



Research paper

Adoption and utilization of sexually transmitted infections testing in outpatient substance abuse treatment facilities serving high risk populations in the U.S.

Erick G. Guerrero*, Julie A. Cederbaum

School of Social Work, University of Southern California, Los Angeles, CA, USA

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ABSTRACT

Background: Although adoption and utilization of sexually transmitted infection (STI) testing is a cost effective public health intervention, it is inconsistently offered or referred out for by outpatient substance abuse treatment (OSAT) programs where at-risk racial/ethnic and sexual minorities receive services.

Methods: We explored the organizational adoption and client utilization of STI testing using a nationally representative sample of OSAT facilities in the U.S. in 2005 ($N = 566$). Data missing at random was imputed and the resulting database was analysed using multivariate Tobit and logistic regressions.

Results: The analyses suggest that private non-profit facilities, which are the largest providers of OSAT treatment are less likely than public facilities to offer STI testing or to report adequate client utilization rates. Higher utilization was instead associated with professionally accredited facilities, and with facilities whose majority of clients were Latino/a, reported a history of treatment, stayed in treatment longer, or received case management.

Conclusion: While OSAT facilities are poised to be primary intervention points for diagnosis and treatment of STIs, only a segment of these facilities provide this preventive practice or manage to refer clients out. As such, U.S. health care policy should ensure the adoption and comprehensive utilization, particularly among high risk clients, of this cost-effective prevention strategy in OSAT admission protocols.

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Introduction

Sexually transmitted infections (STIs) are associated with annual direct medical costs of close to \$15 billion in the United States (U.S.) (Chesson et al., 2004). Because STIs can be asymptomatic, individuals may lack the prompt to seek medical care. As such, identifying points of “first contact” with individuals who are at high risk for STIs but who also are at low probability of accessing care is crucial. The link between substance use and sexual risk is well documented (Ehrenstein, Horton, & Samet, 2004; Logan & Leukefeld, 2000; Nadeau, Truchon, & Biron, 2000; Rees, Saitz, Horton, & Samet, 2001; Stein et al., 2005; Tortu et al., 2000). Further, substance use, particularly injection drug use (IDU), remains significantly associated with STIs, primarily HIV and Hepatitis (Bachmann et al., 2000; Heimer, Grau, Curtin, Khoshnood, & Singer, 2007; Plitt et al., 2005; Semple, Amaro, Strathdee, Zians, & Patterson, 2009). Given this link, outpatient substance abuse treatment (OSAT) facilities are poised to become front line intervention points for assessment, testing and treatment of STIs, particularly

for clients with high risk of infection. Ultimately, whether through adoption or referral, OSATs can contribute to the reduction of new incidence of STIs. As such, this study, using nationally representative data from the U.S., seeks to describe the characteristics of OSAT facilities associated with the organizational adoption (whether or not OSAT facilities offer testing on-site) and client utilization (the extent to which clients receive this testing on or off-site) of this prevention practice. Findings from this study will lead to recommendations for effective methods of increasing access to STI testing and treatment services for members of racial, ethnic and gender minority groups in outpatient substance abuse treatment.

Differences in incidence and prevalence of STIs and substance use by race and gender

Sexually transmitted infections in the U.S.

Although STIs impact persons of all races and socioeconomic status, there are marked disparities in incidence of STIs by both race and gender. The most commonly reported STIs in the U.S. include Chlamydia, Gonorrhea, and Syphilis (Centers for Disease Control & Prevention [CDC], 2009a). In the U.S., Chlamydia is the most frequently reported STI with racial/ethnic minorities as compared to Whites (CDC, 2009a); disparities also exist by gender with

* Corresponding author at: School of Social Work, University of Southern California, 655 West 34th Street, Los Angeles, CA 90089-041, USA. Tel.: +1 213 821 1385; fax: +1 213 821 2088.

E-mail address: erickgue@usc.edu (E.G. Guerrero).

females testing positive more frequently. Rates of Gonorrhea have been less disparate by gender; however, differences by race are once again unequal with Black men and women, as compared to Whites and Latinos, being highly overrepresented (CDC, 2009a). Unlike Chlamydia and Gonorrhea, Syphilis affects men at a greater rate than women and is again over-represented by Blacks as compared to Latinos and Whites (CDC, 2009b). As can be seen through these statistics, in the U.S. racial/ethnic minorities are at increased risk for STI infection. Further, for many STIs, women are shown to be at higher risk than males, while STIs remain most common in adults under 30 years of age (SAMHSA, 2007b).

