however CO data were not collected because research staff were not present on site. Participants received a \$20 gift card.

Directors at each program provided the research team with staff work email addresses, and staff were then invited by email to complete the confidential online survey. After three weekly reminders, the research team used additional strategies approved by the Director. For example, having the Director send a reminder to non-responders, or having the research team re-send the invitation to non-responders. Staff respondents received a \$25 gift card.

Program directors completed an online tobacco policy survey. Study procedures were approved by the Institutional Review Board of the University of California San Francisco.

2.4. Measures

2.4.1. Client measures

In addition to demographic characteristics, participants reported their health insurance coverage. The California Medicaid program (Medi-Cal) covers residential SUD treatment (DHCS, 2020), and also covers smoking cessation counseling and medication (DHCS, 2016). All three study surveys asked participants whether they sought treatment mainly for a substance use problem, for both substance use and mental

health problems, or for some other problem. However, the survey for one study also allowed respondents to say they were in treatment for mental health problems only. For the purpose of analyses, these cases were combined into the substance use and mental health category. Current smoking status was defined by asking clients "Do you currently smoke cigarettes?" with response codes "Yes, I currently smoke," "No, I quit smoking," and "No, I never smoked."

In programs where CO measures were included, we used ≤ 9 ppm to verify non-smoking status. Earlier guidelines for biochemical verification of smoking status recommended using a cutoff from 8 to 10 ppm (Benowitz et al., 2002). More recent guidelines recommend a range of 5–6 ppm while commenting that higher cutoffs may be needed where environmental exposure is high (Benowitz et al., 2019). Indoor smoking is not permitted in public buildings in California, including residential SUD programs, however the rate of smoking among clients is very high (59.6% in the current sample), and outdoor smoking on program grounds is common. Residential SUD clients, even non-smokers, are likely to be exposed to secondhand smoke in the course of entering and exiting buildings, or during breaks where clients socialize in designated outdoor smoking areas. Given the high rate of smoking and likelihood of secondhand smoke exposure, we used the more relaxed (≤ 9 ppm) cutoff. Clients who self-reported as non-smokers, but registered CO above the cutoff were regarded as "probable smokers," and treated as current smokers for analyses. Clients also reported whether they had used e-cigarettes, smokeless tobacco, cigars or little filtered cigars in the past month. These items were used to calculate the proportion who used at least one tobacco product in the past month. Current smokers also reported number of cigarettes per day (CPD), whether they had made a quit attempt in the past year, and whether they were thinking about quitting smoking in the next 30 days.

The survey asked clients about four tobacco-related services they may have received in the treatment program. All clients reported whether any staff member had asked if they smoke. Current smokers reported whether they had attended a smoking cessation support group (yes/no), and how often their counselor encouraged them to quit smoking or arranged an appointment to discuss quitting. The last two items were dichotomized as Never vs. Occasionally/Often/Very Often/Always. If a client received one or more of these three services, they were coded as having received any counseling. Smokers who received a referral to either a smoking cessation specialist or a telephone quitline were coded as having received any referral. Last, smokers who received any nicotine replacement therapy (NRT) or other cessation medication were coded as receiving any NRT/Pharmacotherapy.

2.4.2. Staff measures

In addition to demographic characteristics, staff self-reported current smoking status, but without biochemical verification. Staff reported whether they had used e-cigarettes, smokeless tobacco, cigars or little filtered cigars in the past month. These items were used to calculate the proportion who used any tobacco product in the past month. Current smokers reported number of cigarettes per day (CPD), whether they had made a quit attempt in the past year, and whether they were thinking about quitting smoking in the next 30 days.

