HSR Health Services Research

DOI: 10.1111/1475-6773.12094
RESEARCH ARTICLE

HIV Testing in the Nation's Opioid Treatment Programs, 2005–2011: The Role of State Regulations

Thomas D'Aunno, Harold A. Pollack, Lan Jiang, Lisa R. Metsch, and Peter D. Friedmann

Objective. To identify the extent to which clients in a national sample of opioid treatment programs (OTPs) received HIV testing in 2005 and 2011; to examine relationships between state laws for informed consent and pretest counseling and rates of HIV testing among OTP clients.

Data Source. Data were collected from a nationally representative sample of OTPs in 2005 ($n = 171$) and 2011 ($n = 200$).

Study Design. Random-effects logit and interval regression analyses were used to examine changes in HIV testing rates and the relationship of state laws to HIV testing among OTPs.

Data Collection. Data on OTP provision of HIV testing were collected in phone surveys from OTP managers; data also were collected on state laws for HIV testing.

Principal Findings. The percentage of OTPs offering HIV testing decreased significantly from 93 percent in 2005 to 64 percent in 2011. Similarly, the percentage of clients tested decreased from an average of 41 percent in 2005 to 17 percent in 2011. OTPs located in states whose laws do not require pretest counseling and that use opt-out consent were more likely to provide HIV testing and to test higher percentages of clients.

Conclusions. The results show the need to increase HIV testing among OTP clients; the results also underscore the beneficial possibilities of dropping pretest counseling as a requirement for HIV testing and of using the opt-out approach to informed consent for testing.

Key Words. HIV/AIDS, HIV testing, state regulation, health policy, opioid treatment, organizational factors

HIV testing among the nation's opioid treatment programs (OTPs) is critically important because opioid use is strongly associated with injection drug use and other HIV risk behaviors (Santibanez et al. 2006; Des Jarlais and Semaan

2008). Furthermore, OTPs account for about 26 percent of all individuals enrolled in substance abuse treatment programs across the nation (NSDUH 2009).

To be sure, OTPs are not the only site that should be providing HIV testing for individuals with opioid use problems. Indeed, an integrated primary care system that included substance abuse treatment and HIV health services would likely lead to better testing rates and outcomes. In our current health care system, primary care clinics, emergency rooms, physicians' offices, and local public health departments all should be important, if not focal, sites for HIV testing among the population of opioid users.

Nonetheless, OTPs can play a critical role in HIV prevention efforts: they often serve individuals who otherwise have little or no contact with mainstream providers of health care and public health services. As a result, the Centers for Disease Control and Prevention (CDC), the National AIDS Strategy, the National Institute on Drug Abuse (NIDA), and the Substance Abuse and Mental Health Services Administration (SAMHSA) all encourage routine HIV testing in OTPs (Volkow and Montaner 2011). Yet there has not been a recent nationally representative study that examines HIV testing rates among OTPs.

BACKGROUND

Prior research on HIV testing among substance abuse treatment programs includes studies that rely on cross-sectional data collected in 2008 or earlier (i.e., Pollack and D'Aunno 2010; Abraham et al. 2011, 2012) or on cross-sectional samples that represent only a segment of the total population of treatment programs, in particular private programs (Abraham et al. 2011) and programs that participate in NIDA's Clinical Trials Network (Brown et al. 2006; Abraham et al. 2012). Results from these studies show that fewer than half of U.S. substance abuse treatment programs offer HIV testing on-site; even programs that offer on-site testing often test a small percentage of clients.

Address correspondence to Thomas D'Aunno, Ph.D., Mailman School of Public Health, Columbia University, 600 W. 168th St., New York, NY 10032; e-mail: tdaunno@columbia.edu. Harold A. Pollack, Ph.D., is with the School of Social Service Administration, University of Chicago, Chicago, IL. Lan Jiang, M.S., is with the Providence VA Medical Center, Providence, RI. Lisa R. Metsch, Ph.D., is with the Mailman School of Public Health, Columbia University, New York, NY. Peter D. Friedmann, M.D., M.P.H., is with the Alpert Medical School, Brown University, Providence, RI.

In a major policy shift aimed at increasing testing rates (Branson et al. 2006), the CDC in 2006 made two significant changes in its HIV testing guidelines. First, CDC specified that posttest risk-reduction counseling should only be required for persons who test HIV-positive. Second, CDC recommended an "opt-out" approach to informed consent: individuals are informed that they will be tested for HIV infection as part of a routine assessment and consent is inferred unless the individual declines.

Many states changed their HIV testing and counseling recommendations to conform to the new CDC guidelines (Wolf, Donoghoe, and Lane 2007; Mahajan et al. 2009; Neff and Goldschmidt 2011). In contrast to CDC guidelines, state regulations carry formal legal authority (and often bring corresponding resources) to govern testing practices. For example, using national data from 2004, Chriqui et al. (2008) show that treatment programs located in states with requirements for comprehensive services were more likely to provide these services, including testing services for infectious diseases.