Substance abuse and sexual risk in the U.S.

Like STIs, substance use also varies by minority status. The 2008 National Survey on Drug Use and Health (SAMHSA, 2009b) noted differences in illicit drug use and alcohol use by race/ethnicity and gender. Among adults, males were more likely than females to be current illicit drug users; they were also more likely to be current drinkers and their rates of substance dependence/abuse were two times higher than that for females. In the U.S., by race/ethnicity, those who self-identified as more than one race reported the highest rates of illicit drug use, followed by 10% of Blacks, 8.2% of whites, and 6.2% of Latinos. Alcohol use also varied by race/ethnicity; 56.2% for whites, 47.5% for persons reporting more than one race, 43.2% for Latinos, and 41.9% for blacks (SAMHSA, 2009b).

Alcohol and other substances are known to impair judgment and inhibition (Semaan, Des Jarlais, & Malow, 2007) and increase impulsivity (Semple et al., 2009). As such, alcohol and illicit drug use (particularly crack cocaine and intravenous drug use [IDU]) is associated with unprotected vaginal and anal intercourse without condoms, trading sex for drugs or money, and sex with multiple partners (Cooper, 2006; Leigh, Ames, & Stacy, 2008; Raj, Saitz, Cheng, Winter, & Samet, 2007; Raj et al., 2009; Semaan et al., 2007). A meta-analysis of prevention intervention on sex behaviours with people who use drugs showed that sexual risk behavior was prevalent among 72% of this population (Semaan et al., 2002); other researchers have found markers for at least one STI in 62% of participants who used drugs (Hwang et al., 2000).

In recent studies, frequent alcohol use was identified as a predictor of sexual risk and diagnosed STIs (Buffardi, Thomas, Holmes, and Manhart, 2008; Raj et al., 2009). A report from the National Survey of Drug Use and Health (2007) noted that STIs were related to frequency of alcohol use, and further increased among those who reported use of alcohol and an illicit substance in the last month. Other studies have found an association between increased risk for STIs and participants who reported previous treatment histories of IDU and crack cocaine use (Hwang et al., 2000). STIs were also common among persons 18–25 years, those self-identified as Black/African American and women (Hwang et al., 2000; SAMHSA, 2007b). Substance using women, in particular have reported high rates of Trichomonas (Miller, Liao, Gomez, Gaydoes, & D'Mellow, 2008; Plitt et al., 2005) and bacterial vaginosis (Bachmann et al., 2000).

Summary

Racial/ethnic inequities in substance use and STIs are well recognized (Hallfors, Iritani, Miller, & Bauer, 2007; Newman & Berman, 2008; SAMHSA, 2009a). African American and Latinos, among other minority groups, are more likely to live within low-income communities marked by easier access to alcohol and other substances (Galea, Nandi, & Vlahov, 2004; Williams & Collins, 2001) and high prevalence of STIs (Hallfors et al., 2007). These factors are likely to contribute to the high rates of this public health issue. Substance users are at increased risk of exposure to STIs as alcohol and

illicit substance use impairs judgment and can increase impulsivity. However, these behaviours are often reduced when substance users engage in substance abuse treatment (Brown et al., 2007). Substance abuse treatment providers, if responsive, can adopt new practices to assess for, test, or refer people identified as high risk for STIs.

Organizational characteristics associated with adoption and utilization of prevention practices in OSAT

Despite of the high rate of STIs among those who abuse substances, only about 36% of OSAT facilities in the U.S. provide diagnostic testing. Equally low is the percentage of clients per facility that received this type or preventive intervention. Data from a nationally representative sample shows that between 2000 and 2005, on average per eligible facility, about 24% of clients received testing for STIs (SAMHSA, 2006). Although an estimate of need among clients attending OSAT is not available, the need for STI testing, particularly among high risk drug users most likely exceeds the availability of this practice among the nation's OSAT facilities.