Staff also completed the Smoking Knowledge, Attitudes and Practices (S-KAP) survey which includes multi-item scales reflecting beliefs about addressing tobacco use in SUD treatment ($\alpha = 0.74$), self-efficacy in providing tobacco-related services ($\alpha = 0.72$), and practices ($\alpha = 0.91$) used by counselors to address smoking with clients (Delucchi, Tajima, & Guydish, 2009). The Belief scale includes 7 items which ask, for example, whether quitting smoking while in treatment threatens sobriety and whether counseling motivates clients to quit. The Self-Efficacy scale includes 9 items concerning skills in providing tobacco-related services, for example, that clients want to quit and are likely to follow the clinician's advice. The Practice scale includes 9 items which ask, for example, how often the counselor asks, advises, or assists clients with quitting smoking. All responses are scored from 1 to 5, and the mean of

items comprises the scale score. Higher scale scores reflect more positive beliefs about addressing smoking, greater self-efficacy and greater use of practices to address smoking. Scale items, response codes, and mean (SD) values for the current staff sample are included in Supplemental Table 1.

Residential SUD programs include both clinical and non-clinical staff however, only clinical staff would deliver tobacco-related services. Consequently, the Beliefs scale was completed by all staff, while only clinical staff completed the Self-efficacy and Practice scales. Clinical staff were those who had an active client caseload in the past month (values ≥ 1) and/or had conducted group or individual sessions in the past week (values ≥ 1).

2.4.3. Program tobacco policy

Program directors reported on the tobacco policy at each program was measured using a survey developed for this study. The survey included 20 items drawn from prior research concerning tobacco free grounds (Muilenburg et al., 2016), smoking among staff (Cookson et al., 2014; Skelton et al., 2017), and staff and clients smoking together (Guydish, Campbell, Yip, & Delucchi, 2017). Each item is assigned a score of 1 if the response is aligned with strategies that discourage smoking. For example, the program receives points if clients (1 point) and staff (1 point) are not permitted to smoke outdoors on program grounds, and if the program provides tobacco-related screening (1 point), advice (1 point), counseling (1 point), referral (1 point) or education (1 point). The total possible score is 20, and in this sample of 24 programs the tobacco policy scores ranged from 3 to 19 (median = 11). The scale items and scoring are found at <https://doi.org/10.6084/m9.figshare.14550981.v1>

2.5. Data analysis

We report demographic and tobacco use characteristics, aggregated across programs, for clients and staff. For clients we report the proportion who received each of the four tobacco-related services and, for staff, the mean values for the three scales.

We assessed the association between staff use any tobacco product in each program as the predictor and each of 8 outcomes (client use of any tobacco product, the four client-reported tobacco service measures, and the three staff-reported measures) using general linear models. The unit of the analysis was the clinic ($N = 24$), limiting sample size. The small sample size hindered the number of control variables included in the models. We controlled for two covariates likely to influence associations between staff smoking rates and client receipt of tobacco-related services. These are the proportion of clients in each program who were covered by Medi-Cal and for whom cessation services were covered as a healthcare benefit, and the strength of program tobacco policies which may encourage quitting and reduce tobacco-related disease in this population (Marynak et al., 2016). Unadjusted estimates (with 95% CI) and adjusted estimates (with 95% CI) were presented. We classified 47 cases as "probable smokers" due to discordant self-report and expired CO measures, and these cases were included in the main analyses as current smokers. As it is possible that these cases were not smokers, we repeated multivariate analyses testing the association between staff and client smoking prevalence, but excluding the 47 "probable smokers." Last, we graphically represent the association between staff use of any tobacco product in each program and client use of any tobacco product in its respective program using a scatterplot.

3. Results

3.1. Demographic and tobacco use characteristics

Across all programs, 639 clients completed the survey, representing 84% of those eligible. Participation rates in individual programs ranged from 67% to 100%. Demographic, insurance, and reason for treatment

variables are given in Table 1. With non-smoking status verified by expired CO ≤ 9 ppm, client smoking prevalence was 67%. This prevalence includes 47 cases who self-reported as non-smokers but registered above the CO cutoff. An additional 26 cases reported no current use of combustible cigarettes, but used other tobacco products in the past month, giving a total of 454 (71%) tobacco users.

Across all programs, 363 staff completed the survey, representing 80% of those eligible. Participation rates in individual programs ranged from 59% to 100%. Staff demographic characteristics are reported in Table 1. Nearly two-thirds (65.4%) had clinical responsibilities. Among staff, 21.8% self-reported as current smokers, and 32% had used any tobacco product in the past month.