To what extent are changes in CDC guidelines and state regulations for HIV testing associated with increased testing among individuals in treatment for opioid abuse problems? This study addresses this key question, first, by assessing the extent to which clients in the nation's OTPs received HIV testing, either on-site or off-site from any source, in 2005 and 2011. We then explore the role of state regulations in promoting the provision of HIV testing services among OTPs.

METHODS

Sampling Frame and Sample

We define an OTP as a physical facility with resources dedicated specifically to treating opiate dependence through methadone or buprenorphine. Because SAMHSA licenses all OTPs, it has a list that precisely identifies the entire U.S. population of approved OTPs. In 2007, SAMHSA (2009) reported that there were 1,108 licensed OTPs in the United States. By 2011, this population had increased to 1,459, with about 304,000 opioid-dependent individuals receiving services on any given day.

This study draws from two nationally representative surveys of OTPs. The first survey includes data from 170 OTPs collected as part of the 2005 National Drug Abuse Treatment System Survey (NDATSS), with an 88 percent response rate (Pollack and D'Aunno 2010). For the second survey (2011), we contacted OTPs that participated in 2005, and to ensure that the 2011

sample is nationally representative and has adequate statistical power, we contacted additional randomly selected OTPs from SAMHSA's 2011 list. Of all the 2005 and newly selected OTPs contacted in 2011, 200 completed surveys, for a response rate of 86.6 percent.

We conducted extensive analyses to assess possible nonresponse bias stemming from 22 OTPs that refused to participate in the 2011 study and another 90 OTPs with which we made an initial contact but did not have the time or funds to follow-up with. We compared responding OTPs to these two types of nonparticipating OTPs along 20 key variables (e.g., ownership; provision of HIV testing in 2009) and did not find a single (0) statistically significant difference.

Analyses also show that the results reported below do not differ between panel programs (n = 59) and the OTPs that we added to the sample in 2011 (n = 138). These results indicate that observed changes in HIV testing between 2005 and 2011 are not due to the new OTPs added to the sample.

Data and Measures

In each NDATSS wave, each OTP's administrative director and clinical supervisor were asked to complete a telephone survey. Directors provided information concerning ownership, finances, organizational structure, and managed care arrangements. Clinical supervisors provided information regarding staff composition, client characteristics, and available treatment and ancillary services.

In addition to collecting survey data from OTPs in 2011, we also draw on data from SAMHSA's National Survey of Substance Abuse Treatment Services survey ([N-SSATS] SAMHSA, 2005); SAMHSA's N-SSATS (2009); and from prior analyses of state HIV testing regulations. Data from these sources were merged with the phone survey data we collected in 2011 and with NDATSS data from 2005.

Data Reliability and Validity

We followed established methods that maximize reliability and validity in phone surveys (Groves 1988). These methods include pretesting the survey with a random sample of 10 programs; providing training about our study for telephone interviewers who already have been trained at Cornell's Survey Research Institute (which collected the 2011 data); sending each program director a cover letter explaining the study, along with web-based work-sheets

that inform participants of the requested data and enable them to consult financial and administrative records prior to the call; and making a brief phone call to follow up on the letter.

Furthermore, as data are collected, we perform extensive computer reliability checks to signal interviewers of inconsistent or infeasible responses (e.g., % of clients with various demographic characteristics should sum to 100 percent). Interviewers then work with respondents to resolve inconsistencies. Results are further scrutinized for reliability and validity. Reliability checks include comparisons of reported totals (e.g., total revenue) with the sum of reported detail (e.g., revenues by source); comparison of responses to related questions; comparison of responses between director and supervisor; and, for panel programs, comparison of responses over time. Results from several analyses provide support for NDATSS data reliability and validity (Pollack and D'Aunno 2010).

Dependent Variables

In each survey wave, clinical supervisors were asked whether their facility provided HIV testing, and, if so, what percentage of clients had actually received these services on-site or off-site in the past year. This analysis explored two dependent variables drawn from these responses. First, we examined whether OTP programs offered HIV testing to their clients in the past calendar year; we created a dummy variable (0–1) set to 1.0 if the program offered HIV testing to its clients. Second, we examined the percentage of clients reported as actually receiving these services in the past calendar year.

Predictor Variables

State Regulations. We used data from two prior studies of the consistency of states' HIV testing laws with CDC recommendations; we used data from Mahajan et al. (2009) to code 2008 state laws, and we used data from Neff and Goldschmidt (2011) to code 2011 state laws. On the basis of these data, we created six dummy-variable measures of state regulations concerning HIV testing. Specifically, we coded states that *changed* their regulations between 2008 and 2011 *to make them consistent* with CDC guidelines for *opt-out consent* with testing (1 = yes, 0 = no; i.e., CDC guidelines state that all clients should be notified that they will be tested, and can opt-out of testing, but they are otherwise tested). A second dummy variable codes states whose regulations for consent continued to be *inconsistent* with CDC guidelines in 2011 (1 = yes,

0 = no). Third, we created a reference group consisting of states whose informed consent laws were originally consistent with CDC guidelines. Similarly, we coded states that, following CDC guidelines, *dropped* requirements for *pretest counseling* between 2008 and 2011 (1 = yes, 0 = no). We included a variable for states that in 2011 had *kept their requirements for pretest counseling* (1 = yes, 0 = no). Finally, a referent category included states whose laws for counseling requirements were originally consistent with CDC guidelines.