To respond to this issue as a primary point of access for high risk clients, the OSAT field is challenged to develop organizational capacity to either adopt this prevention practice or incorporate an appropriate assessment and referral process in their treatment protocols (D'Annunzio & Pollack, 2002). Accumulating evidence shows how public resources and regulation of services, driven by national health policies shape the type and priority from which evidence-based practices are implemented in OSAT facilities (D'Annunzio, 2006).

As generally observed, the means for adoption of public health strategies in OSAT rely on government resources, while regulation from licenses and professional accreditation monitor the implementation of such practices (D'Annunzio, Vaughn, & McElroy, 1999; Pollack, D'Annunzio, & Lamar, 2006). Findings from studies show that public facilities generally perform more safety net and health prevention care than private or non-for profit OSAT providers (Campbell, Alexander, & Lemak, 2009; D'Annunzio et al., 1999; Ducharme, Mello, Roman, Knudsen, & Johnson, 2007; Durkin, 2002; Friedman, Alexander, & D'Annunzio, 1999; Pollack et al., 2006; Roman, Ducharme, & Knudsen, 2006), while state licensed and professionally accredited facilities are more likely to adopt testing for HIV/AIDS (Chriqui, Terry-McElrath, McBride, & Eidson, 2008; D'Annunzio & Pollack, 2002; D'Annunzio et al., 1999). Specifically, it is those facilities accredited by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) that are more likely than non-accredited units to provide HIV/AIDS prevention practices, particularly if located within hospitals (D'Annunzio et al., 1999).

In substance abuse treatment organizations, public funding, state regulation and professional accreditations characterize the resources and regulation necessary to set the stage for adoption of health prevention practices (D'Annunzio, 2006; Burke, D'Annunzio, & Price, 1983). Particularly, facilities affiliated with hospital settings have staff with greater expertise to provide health interventions that aim at decreasing public health risk (Wells, Lemak, & D'Annunzio, 2006). Other program characteristics relevant to the adoption of new practice include units' type of treatment program and their affiliation. Methadone treatment units and units located in mental health or hospital settings compared to regular outpatient and free standing units are better equipped to offer health treatment approaches (Knudsen & Roman, 2004).

The type of clients served also generate social pressure on OSAT facilities to adopt practices that are congruent with clients' service needs (see Campbell & Alexander, 2005; D'Annunzio & Pollack, 2002; D'Annunzio et al., 1999; Howard, 2003; Marsh, Cao, Guerrero, & Shin, 2008). Epidemiological studies show that Latinos, African

Americans, women and men having sex with men are at increased risk for STIs and thus need tailored services (CDC, 2009a). Yet, evidence suggests that Latino and African American clients, in particular, face greater barriers than White clients to receive adequate services (Wells, Klap, Koike, & Sherbourne, 2001). Case management is suggested as one of the most important approaches in treatment to facilitate and coordinate the multiple service needs of vulnerable clients (Teitelbaum et al., 1992). When offered on-site, case management is strongly associated with client utilization of health and social services provided on or off-site (Friedmann, D'Aunno, Jin, & Alexander, 2000).

Overall, the organizational context of OSAT facilities plays a significant role in the adoption and effective utilization of STIs (D'Aunno, 2006; D'Aunno & Pollack, 2002). Funding, regulation, clients' characteristics and existing services may determine whether or not OSAT units adopt and or effectively utilize STI testing for their clients. Considering these factors, we hypothesize that facilities with higher racial, ethnic and gender representation and higher receipt of case management on-site will be more likely to adopt STI testing and report a positive association with the percentage of clients receiving STI testing on or off-site.

In addition, we hypothesize that public ownership and funding and facilities with state and local license and JCAHO accreditation will be more likely than private and non-licensed and non-accredited facilities to adopt STI testing and report a positive association with the percentage of clients receiving STI testing on or off-site.

Methods

The current study conducted analyses of secondary data collected in 2005 from a nationally representative sample of outpatient substance abuse treatment facilities (SAMHSA, 2007a). We analysed the National Drug Abuse Treatment Services Survey (NDATSS), considered the most comprehensive survey on management and organizations' characteristics in outpatient treatment units, which represent over 75% of all SAT facilities in the U.S. (D'Aunno, 2006). Hence, this survey provides critical information on funding, regulation, provision of service and clients' characteristics in the most common substance abuse treatment setting in the U.S.