Table 1
Demographic characteristics for clients (N = 639) and staff (N = 363) across 24 SUD treatment programs.

	Mean (SD) or n (%)	
	Clients (n = 639)	Staff (n = 363)
Age, mean	38.5 (11.7)	44.6 (12.5)
Gender, %		
Male	460 (72.2%)	122 (33.7%)
Female	166 (26.1%)	233 (64.4%)
Other	11 (1.7%)	7 (1.9%)
Race/ethnicity, %		
Hispanic/Latino	255 (39.9%)	111 (30.8%)
Black or African American	126 (19.7%)	81 (22.4%)
White or Caucasian	193 (30.2%)	124 (34.4%)
Other/Multiple ^a	65 (10.2%)	45 (12.5%)
Education, %		
No HS diploma/GED	164 (25.7%)	7 (2.0%)
High school diploma or GED	223 (34.9%)	52 (14.7%)
Some college or technical/trade school ^b	186 (29.1%)	127 (36.0%)
Bachelor's or Associate's	66 (10.3%)	104 (29.5%)
Graduate degree ^c		63 (17.9%)
Smoking Status, %		
Current Smoker	381 (59.6%)	79 (21.8%)
Probable smoker ^d	47 (7.4%)	
Former Smoker	150 (23.5%)	177 (48.8%)
Never Smoker	61 (9.6%)	107 (29.5%)
Any E-cigarette use past month	47 (23.4%)	61 (16.8%)
Any Tobacco Product use past month	454 (71.1%)	116 (32.0%)
Healthcare coverage, %		
Medi-Cal	453 (70.9%)	
Medicare	30 (4.7%)	
Employer, family, or other plan ^e	38 (6.0%)	
No healthcare coverage	71 (11.1%)	
Don't know/not sure if covered	47 (7.4%)	
In treatment for, %		
Substance use	356 (56.2%)	
Both substance use and mental health ^f	189 (29.8%)	
Other reason for treatment	89 (14.0%)	
Clinical Staff, n (%)		236 (65.4%)

^a Client category includes American Indian or Alaska Native (2.7%), Asian/Pacific Islander (1.7%), and those reporting multiple (3.8%) and "other" (2.0%) race/ethnicity. Staff category includes American Indian or Alaska Native (0.8%), Asian (2.2%), Native Hawaiian/Pacific Islander (1.1%), those reporting multiple (4.2%), and "other" (4.2%) race/ethnicity

^b For staff, this category includes cases reporting college coursework related to counseling licensure.

^c Graduate training was not asked of clients

^d Self-reported as non-smokers but registered >9 ppm on expired CO measure.

^e Includes cases reporting another source of health insurance (2.8%) and those reporting that source of health insurance was unknown (1.1%)

^f In one of the projects, response codes for this item included "mental health only" (with 3.2%) responses. To represent the entire sample, these cases are collapsed into "Both substance use and mental health disorders."

Among current smokers, for clients and staff respectively, mean (SD) CPD was 9.8 (7.7) and 7.9 (5.7), proportions reporting a quit attempt in the past year were 59.8% and 65.8%, and proportions thinking of quitting smoking in the next 30 days were 32.4% and 39.2% (data not shown). As the Tobacco Policy Measure was developed for this study, we assessed the correlation between the policy measure (reported by program directors) and the Belief, Self-Efficacy, and Practice scales (reported by program staff) in the 24 programs. The policy measure was positively and significantly correlated with the Belief ($r = 0.52, p < .01$) and Practice ($r = 0.42, p < .05$) scales, but the correlation fell short of significance for the Self-Efficacy scale ($r = 0.39, p = .063$). These findings suggest that tobacco policy measure reported by program directors was positively associated with tobacco-related beliefs and practices reported by staff in the same program.