Client Risk Profile. OTPs that treat a large proportion of clients in high-risk HIV groups may be more likely to adopt or maintain HIV testing programs. Clinical supervisors reported the percent of clients who had injected drugs in the previous fiscal year and the proportion of African American, Hispanic/Latino, and women clients.

Resources. OTPs may lack resources, financial incentives, or expertise to provide HIV testing services. We thus examine the extent to which OTPs with higher staff–client ratios are more likely to offer HIV testing services (D'Aunno, Vaughn, and McElroy 1999). Clinical supervisors reported the number of clients and the number of full-time equivalents (FTEs) employed by the treatment program in the last fiscal year. The number of FTEs was divided by the annual number of clients to create a staff–client ratio. Because the relationship between OTP size and service provision is likely concave, we took the natural logarithm of this ratio in our regression specifications.

Program Ownership. Publicly owned OTPs may be more likely to see HIV testing as falling within their core mission of promoting public health. OTP directors were asked whether their treatment units were private nonprofit, private for-profit, or publicly owned.

Parent Organization. Hospital-affiliated OTPs may be more familiar with HIV testing services and more likely to see them as falling within their mission. OTP directors were asked whether their programs were owned by, operated by, or had any affiliation with another organization; if directors replied "yes" to any of these questions, they were asked whether the organization was a hospital. A positive response to this question was coded as 1; other responses were

coded 0. We included a separate dummy whether an OTP had formal linkages with a mental health center or psychiatric facility.

Director Attitudes. We explored the extent to which directors' values about HIV prevention services may influence programs' HIV testing. In particular, programs whose directors favor syringe exchange programs may be more likely to regard HIV testing as within their core mission. Using 5-point Likert scales, program directors reported the extent to which they support syringe exchange (a measure of support for harm reduction efforts). We create a dummy variable that equals 1.0 if a director supports syringe exchange to a "great" or "very great" extent.

Managed Care. Managed care also has the potential to affect service provision. Following prior work (Lemak and Alexander 2001; Pollack and D'Aunno 2010), we focus on managed care *stringency*; clinical supervisors reported the percent of clients whose payment sources required authorization before clients could begin treatment.

Licensing and Accreditation. Some accrediting bodies, including the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), encourage the provision of prevention services. Directors reported whether their OTP currently held JCAHO accreditation and we included this as a dummy variable.

Market Area Availability of HIV Testing among OTPs. We used data from SAMHSA's 2005 and 2009 N-SSATS to measure the availability of HIV testing in local market areas by calculating the percentage of OTPs in the focal county of each sample OTP that conducts HIV testing. We used 2005 NSATSS data to calculate the county-level rate of OTPs that offer HIV testing for the 2005 sample, and we used 2009 NSATSS data to calculate the same rate of testing among OTPs for the 2011 sample.

In the 2005 data, there were 1,121 OTPs located within 393 counties. We merged data from these counties with our 2005 data (a total of 116 counties). There were 14 programs that had no county-level data for OTPs because the sample program was the only OTP within the county. For these counties,

we imputed the respective average HIV testing rate of the contiguous counties. We also generated a dummy coded variable to indicate counties for which we could not calculate a county-level HIV test rate because no OTPs (other than the sample OTP) were located there.

We used the same approach for the 2009 NSATSS data in which there are 1,425 OTPs located within 492 counties. We merged data from these counties with our 2011 data (a total of 134 counties); 55 sample programs were the only OTP programs within the county.

Time Trends. We created dummy variables to represent data from 2005 and 2011 (with 2011 as the referent).

Control Variables. We controlled for the effects of several variables that could influence OTPs' provision of HIV testing services, including (log) size of the treatment program as measured by the total number of clients served in the past year, as reported by clinical supervisors, and programs' geographic location (using dummy variables for Northeast, Midwest, South, West, with West as the omitted referent category).

The use of buprenorphine for opioid abuse treatment has increased in recent years, and we assessed whether OTPs' use of buprenorphine might be related to their provision of HIV testing services. We thus included indicators for whether an OTP provided methadone maintenance treatment only, buprenorphine-only, or methadone and buprenorphine, with buprenorphine-only as the referent category.

Data Analyses

Many OTPs in our analysis sample ($n = 59$) participated in both the 2005 and 2011 survey waves. We must therefore account for repeated observations from the same OTP over time. We use random-effect specifications that allow the possibility of within-unit clustering over time (Diggle, Liang, and Zeger 1994). All available data were used in each survey wave, including data from OTPs that participated in some years, but not in others. We chose not to restrict our analysis to OTPs that participated in all survey waves, because nonrandom exclusion might introduce bias (Little and Rubin 2002).