Sampling frame and data collection

The sampling frame for NDATSS was drawn from several national lists of substance abuse treatment providers in the U.S., as described in other studies (D'Aunno & Pollack, 2002). The sampling frame drew random samples stratified by treatment modality (methadone, non-methadone), ownership (public, private-for profit or non-for profit), and organizational affiliation (hospital, mental health center, freestanding).

This study used the most current wave of the six waves collected for the NDATSS project. This wave of data was collected in 2005 and contained responses from 566 facilities. All facilities were included in the analyses. This data defines an OSAT unit as any unit for which outpatient substance abuse treatment constituted at least 50% of services. Data were collected by highly trained interviewers, who probed administrators and supervisors when discrepancies were identified and achieved an 80% response rate administering this survey via phone.

Dependent variables

Sexually transmitted infection testing. In 2005, clinical supervisors in NDATSS were asked the following three questions about STI testing: (1) In the most recent complete fiscal year, did any

of your unit's outpatient substance abuse clients receive STI testing either directly from your staff or through arrangements with other providers?; (2) What percent of your unit's outpatient substance abuse clients received STI testing?; and (3) Of all clients who received this service, what percent received this service off-site? Although we did not use question (1) as a dependent variable, but rather as a control variable to account for facilities having a different probability of being included in the analyses, we added its description here to justify our conceptual model. Because this study aimed to examine facilities' adoption of STI testing and the extent to which their clients are tested in general, we included Question (2) as a dependent variable. This measure (Question 2) captures client's utilization of STI testing irrespective of whether this service was provided on-site or by another organization (off-site). This measure was bimodal with over 60% of values falling on zero or 100%. In order to capture specifically organizational on-site adoption of STI testing in treatment services, we recoded question (3), which reported the percent of clients who received off-site testing. By subtracting a hundred percent from question (3) we generated a dichotomous variable, where 1 = facilities that reported any on-site testing. See Table 1 for descriptive statistics and response format on all variables

Independent variables

The following variables represent the social context of OSAT facilities. They included indicators of clients' characteristics, resources and regulation.

Clients' duration in treatment. Clients who stay longer in treatment are more likely to receive more comprehensive health and social services (Friedmann et al., 2000). The clinical supervisor was asked about the number of weeks the average clients stays in treatment. Because this variable was positively skewed, a logarithmic transformation was used.

Clients' history of treatment. Prior treatment in substance abuse is highly correlated with high utilization of health and social services (Marsh et al., 2009). This item measures the percentage of clients that started services with no prior treatment experience.

Client diversity. Racial, ethnic, gender and sexual minorities are at a higher risk for sexually transmitted infections (CDC, 2009b). Although, the NDATSS dataset did not include information about the representation of sexual minorities (men having sex with men) in treatment, we were able to capture specific levels of racial, ethnic and gender diversity in facilities. We developed three dummies that represented low, medium and high representation of Latino/a, African American and female clients. Using a measure of percentage of these clients in the facility, we created dichotomous measures based on the average representation of each minority group in outpatient substance abuse treatment in the U.S. For instance, for Latinos whose overall representation in the field is about 8% (low = 5%, medium = 6–30% and high = 31% and up). See Table 1 for response format on all other variables.

Case management. It is generally established in substance abuse treatment and other social services that provision of case management bears a significant association with clients receiving ancillary and health services (Friedmann et al., 2000; Marsh, Cao, & D'Aunno, 2004; Smith & Marsh, 2002). This item was measured as the percent of clients who received case management on-site.

Organizational factors

Resources and regulation. Organizational size is commonly associated with programs' level of resources. This variable was measured as the total number of clients served during the past fiscal year. Location was also considered because urban facilities tend to have more resources and pressure to adopt legitimate

Table 1
Descriptive statistics and response format.