3.2. Tobacco related services measures reported by clients and staff

Table 2 summarizes, in the first column, the proportion of clients who were asked about their smoking status, and who received tobacco-related counseling, medication, or referral. The denominator varies because smoking status was asked of all clients (N = 639), while receipt of tobacco-related services was asked only of those who reported current smoking status or quitting smoking while in the treatment program (n = 466). Among all clients, 64.1% had been asked their smoking status. Among tobacco users or those who quit in the program, 57.1% had received tobacco-related counseling, 26% had received cessation medication, and 32.5% had received tobacco-related referral.

The rightmost column of Table 2 shows mean (SD) values for the three S-KAP scales. The denominator varies by scale, as the belief scale items were asked of all staff (N = 363) while the efficacy and practice scale items were asked of clinical staff (n = 236). All mean scale scores shown occur on a scale of 1 to 5, where higher scores indicate greater belief about treating tobacco use, and greater ability to do so.

3.3. Association between staff tobacco, client tobacco use, and tobacco service measures

Results of analyses for associations between staff use of any tobacco product and both client and staff outcome measures are shown in Table 3. At the top of the table, the first unadjusted estimate shows that the rate of staff tobacco use was positively associated with the rate of client tobacco use (beta = 0.63, CI 0.13, 1.12). After adjusting for the proportion of clients who were covered by Medi-Cal and strength of the tobacco policy in each program, this association remained significant

Table 2
Tobacco-related services reported by clients and staff across 24 SUD treatment programs.

	Mean (SD) or n (%)	
	Clients	Staff
Client was asked about smoking ^a	409 (64.1%)	N/A
Client received any counseling ^b	265 (57.1%)	N/A
Client received any cessation medications ^b	121 (26.0%)	N/A
Client received any referral ^b	151 (32.5%)	N/A
Staff belief scale ^c	N/A	3.5 (0.70)
Staff self-efficacy scale ^d	N/A	3.2 (0.69)
Staff practice scale ^d	N/A	2.6 (1.03)

^a All clients (N = 639).

^b Self-reported current smokers and former smokers who quit in the program (N = 466).

^c All staff (N = 363).

^d Clinical staff (N = 236).

Table 3
Association between prevalence of tobacco use among staff and selected client and staff outcomes (N = 24 programs).

	Unadjusted estimates (95% CI)	p-Value	Adjusted estimates (95% CI) ^a	p-Value ¹
Client tobacco use prevalence	0.63 (0.13, 1.12)	0.016	0.59 (0.06, 1.12)	0.030
Client was asked about smoking	-0.13 (-0.53, 0.27)	0.516	-0.11 (-0.49, 0.27)	0.548
Client received any counseling	-0.74 (-1.15, -0.33)	0.001	-0.69 (-1.12, -0.27)	0.003
Client received any cessation medications	-0.28 (-0.80, 0.24)	0.272	-0.18 (-0.69, 0.32)	0.456
Client received any referral	-0.41 (-0.84, 0.03)	0.065	-0.35 (-0.76, 0.07)	0.100
Staff belief scale	-0.02 (-0.02, -0.01)	<0.001	-0.01 (-0.02, -0.01)	<0.001
Staff self-efficacy scale	-0.01 (-0.02, -0.01)	<0.001	-0.01 (-0.02, -0.01)	<0.001
Staff practice scale	-0.01 (-0.02, -0.001)	0.041	-0.01 (-0.02, 0.001)	0.083

Bolded values reflect associations significant at $p > 0.05$
^a Adjusted for % Med-Cal clients and Tobacco policy strength score.

(beta = 0.59, 95% CI 0.06–1.12, $p = .03$). In the sensitivity analysis, excluding the 47 “probable smokers,” the finding was the same (beta = 0.64, 95% CI 0.13–1.15, $p = .017$, data not shown).

The rightmost column of Table 3 shows the association of staff tobacco use with other outcomes, adjusting for the proportion of clients covered by Medi-Cal, and controlling for the strength of program tobacco policies. The prevalence of tobacco use among staff was significantly and inversely associated with client receipt of tobacco-cessation counseling, staff beliefs about having clients quit in drug treatment, and

staff self-efficacy to assist clients with quitting.