Some independent variables (percent of clients requiring prior authorization, and percent clients who are female) displayed missing observations in

particular survey waves. When a given OTP displayed missing values for these variables, we imputed values by calculating predicted values using multiple regression analysis based on dummy variables for NDATSS survey wave and the observed values of these variables within the same OTP program in other waves. We compared results obtained with imputed and nonimputed data and found that imputation had no substantive impact on our point estimates but increased our sample size in pooled regression analysis from 339 to 370 programs.

Our key dependent variable, the percentage of clients who receive HIV testing, on-site or off-site, is left-censored at zero, and is right-censored at 100 percent. Specifically, within the sample of 370 observations used in our regression analyses, 100 (26 percent) reported that *no* clients received HIV testing services and 39 (10 percent) reported that *all* clients received HIV testing. The majority of observations, 231, reported that between 1 and 99 percent of clients received HIV testing. We therefore implemented a random-effects interval regression specification to accommodate these constraints. All regressions were performed using the *cnreg* procedure in the STATA 10.0 software package.

RESULTS

The percentage of programs in our sample offering HIV testing decreased markedly from 93 percent in 2005 to 64 percent in 2011 (Table 1). We saw a similar overall pattern in the percentage of clients tested in sample programs. Weighted by outpatient caseload, this decreased from an average of 41 percent in 2005 to 17 percent in 2011. This amounts to a marked decrease in both the availability and use of HIV testing for opioid clients across the nation.

Tables 2 and 3 show our multivariate regression results for the pooled sample of 2005 and 2011 data. Table 2 shows our random-effect logistic regression results. Coefficients (standardized for continuous variables) in this table indicate the estimated relationship of a predictor variable to the probability that an OTP will offer HIV testing services (yes or no).

Table 3 shows the estimated effect (again with standardized coefficients) of the predictor variables on the percentage of clients reported to receive HIV testing, either on- or off-site. Because the dominant majority of OTPs (particularly public-owned and methadone-only) offered testing in 2005, we find quite large adjusted odds ratios for these coefficients.

Table 1: Descriptive Statistics for All Variables (Weighted by Case Load)

Variable	*Mean 2005 (SD)*	*Mean 2011 (SD)*
Percent of OTPs offering HIV testing (i.e., at least 1% of clients tested)	0.93 (0.26)	0.64 (0.48)
Percent OTP clients who get HIV/AIDS testing (on-site or off-site)	40.8 (38.6)	16.8 (24.8)
JCAHO accreditation	0.42	0.25
Hospital affiliation	0.19	0.10
Mental health center affiliation	0.04	0.03
Northeast region	0.38	0.34
Midwest region	0.14	0.25
South region	0.23	0.22
Public ownership	0.24	0.10
Private nonprofit ownership	0.41	0.57
Percent OTP clients who injected with needles in past year	40.9 (30.3)	38.6 (27)
Log (number of clients)	6.98 (1.1)	6.6 (0.79)
Percent of clients who are non-Hispanic African American	32.1 (26.5)	19.1 (21.2)
Percent of clients who are Hispanic/Latino	20.2 (22)	14.8 (19.6)
Percent of clients who are female	42.5 (21.2)	43.2 (9.4)
Methadone-only unit dummy	0.59	0.43
Methadone or buprenorphine unit dummy	0.27	0.30
Buprenorphine-only dummy (referent)	0.14	0.27
Percent clients requiring prior authorization of services	19.6 (33.3)	25.9 (35)
Log (staff/client)	−4.01 (1.11)	−3.50 (0.79)
Director supports needle exchange programs to a great/very great extent	0.62	0.75
Informed consent state law changed to be CDC-consistent (1 = yes, 0 = no)	0.36	0.38
Informed consent state law stays inconsistent with CDC (1 = yes, 0 = no)	0.28	0.27
HIV pretest counseling requirement changed to be CDC-consistent (1 = yes, 0 = no)	0.79	0.77
HIV pretest counseling stays inconsistent with CDC (1 = yes, 0 = no)	0.10	0.07
Percent of OTPs providing HIV testing in county	67.2 (27.5)	54.8 (30.1)
No OTP in county of focal OTP (1 = yes, 0 = no)	0.05	0.18
N	171	197

Controlling for potential confounders, we find a statistically significant decrease from 2005 to 2011 in both the likelihood that an OTP will offer HIV testing services and the percentage of OTP clients receiving HIV testing. Both dependent variables were associated with state regulations for HIV testing and several characteristics of OTPs and their client populations.