Variables	2005 (N = 566)	Response format
Dependent variables		
Facility adopted STI testing (%)	36	1 = Unit offers STI testing 0 = Unit does not offer STI testing
Clients' utilization of STI testing, M (SD)	24 (35.97)	% of clients
Independent variables		
Clients' characteristics		
Clients' received STI testing from on/off-site (%)	57.1	1 = One or more clients received STI testing on/off site 0 = No clients received STI testing on/off site
Clients' treatment duration, M (SD)	10.44 (13.54)	# of weeks average client stays in treatment
Clients with no treatment history, M (SD)	33 (26.1)	% of clients with no history of substance abuse treatment
Clients with case management, M (SD)	58.1 (42.3)	% of clients who received case management
Client racial/ethnic & gender diversity in unit		
High – Latino/a (%)	17.7	1 = >30% of total clients are Latino/a 0 = ≤30% of total clients are Latino/a
Medium – Latino/a (%)	33.8	1 = 6% to 30% of total clients are Latino/a 0 = 6% to 30% of total clients are not Latino/a
Low – Latino/a (referent) (%)	48.5	1 = <6% of total clients are Latino/a 0 = ≥6% of total clients are Latino/a
High – Black (%)	24	1 = >40% of total clients are Black 0 = ≤40% of total clients are Black
Medium – Black (%)	33.5	1 = 10% to 40% of total clients are Black 0 = 10% to 40% of total clients are not Black
Low – Black (referent) (%)	42.5	1 = <10% of total clients are Black 0 = ≥10% of total clients are Black
High – female (%)	23.5	1 = >45% of total clients are female 0 = ≤45% of total clients are female
Medium – female (%)	48.4	1 = 26% to 45% of total clients are female 0 = 26% to 45% of total clients are not female
Low – female (referent) (%)	28	1 = <26% of total clients are female 0 = ≥26% of total clients are female
Clients with Medicaid payment, M (SD)	20.9 (29.8)	% of clients whose services are paid by Medicaid
Clients with HMO/PPO payment, M (SD)	10.7 (20.2)	% of clients whose services are paid by HMO/PPO
Organizational factors		
% public revenue, M (SD)	52.7 (38.9)	% of total budget
State license (%)	91.7	1 = Unit has a state license 0 = Unit does not have a state license
City license (%)	19.8	1 = Unit has a city or municipality license 0 = Unit does not have a city or municipality license
Accreditation (JCAHO) (%)	25.2	1 = Unit has JCAHO accreditation 0 = Unit does not have JCAHO accreditation
Unit size (number of clients), M (SD)	663 (1268)	Number of total clients served past fiscal year (logarithm and mean-centered in analyses)
Urban unit (%)	31	1 = Unit is within metropolitan area 0 = Unit is not within metropolitan area
Ownership		
For profit (%)	22.5	1 = Unit is for profit 0 = Unit is not for profit
Non-for profit (%)	57.5	1 = Unit is non-for profit 0 = Unit is not non-for profit
Public (referent) (%)	20	1 = Unit is public 0 = Unit is not public
Affiliation		
Unit in hospital (%)	13.3	1 = Unit is affiliated with hospital 0 = Unit is not affiliated with hospital
Unit in mental health facility (%)	14.5	1 = Unit is affiliated with mental health center 0 = Unit is not affiliated with mental health center
Free standing unit (referent) (%)	72.2	1 = Unit is free standing 0 = Unit is not free standing

practices (D'Aunno & Pollack, 2002; Howard, 2003; Pollack et al., 2006). Urban level was represented by a continuous measure using the Beale Urbanicity Code, which ranges from 0 (fewer than 20,000 resides) to 9 (urban areas with a population of 1 million or greater). Funding resources included two measures associated with provision of health care practices: (1) public funding, which was measured as the percent of total funding received by the facility in the last fiscal year, and (2) Medicaid funding measured as the percentage of clients whose services are paid by Medicaid. Finally, to examine the role of regulation in adoption and utilization of

STI testing, we included three dichotomous measures of empirical relevance (Wells et al., 2007); two governmental measures of regulation and one from a premier accreditation entity. The government measures evaluated whether the facility had a license from the state and or the city to provide services, whereas the accreditation item asked whether the facility was accredited by the Joint Commission on Accreditation of Hospitals and other Organizations.

Ownership and affiliation. We needed to control for facilities' ownership and affiliation because public treatment centers (as compared to those privately owned) are more responsive to

Table 2
Adoption of STI testing Utilization of STI testing.