Prevalence of past month tobacco use among both staff and clients in the 24 programs is plotted in Fig. 1. The program at bottom left had 0% of staff and 20% of clients reporting recent use of tobacco products. The program at far right had 100% of staff and 86% of clients reporting use of tobacco products.

4. Discussion

In this sample of 24 publicly-funded California residential SUD treatment programs, staff smoking ranged from 0% to 57.1% by program and, collapsed across all programs, staff smoking prevalence was 21.8%. This prevalence is in contrast to the California general population smoking rate of 11.2% in 2018 (Centers for Disease Control and Prevention, 2018). We consider not only use of combustible cigarettes, but also use of other tobacco products. In the current sample, prevalence of use of any tobacco product among staff ranged from 0% to 100% and, collapsed across programs was 32%.

One explanation for elevated rates of staff smoking and use of other tobacco products may be the tradition of hiring persons who are in recovery from substance use. Doing so offers an available recruitment pool, dedicated to SUD treatment, and with lived experience relevant to the counseling mission (Guldish et al., 2017). However, if the use of tobacco products is high among clients, and if those clients enter the treatment workforce, then use of tobacco products may also be high in the workforce.

Multivariate analyses found that higher rates of staff tobacco use were associated with higher rates of client tobacco use, and with fewer clients receiving tobacco-related counseling. In programs with higher rates of staff tobacco use, staff were less likely to believe that clients should quit smoking in the treatment program, and had lower self-efficacy to address smoking among clients.

Our analyses suggest that greater tobacco use among staff is associated with fewer tobacco services among clients, but it may depend on

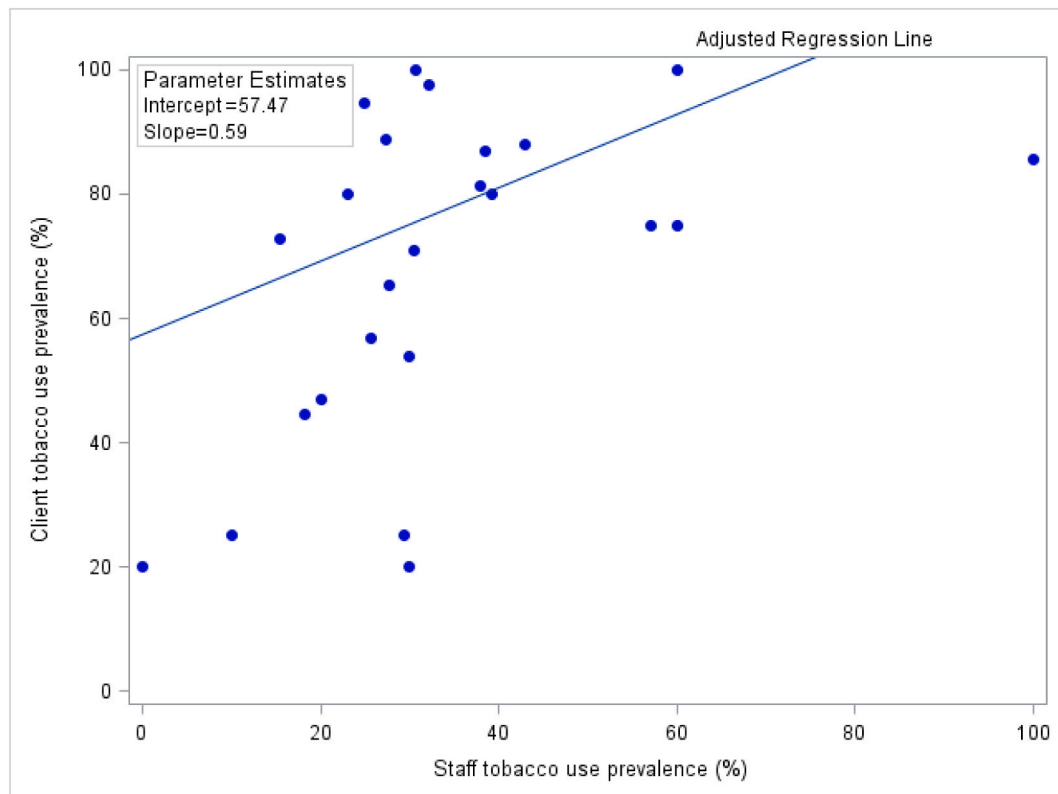


Fig. 1. Plot of staff tobacco use prevalence v. client tobacco use prevalence (N = 24 programs).