Table 2: Results from Logistic Regression Analysis of OTP Provision of HIV Testing (yes = 1, no = 0) (Pooled Sample, 2005 and 2011)

Predictor Variable	*Odds Ratio**	*Confidence Interval*
State regulations		
Informed consent state law changed to be CDC-consistent (1 = yes, 0 = no)	**2.69**	**1.20–6.02**
Informed consent state law originally consistent with CDC (1 = yes, 0 = no)	0.94	0.23–3.78
HIV pretest counseling requirement dropped (1 = yes, 0 = no)	0.43	0.15–1.28
HIV pretest counseling remains inconsistent (1 = yes, 0 = no)	0.95	0.18–5.03
OTP organizational characteristics		
JCAHO-accredited	1.01	0.47–2.18
Hospital affiliated	0.77	0.28–2.14
Mental health center affiliated	1.34	0.34–5.26
Public ownership	**15.47**	**3.08–77.67**
Private nonprofit	**2.47**	**1.24–4.92**
% clients require prior authorization before treatment (standardized coefficient)	1.30	0.94–1.81
Director supports needle exchange	1.37	0.72–2.62
Log ratio of staff to clients (standardized coefficient)	0.92	0.64–1.33
Percent of OTPs providing HIV testing in county (standardized coefficient)	1.20	0.90–1.59
OTP is sole provider in a county (1 = yes, 0 = no)	**2.61**	**1.20–5.68**
OTP client profile		
% clients inject (standardized coefficient)	0.87	0.62–1.23
% clients African American (standardized coefficient)	1.29	0.90–1.86
% clients Hispanic (standardized coefficient)	**1.52**	**1.05–2.21**
% clients female (standardized coefficient)	0.96	0.69–1.34
Control variables		
Northeast region	2.21	0.59–8.26
Midwest region	1.31	0.48–3.58
South region	**3.85**	**1.45–10.25**
OTP provides methadone-only	**5.07**	**2.18–11.79**
OTP provides methadone and buprenorphine	**2.74**	**1.08–6.95**
Log no. of OTP clients in last year (standardized coefficient)	1.10	0.77–1.57
Time (2005)	**4.77**	**2.45–9.29**
N	370	

Note. Bold type indicates significance at $p < .05$ with a one-tailed test.

First, state regulations seem to matter, independent of many factors we examined. The results show that state laws are significantly associated with both the likelihood that OTPs will offer HIV testing and the percent of their clients tested. Specifically, OTPs located in states that changed their regula-

Table 3: Results from Interval Regression Analysis of Percentage of OTP Clients Tested, On- or Off-Site (Pooled Sample, 2005 and 2011)

Predictor Variable	*Estimate**	*Confidence Interval*
State regulations		
Informed consent state law changed to be CDC-consistent (1 = yes, 0 = no)	**20.53**	**7.91–33.16**
Informed consent state law originally consistent with CDC (1 = yes, 0 = no)	10.59	−10.44–31.61
HIV pretest counseling requirement dropped (1 = yes, 0 = no)	**−22.28**	**−37.83–6.73**
HIV pretest counseling not required by state (1 = yes, 0 = no)	−8.72	−32.91–15.47
OTP organizational characteristics		
JCAHO accreditation	3.55	−7.63–14.72
Hospital affiliated	−3.56	−18.50–11.38
Mental health center affiliation	−4.94	−22.93–13.05
Public ownership	**30.61**	**15.58–45.63**
Private nonprofit	10.51	−0.67–21.69
% clients require prior authorization before treatment (standardized coefficient)	0.55	−4.06–5.15
Director supports needle exchange	6.33	−3.79–16.45
Log ratio of staff to clients (standardized coefficient)	−2.43	−7.84–2.99
Percent of OTPs providing HIV testing in county	3.56	−1.08–8.20
OTP is sole provider in a county (1 = yes, 0 = no)	**19.15**	**5.78–32.52**
OTP client profile		
% clients inject drugs (standardized coefficient)	**8.31**	**3.16–13.46**
% clients African American (standardized coefficient)	4.93	−0.06–9.92
% clients Hispanic (standardized coefficient)	**8.71**	**3.36–14.06**
% clients female (standardized coefficient)	4.35	0.03–8.67
Control variables		
Northeast region	15.52	−4.27–35.30
Midwest region	6.76	−9.68–23.20
South region	**25.52**	**10.48–40.56**
OTP provides methadone-only	**18.90**	**5.68–32.11**
OTP provide methadone and buprenorphine	10.95	−4.80–26.71
No. of OTP clients in last year (log) (standardized coefficient)	−3.37	−8.57–1.84
Time (2005)	**28.62**	**19.00–38.25**
N	370	

Note. Bold type indicates significance at $p < .05$ with a one-tailed test.

tions between 2005 and 2011 to make them consistent with CDC guidelines for *consent* with testing were both more likely to offer HIV testing and to have higher proportions of clients tested (i.e., CDC guidelines states that all clients should be notified that they will be tested, and can opt-out of testing, but they are otherwise tested). Similarly, OTPs located in states that followed CDC

guidelines and dropped requirements for *pretest counseling* between 2005 and 2011 also were much more likely to have higher proportions of clients tested.

Second, results concerning client populations show that OTPs, which serve a high proportion of Hispanic clients, are more likely both to offer HIV testing services and have a higher percentage of clients tested. OTPs that serve a high proportion of injection drug users were more likely to have tested a significantly higher proportion of clients.