	Outcome variables	
	Adoption of STI testing Odds ratio (95% CI)	Utilization of STI testing Tobit-Beta (S.E.) [‡]
Independent variables		
Clients' characteristics		
Clients' received STI testing from on/off-site	0.01 (0.00–0.02) ^{***}	126.95 (9.41)
Clients' treatment duration	1.03 (1.01–1.05) ^{**}	1.23 (0.21) ^{***}
Clients with no treatment history	1.00 (0.98–1.01)	–0.06 (0.11)
Clients with case management	0.99 (0.99–1.00) [†]	0.15 (0.06) [*]
Client racial/ethnic & gender diversity in unit		
High – Latino/a ^a	1.92 (0.94–3.92) [*]	21.10 (7.23) ^{**}
Medium – Latino/a ^a	1.11 (0.59–2.09)	3.58 (6.06)
High – Black ^b	0.97 (0.47–2.02)	5.16 (7.30)
Medium – Black ^b	1.21 (0.56–2.62)	2.82 (6.42)
High – female ^c	1.62 (0.71–3.67)	3.29 (7.70)
Medium – female ^c	1.42 (0.72–2.80)	2.31 (6.46)
Clients with Medicaid payment	1.01 (0.49–2.09)	–0.06 (0.09)
Clients with HMO/PPO payment	0.74 (0.29–1.89)	–0.27 (0.14) [†]
Organizational factors		
% public revenue	1.05 (0.54–2.05)	4.35 (7.47)
State license	1.54 (0.69–3.43)	–15.83 (9.67)
Local license	1.00 (1.00–1.00)	12.58 (6.53) [†]
Accreditation (JCAHO)	1.00 (0.99–1.01)	19.96 (7.36) ^{**}
Unit size (number of clients)	0.99 (0.98–1.01)	0.00 (0.00)
Urbanicity	0.91 (0.75–1.09)	–2.08 (1.58)
Ownership		
For profit ^d	0.50 (0.19–1.34)	3.05 (9.27)
Non-for profit ^d	0.45 (0.22–0.90) ^{**}	–17.25 (6.90) ^{**}
Affiliation		
Unit in hospital ^e	1.06 (0.41–2.77)	–2.86 (9.91)
Unit in mental health ^e	0.56 (0.23–1.41)	–2.40 (8.25)
Constant	159.15 (19.71–1285.31) ^{***}	–92.94 (18.15) ^{***}
Observations	566	566

^a Units with low percentage (<5%) of Latino/a clients is the referent.

^b Units with low percentage (<10%) of Black clients is the referent.

^c Units with low percentage (<26%) of female clients is the referent.

^d Public is the referent.

^e Free standing unit is the referent.

[‡] Unstandardized parameter estimates, with standard errors in parentheses from two tailed test.

[†] $P < .10$.

^{*} $P < .05$.

^{**} $P < .01$.

^{***} $P < .001$.

federal and state expectations and more likely to perform safety-net care (D'Aunno, 2006; Howard, 2003). This variable was measured as whether the unit was private for-profit or private non-profit and public units were the reference category. Likewise, whether facilities were affiliated with a mental health center or hospital, as opposed to be free standing, were dichotomous scales.

Statistical analysis

A rigorous approach was introduced in order to reduce bias in selection and estimation processes. To respond to potential bias in non-response in NDATSS, appropriate weights were used according to other studies (Campbell & Alexander, 2005; Wells et al., 2007). We also introduced stratification variables (hospital or mental health affiliation and for profit ownership) to account for the probability of entry into the study (Adams & Heeringa, 2001). Additionally, we accounted for selection bias for those facilities whose clients did not receive testing on or off-site (43%). Friedmann et al. (2000) used a similar procedure with this data to correct for facilities that did not adopt services because of lack of eligible clients.

To take advantage of the maximum amount of information in the data sets, multiple imputation was used to fill in missing values, which ranged from 3% to 8%. Assuming missing data at random, the Markov Chain Monte Carlo method (MCMC method, Schafer, 1997)

was used to generate five possible values for each missing value and increase the accuracy in parameter estimation.