who is asked. When staff were asked about tobacco services they provide to clients, we see the association in unadjusted analysis but significant is lost in the adjusted analysis. This loss of significance may indicate no relationship, or a relationship that could be seen only in a larger sample. When clients were asked about services they received, the association was present and unambiguous. Reports by clients regarding tobacco-related services they received in a program may be more reliable than staff reports about tobacco services they provide, to the degree that they reflect what services clients actually received, or what services they recognized as tobacco-related.

The current findings are broadly consistent with literature showing that staff who smoke held more negative views about addressing smoking (Bobo et al., 1995; Campbell et al., 1998), more often believed that clients were not interested in quitting smoking (Skelton et al., 2017), and were less likely to implement smoking related client services (Bobo et al., 1995; Campbell et al., 1998; Knudsen & Studts, 2010; Laschober et al., 2015).

Study limitations include small sample size ($N = 24$), which restricts the number of covariates that can be controlled in analyses. The two covariates selected, whether clients had Medi-Cal insurance that covered smoking cessation services and the strength of the tobacco policy in each program, have face validity. However, other covariates could be tested and, particularly in a larger sample of programs, could result in different findings. All participating programs were recruited in California, which has the lowest general population smoking rate (11.2%) of any US State excepting Utah, and a robust state tobacco control program (Centers for Disease Control and Prevention, 2018; Roeseler & Burns, 2010). If staff and client tobacco use rates are influenced by statewide smoking rates, then our findings concerning prevalence of staff smoking may underestimate staff smoking rates in states where population smoking rates are higher. The study sample includes adult residential SUD programs only which, in California, comprise 19% of all publicly funded treatment programs (Guydish et al., 2020). Findings may not extend to outpatient, methadone, or adolescent focused programs. All programs in this sample were publicly-funded programs. Higher rates of smoking, or of use of any tobacco product, may be more likely in publicly-funded treatment systems. Hospital-based programs, Veteran's Affairs programs, and private healthcare systems providing their own chemical dependence services may include more professional and medical staff where smoking rates are low. However, two-thirds of current SUD treatment occurs in the public sector (Mark, Levit, Vandivort-Warren, Coffey, & Buck, 2007; Mechanic, Schlesinger, & McAlpine, 1995), so high rates of smoking among SUD staff may occur in the preponderance of programs. The measure of tobacco policy strength was created for this research, and has not been validated. Last, programs in this study were recruited for research on tobacco-free grounds, and had expressed interest in better addressing tobacco use among clients. Findings may be conservative if other programs not included in the study tended to have little or no interest in changing practices to address smoking.

We are aware of no other study in which staff and client tobacco-related variables were assessed in a similar or larger number of SUD treatment programs, and where staff tobacco use was assessed for relationships with both client and staff variables. Findings show that higher rates of tobacco use among staff are associated with higher rates of tobacco use and lower rates of tobacco-related services among clients. SUD treatment programs, and agencies that fund and regulate those programs, should work to reduce use of all tobacco products among staff. This is in the interest of the treatment workforce as well as in the interest of the treatment clients. Smoke-free workplace policies, which reduce smoking (Fichtenberg & Glantz, 2002) and increase health equity (Hafez, Gonzalez, Kulik, Vijayaraghavan, & Glantz, 2019), should be implemented in SUD settings no less than they are implemented in virtually every other healthcare setting.

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CRediT authorship contribution statement

JG: conceptualization, funding acquisition, supervision, writing – original draft. TL: formal analysis, methodology. SH, ES, JW: project administration, data collection. CM: conceptualization. KD: methodology. All authors: writing – review and editing.

Declaration of competing interest

The authors have no conflicts of interest to disclose.

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