Third, results concerning organizational characteristics of OTPs show that public and private nonprofit programs are significantly more likely to offer HIV testing services than for-profit programs; similarly, publicly owned OTPs have a markedly higher proportion of clients tested than was observed among private for-profit facilities. Indeed, our interval regressions imply a 30.6 percentage-point difference between publicly owned and private for-profit OTPs.

OTPs that rely exclusively on methadone maintenance therapy also were markedly more likely than others both to offer HIV testing services and have a higher proportion of clients tested. We also saw striking regional differences, with the South and Northeast regions showing the most intensive HIV testing and West and Midwestern OTPs showing the least-intensive providers of testing; OTPs located in the South region were significantly more likely to offer testing and have a higher proportion of clients tested than OTPs located in the West. Finally, the results show that OTPs that are sole providers of opioid treatment in a county are significantly more likely to offer HIV testing and to have a higher proportion of clients tested.

DISCUSSION

OTPs are far from implementing the routine provision of HIV testing services that CDC and other public health authorities recommend. Although 64 percent of OTPs offer some form of HIV testing services (on- or off-site) in 2011, only a small minority of clients actually receive HIV testing within these programs. Within the 2011 survey wave, only 17 percent of OTP clients were reported to have received HIV testing services. Almost 36 percent of clients received treatment in facilities that reported that they did not offer any HIV testing services. Abraham et al. (2011, 2012) report similar HIV testing rates using data from a 2008 national sample of private substance abuse treatment programs and in treatment programs that belong to the Clinical Trials Network, of which only 48 percent offered on-site HIV testing in 2008.

Perhaps most important, we observed marked and statistically significant declines between 2005 and 2011 in HIV testing in all types of OTPs. This decrease in sample programs offering HIV testing is similar to the decline in test availability among all OTPs in the United States, which dropped from a county-wide average of 67 percent in 2005 to a county-wide average of 57 percent in 2009 (NSDUH 2009). Within 32 percent of all counties in the nation, no OTP reported that it offered HIV testing in 2009. The comparable 2005 figure was only 9 percent. This is surprising given the increased focus on offering HIV testing in health care settings, including substance abuse treatment clinics, as suggested in CDC's 2006 HIV testing recommendations.

Controlling for case mix and other confounders, we also find that OTPs located in states that changed their regulations to become more consistent with CDC guidelines were significantly more likely to offer testing. The pattern of results concerning state regulations is interesting and important. OTPs located in states that changed their regulations between 2005 and 2011 to make them consistent with CDC guidelines for consent with testing were both more likely to offer HIV testing and to have higher proportions of clients tested. States that changed their regulations governing individuals' consent for testing to make the laws consistent with the CDC-recommended opt-out approach were both more likely to have OTPs that provided HIV testing and these OTPs had higher proportions of clients tested.

Furthermore, the percentage of OTP clients tested was significantly related to state regulations for pretest counseling. Specifically, OTPs located in states that removed this condition for testing had significantly higher percentages of clients tested. This result provides further evidence that streamlined HIV testing is preferable to HIV testing with risk-reduction counseling (Metsch et al. 2012). Requirements for pretest counseling appear to pose a significant barrier to testing. These results also support state efforts to promote HIV testing using opt-out consent.

This study has several limitations. The greatest limitation is the absence of client-level data. We cannot directly explore client characteristics associated with service receipt or the impact of such services on client outcomes. Comparisons with client-level surveys indicate high validity of NDATSS data; therefore, this limitation should not bias the results.

The data are also based on director and supervisor responses, and may be susceptible to measurement error. Yet, as noted above, our results closely match data from SAMHSA's (2005, 2009) national survey and from Abraham et al.'s studies (2011, 2012). To the extent that respondents overstate the intensity of HIV testing provision, we suspect that OTP providers are even further

from meeting CDC guidelines and state regulations than our descriptive results would indicate.

Lastly, the data do not indicate health services provided to OTP clients by other providers or by referral organizations. Some OTP clients likely received HIV testing independently of OTP care. Our analysis likely understates access to HIV testing within public health clinics and other testing sites. As noted above, an integrated primary care system that included substance abuse treatment and HIV health services would likely lead to better testing rates. In our current health care system, primary care clinics, emergency rooms, physicians' offices, and local public health departments all should be important, if not focal, sites for HIV testing among the population of opioid users.

Notwithstanding these limitations, we present several findings pertinent to policy, practice, and research. To begin, we need research to develop understanding of why OTPs significantly decreased their role in HIV testing. One important factor is that treatment programs that use buprenorphine (either alone or in combination with methadone) are much less likely to offer HIV testing for their clients. Buprenorphine-only programs, which are the least likely type of OTP to provide HIV testing, increased significantly as a percentage of the total population of OTPs from 14 percent in 2005 to 27 percent in 2011 (see Table 1). Perhaps clients and staff in buprenorphine treatment programs are less aware of the need for HIV testing. They may see less need for it, because their clients are less likely to be IDUs. Clients and staff in these programs may have been less influenced by the HIV epidemic, which played a profound role in traditional methadone treatment populations during the 1980s and 1990s.