Data analysis was undertaken using STATA/SE (Version 10) to conduct all statistical procedures, including the use of ICE and MIM procedures to conduct multiple imputation and to analyse imputed data. We employed logistic regression models for the dichotomous outcomes (adoption of STI testing), whereas the utilization of STI testing was analysed using censored regression (Tobit) because the outcome variable (percentage) was bimodal at both ends (0 and 100). Goodness of fit tests were used to determine the appropriateness of the regression models.

Results

As described in Table 2, findings show few, but important facility and client characteristics associated with organizational adoption of STI testing and utilization of this health prevention measure. We found partial support for our first hypothesis that tested the relationship between racial, ethnic and gender representation and the receipt of case management and the adoption and utilization of STI testing. Clients' racial and gender representation was not associated with facilities offering or ensuring STI testing. Yet, ethnic representation was statistically significant. Compared with programs with low client representation of Latinos, those with high

representation were almost twice as likely to adopt STI testing ($P < .05$) and also reported a positive relationship with utilization of this practice ($P < .01$). Similarly, facilities where a higher percentage of clients receive case management on-site reported higher utilization of STI testing compared with programs with lower case management ($P < .05$). However, high case management facilities were marginally associated with programs that were less likely to offer STI testing on-site.

Our second hypothesis on the relationship between public resources, licenses and accreditation and the adoption and utilization of STI testing was also partially supported. Local licensing was only marginally associated with utilization of STI testing ($P < 0.10$), whereas facilities accredited by JCAHO showed a robust positive relationship with percentage of clients' receiving STI testing ($P < 0.01$). Similarly, compared with public facilities, for-profit and non-for-profit reported a lower likelihood of adoption of STI testing ($P < 0.01$) and a lower rate of utilization of this preventive practice ($P < .01$; see Table 2).

Among the relevant control variables, notably clients' treatment duration was the most robust indicator of both adoption ($P < 0.001$) and utilization of STI testing ($P < 0.001$). Facilities with a higher percentage of clients with HMO/PPO insurance were marginally associated with a lower utilization of this diagnostic intervention ($P < 0.10$). Overall, most models accounted for about 30% of the explained adjusted variance in adoption and utilization of STI testing.

Discussion

Public resources in the United States play a significant role in the provision of safety health net care in OSAT. Public funding, through government provisions have been consistently associated with adoption of preventive and comprehensive practices (Brown et al., 2007; Campbell & Alexander, 2002, 2005; D'Aunno, 2006; Guerrero, 2010). However, the role of government funding and regulation was not clear in this analysis. Low funding or vague expectations in funding contracts and licensing requirements, particularly for private and non-profit facilities may explain the low adoption and utilization of this simple and concrete practice. Notably, compared to private for-profit and non-for-profit, public facilities were most likely to offer STI testing and along with JCAHO accredited facilities report a higher utilization of this preventive service. Multiple studies have documented the importance of public facilities and JCAHO accreditation in the offering of health prevention practices (Campbell & Alexander, 2002, 2005; D'Aunno et al., 1999; Durkin, 2002; Pollack et al., 2006). Specifically on adoption of STI testing, a new study using 2005 data from the census of all OSAT facilities in the U.S. (National Survey on Substance Abuse Treatment Services) also support these relationships (Guerrero & Cederbaum, 2010). This robust finding stresses that although for-profit and non-profit facilities, as well as those facilities not regulated by JCAHO represent the majority of OSAT providers in the country serving most at-risk clients, they are least likely to offer this preventive practice.

As noted in the literature, particular groups, specifically men who have sex with men, women, and those who are infected with HIV, are at increased risk for STIs. Further, STIs are more commonly reported in persons of minority backgrounds (CDC, 2009a). In substance abuse treatment, these infections affect the most vulnerable and high risk client populations; racial/ethnic minorities, persons who are low-income, and those who have used injection drugs, traded sex for drugs and/or money, and those who have engaged in unprotected vaginal and anal sex with multiple partners. Notably, this concrete and necessary practice is not generally offered at facilities that target and reach the most at-risk clients, particularly minority women, who are at highest risk for negative outcomes

from STIs. The findings here show that although some individual characteristics are predictive of increased levels of STI infection in the U.S., this public health knowledge has not translated into practice in most OSAT settings. In this data, facilities mainly serving Latino/a clients, which are generally small and low-resourced, were most likely to respond to their clients' health service needs for STI testing. This may be evidence of the increasing awareness of the need for and benefit of STI testing among specific high risk populations.