Expanded access to buprenorphine is an important treatment advance. However, the growth of this market segment may raise new concerns, because buprenorphine providers have different organizational histories, cultures, and client populations from those found in traditional treatment programs for opiate use disorders. The role of buprenorphine-only OTPs in HIV testing merits further study (Edelman et al., 2012).

A second factor in the decline of HIV testing among OTPs is the significant decrease in publicly owned programs, from 24 percent of all OTPs in 2005 to 10 percent in 2011. Compared with private for-profit programs, we found that publicly owned programs had 15 times the odds of offering HIV testing. This pattern is consistent with prior research highlighting the sharp contrast in roles across providers (Wheeler and Nahra 2000), with public providers assuming greatly increased public health and safety-net roles. At the

same time, this pattern may suggest the need for intervention. Specifically, to the extent that for-profit programs are inappropriately providing the bare minimum of services to optimize profit, state or national regulations might be needed to require these OTPs to do routine HIV testing and to monitor their compliance.

Yet it is possible that for-profit programs are being efficient and only testing clients who need it—perhaps much of their client population already has been tested. Indeed, perhaps private and public programs are testing both appropriately and efficiently, but the client populations in private programs and public programs may differ in ways that we have not measured (e.g., more previously untested clients are in public programs). Examining these possibilities should be a research priority.

Our results also show that OTPs that are sole providers of opioid treatment in their counties are more likely to provide HIV testing. This result may reflect that such "sole providers" have the necessity of being "one-stop shopping" centers due to lack of alternative service providers, particularly in rural areas. This result also may suggest that in areas with a higher density of service providers of various types (public health departments, hospitals), OTP clients may get HIV testing at sites other an OTP; as noted above, we do not have the data to examine this possibility.

The results concerning testing rates among African American and Hispanic OTP clients are important because the most recent CDC (2012) statistics show that HIV infection continues to disproportionately affect these groups. The estimated rate of new HIV infections in 2010 among African Americans (68.9) was 7.9 times as high as the rate in whites (8.7). Similarly, 21 percent of new HIV infections in 2010 occurred among Hispanics; this rate (27.5) was three times the rate for whites (8.7). Our results show that OTPs that serve higher percentages of Hispanic, but not African American, clients are more likely to provide HIV testing. It is clear that increased HIV testing and other prevention efforts are needed among both of these minority groups.

Furthermore, we need to improve understanding of barriers to increased HIV testing in OTPs. For example, if analyses identify financial barriers as a central obstacle, local health departments could provide free test kits. If staff skill performing informed consent or posttest counseling is identified as a key barrier, in-service training may be a more effective mechanism to expand use of HIV testing services. Understanding barriers to off-site testing also may be especially valuable in designing improved off-site linkages to services and care. If clients' sense of HIV stigma or perceived lack of personal risk

constrains service use, client education, public information campaigns, and test recruitment efforts may have the largest impact on testing.

More generally, at least in our current system of care, different populations and various service sites may need different interventions to increase testing. This would argue for a flexible strategy to increase HIV testing rates that would aim to reach individuals "where they live."

OTP providers can play a central role in HIV prevention. Our results suggest, however, that OTP facilities are not providing the broad HIV testing called for by public health authorities. Despite increased attention to the value of such services, both in public health and in society, in general, OTPs significantly decreased the provision of HIV testing services between 2005 and 2011. Efforts to identify and address barriers to expanded HIV testing should be a high priority for public health policy and practice. To begin, states should re-examine, and if necessary, revise their regulations that govern HIV testing to make them consistent with CDC recommendations for consent and counseling.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This study was supported by NIDA grant 1R01DA030459, Thomas D'Aunno, Ph.D., principal investigator.

Disclosures: None.

Disclaimers: None.

REFERENCES

Abraham, A. J., L. A. O'Brien, B. E. Bride, and P. A. Roman. 2011. "HIV/AIDS Services in Private Substance Abuse Treatment Programs." *Drug and Alcohol Dependence* 115: 16–22.

Abraham, A. J., L. A. O'Brien, H. K. Knudsen, B. E. Bride, G. R. Smith, and P. M. Roman. 2012. "Patient Characteristics and Availability of Onsite Non-Rapid and Rapid HIV Testing in US Substance Use Disorder Treatment Programs." *Journal of Substance Abuse Treatment* 44 (1): 120–5. doi:10.1016/j.jsat.2012.03.004.

Branson, B. M., H. H. Handsfield, M. A. Lampe, R. S. Janssen, A. W. Taylor, and S. B. Lyss. 2006. "Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings." *Journal of the American Medical Association* 100: 131–47.

Brown, L. S., S. A. Kritz, R. J. Goldsmith, R. J. Bini, J. Rotrosen, S. Baker, J. Robinson, and P. McAuliffe. 2006. "Characteristics of Substance Abuse Treatment Pro-

grams Providing Services for HIV/AIDS, Hepatitis C Virus Infection, and Sexually Transmitted Infections: The National Drug Abuse Treatment Clinical Trials Network." *Journal of Substance Abuse Treatment* 30 (4): 315–21.