The burden to receive STI testing may reside on clients who may need to stay in treatment long enough to access testing. Despite of the increasing number in the U.S. of cases of STIs in minority populations in the last decade, it is concerning that offering this practice decreased from 2000 to 2005 (SAMHSA, 2007a, 2008). This disconnect between knowledge and practice offers OSAT providers a unique opportunity to re-evaluate and re-prioritize service provision.

Limitations

These analyses were cross-sectional and thus no causality claims are drawn. But a separate analysis (not included here) using the census of facilities in the U.S. points to similar structural factors associated with adoption of STI testing as a preventive public health practice for people who abuse substances (Guerrero & Cederbaum, 2010). While the current study cannot ascertain to what extent STI practices are implemented in OSAT facilities, the client utilization outcome measure, although not a direct measure of implementation, provides initial evidence of use. Comprehensive measurement of implementation directly collected from clients is warranted to understand their access to STI testing services in OSAT.

Conclusions and implications

Individuals who are actively seeking to reduce or eliminate their use of alcohol and illicit drugs are faced with a number of challenges. Some of these include attending to their physical and emotional health, areas often neglected during active addiction. As part of recovery, we assert that attention to physical health, particularly sexual health, is an imperative part of the recovery process. To do so, clients should be supported by their OSAT providers. This includes being given information about their increased risk of exposure to STIs during their active substance use (particularly for clients who may have been bartering sex for substances) and knowledge about the ease of testing and treatment of most STIs.

In order to make a significant public health impact in the prevention of STIs among high risk clients, it is important to ensure that all OSAT providers, as first point of service develop the capacity to offer STI testing on-site or through outside referrals. Certainly, OSAT facilities in the U.S. are facing decreasing public funding and limited reimbursement on preventive services from managed care organizations. However, STI testing is a low-cost intervention (Tuli & Kernt, 2009) with an extremely positive public health outcome. As services are provided in-house or through partnering with public health clinics, there can be little financial burden to OSAT facilities.

A concerted effort is needed from treatment providers, state and other regulators to reduce the incidence of STIs in individuals attending OSAT. Providers should diversify funding and upgrade their intake protocols, while federal and state regulatory bodies can offer financial incentives, as well as monitoring guidance to ensure wide implementation of STI testing or at least a screening protocol.

By evaluating clients' service needs, each facility should determine whether they should offer STI testing on-site, or conduct assessment of STI risk behaviours and provide information about testing, referral and harm reduction techniques (i.e. condom use or

needle bleaching). Clients' acceptability of STI screening while in short-term treatment has been reported as high (86%; Lally et al., 2002) and providers who believe in the importance of substance abuse and communicable disease prevention are more likely to provide needed services and referrals (Tracy et al., 2009). Thus, as part of the intake process already in place in OSAT facilities, we recommend that clinicians/case managers are trained to conduct a comprehensive evaluation of clients' self-reported behavior to determine the risk for STIs. Because individuals in treatment may endorse sex while under the influence of substances, clinicians might highlight the connection between the two behaviours as part of the treatment plan (Casyln, Cousins, et al., 2010; Casyln, Crits-Christoph, et al., 2010). Training staff on how to target high risk sexual behaviours as part of a comprehensive treatment plan will help reduce the incidence of new infections (U.S. Prevention Task Force, 2008) and guide clients to a healthier lifestyle.

Finally, for groups at higher risk for both STIs and lack of access to screening and treatment, increased attention should be given to assessment of sexual risk engagement. Racial/ethnic minorities in the U.S. are more likely to live in low-income communities (Galea et al., 2004; Williams & Collins, 2001). As health behaviours have been found to be predicted by perception of neighbourhood housing, employment, and safety, and to reinforce social norms (Sampson, Raudenbush, & Earls, 1997), the environment from which the individual is coming from must also be taken into account. Therefore, the screening/assessment process should not be taken as a product of race, but rather social conditions (Cohen et al., 2000).

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