CDC. 2006. Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health Care Settings. *Morbidity and Mortality Weekly Report* 55 (RR14):1–17.

CDC. 2012. *HIV/AIDS Statistics and Surveillance: HIV Incidence, 2008-2010.* Atlanta, GA: Centers for Disease Control and Prevention.

Chriqui, J. F., Y. Terry-McElrath, D. C. McBride, and S. S. Eidson. 2008. "State Policies Matter: The Case of Outpatient Drug Treatment Program Practices." *Journal of Substance Abuse Treatment* 35: 13–21.

D'Aunno, T., T. E. Vaughn, and P. McElroy. 1999. "An Institutional Analysis of HIV Prevention Efforts by the Nation's Outpatient Drug Abuse Treatment Units." *Journal of Health and Social Behavior* 40 (2): 175–92.

Des Jarlais, D. C., and S. Semaan. 2008. "HIV Prevention for Injecting Drug Users: The First 25 Years and Counting." *Psychosomatic Medicine* 70: 606–11.

Diggle, P. J., K. Y. Liang, and S. L. Zeger. 1994. *Analysis of Longitudinal Data.* Oxford, UK: Oxford University Press.

Edelman, E. J., A. Dinh, B. A. Moore, R. Schottenfeld, D. A. Fiellin, and L. E. Fiellin. 2012. "HIV Testing Practices among Buprenorphine-Prescribing Physicians." *Journal of Addiction Medicine* 6 (2): 159–65.

Groves, R. M.. 1988. *Telephone Survey Methodology*, New York: John Wiley and Sons.

Lemak, C., and J. A. Alexander. 2001. "Managed Care and Outpatient Substance Abuse Treatment Intensity." *Journal of Behavioral Health Services and Research* 28 (1): 12–29.

Little, R. A., and D. B. Rubin. 2002. *Statistical Analysis with Missing Data.* New York: Wiley-Interscience.

Mahajan, A. P., L. Stemple, M. F. Shapiro, J. B. King, and W. E. Cunningham. 2009. "Consistency of State Statutes with the Center for Disease Controls and Prevention HIV Testing Recommendations for Health Care Settings." *Annals of Internal Medicine* 150: 263–9.

Metsch, L. R., D. J. Feaster, L. Gooden, T. Matheson, R. N. Mandler, L. Haynes, S. Tross, T. Kyle, D. Gallup, A. S. Kosinki, A. Douaihy, B. R. Schackman, M. Das, R. Lindblad, S. Erickson, P. T. Korthuis, S. Martino, J. L. Sorensen, J. Szapocznik, R. Walensky, B. Branson, and G. N. Colfax. 2012. "Implementing Rapid HIV Testing with or without Risk-Reduction Counseling in Drug Treatment Centers: Results of a Randomized Trial." *American Journal of Public Health* 102 (6): 1160–7. Published online ahead of print April 19, 2012.

Neff, S., and R. Goldschmidt. 2011. "Research Letter: CDC & Prevention 2006 HIV Testing Recommendations and State Testing Laws." *Journal of the American Medical Association* 305 (17): 1767.

NSDUH. 2009. Substance Abuse and Mental Health Services Administration. Results from the 2009 National Survey on Drug use and Health: National Findings

(Office of Applied Studies, NSDUH Series H-34, DHHS Publication No. SMA 08-4343). Rockville, MD.

Pollack, H. A., and T. D'Aunno. 2010. "HIV Counseling and Testing in the Nation's Outpatient Drug Abuse Treatment System: Results from a National Survey, 1995-2005." *Journal of Substance Abuse Treatment* 38 (4): 307–16.

Santibanez, S. S., R. S. Garfein, A. Swartendruber, D. W. Purcell, L. A. Paxton, and A. E. Greenberg. 2006. "Update and Overview of Practical Epidemiologic Aspects of HIV/AIDS among Injection Drug Users in the United States." *Journal of Urban Health* 83 (1): 86–100.

Substance Abuse and Mental Health Services Administration Office of Applied Studies. 2005. National Survey of Substance Abuse Treatment Services (N-SSATS) [accessed September 22, 2009]. Available at http://www.oas.samhsa.gov/nssats2k7/nssats2k7toc.cfm.

———, and J. Montaner. 2011. The Urgency of Providing Comprehensive and Integrated Treatment for Substance Abusers with HIV. *Health Affairs* 30: 1411–9.

Wheeler, J. R., and T. A. Nahra. 2000. "Private and Public Ownership in Outpatient Substance Abuse Treatment: Do We Have a Two-Tiered System?" *Administration and Policy in Mental Health* 27 (4): 197–209.

Wolf, L. E., A. Donoghoe, and T. Lane. 2007. "Implementing Routine HIV Testing: The Role of State Law." *PLoS ONE* 2 (10): e1005.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.