HHS Public Access

Author manuscript

Drug Alcohol Depend. Author manuscript; available in PMC 2016 December 02.

Published in final edited form as:

Drug Alcohol Depend. 2016 August 1; 165: 270–274. doi:10.1016/j.drugalcdep.2016.05.024.

Low HIV testing among persons who inject drugs—National HIV Behavioral Surveillance, 20 U.S. cities, 2012☆

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Abstract

Introduction—Persons who inject drugs (PWID) continue to be disproportionately affected by HIV. HIV testing is key to reducing HIV transmission by increasing awareness of HIV status and linking HIV-positive persons to care. Using data from PWID participating in CDC's National HIV Behavioral Surveillance (NHBS) system, we examined prevalence of recent HIV testing among PWID by certain characteristics to guide interventions to increase HIV testing.

Methods—We analyzed NHBS data from PWID 18 years or older recruited via respondent-driven sampling in 20 US cities in 2012. We examined demographic and behavioral factors associated with recent HIV testing (within 12 months before interview) using a Poisson model to calculate adjusted prevalence ratios (aPRs).

Results—Of 9555 PWID, 53% had recently tested for HIV. In multivariable analysis, HIV testing was more frequent among participants who visited a healthcare provider (aPR 1.50, $P < 0.001$), participated in alcohol or drug treatment (aPR 1.21, $P < 0.001$), or received an HIV prevention intervention (aPR 1.26, $P < 0.001$). HIV testing was also more frequent among participants who received free sterile syringes (aPR 1.12, $P < 0.001$).

Discussion—Only half of PWID participating in NHBS in 2012 reported recent HIV testing. HIV testing was more frequent among participants who accessed health and HIV prevention services. To increase HIV testing among PWID, it is important for providers in healthcare and HIV prevention settings to proactively assess risk factors for HIV, including injection drug use, and offer a wide range of appropriate interventions, such as HIV testing.

☆These data were presented at the National HIV Prevention Conference in Atlanta, GA, December 8, 2015.

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[1]Membership of the NHBS Study Group is provided in the Acknowledgments.

Contributors

All authors contributed individually to the analysis of these data and to the conceptualization, writing, and editing of this manuscript

Conflict of interest

No conflict declared.

Disclaimer

The findings and conclusions in this paper are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).

Keywords

HIV testing; Persons who inject drugs; HIV prevention

1. Introduction

Persons who inject drugs (PWID) are disproportionately affected by HIV. Although PWID who reported injecting within the past 12 months comprised <1% of the U.S. population aged 13 years or older in 2011 (Lansky et al., 2014), injection drug use accounted for an estimated 20% of prevalent infections among persons living with diagnosed HIV infection in the United States at the end of 2012 (Centers for Disease Control and Prevention (CDC), 2015d). Recent increases in heroin use in the United States (CDC, 2015g), outbreaks of viral hepatitis among PWID (CDC, 2015e), and a large outbreak of HIV among PWID in rural Indiana (CDC, 2015a) raise concerns about HIV transmission among PWID.

The CDC recommends that persons at increased risk of HIV infection, including PWID and their sex partners, undergo HIV screening at least annually (CDC, 2006). For HIV-positive persons, achieving awareness of HIV infection is the first step in linkage to medical care and services, which can lead to improved clinical outcomes (Castel et al., 2013; Panel on Antiretroviral Guidelines for Adults and Adolescents, 2014) and a reduced likelihood of HIV transmission (Celentano et al., 1994; Marks et al., 2005; Porco et al., 2004; Weinhardt et al., 1999). At the end of 2012, an estimated 13% of U.S. HIV infections among persons aged 13 years or older were undiagnosed (CDC, 2015f). Data from the CDC's National HIV Behavioral Surveillance (NHBS), which helps health departments in 20 cities with high AIDS prevalence monitor HIV-related behaviors, indicated that among PWID in 2012, 9% of participants tested positive for HIV, of whom only 64% were aware of their infection (CDC, 2015c).

Reaching PWID with HIV prevention interventions, such as HIV testing, can be challenging. PWID comprise a unique population for whom risk behaviors, healthcare needs, and available resources may differ from the general population (CDC, 2012b). The CDC's Expanded HIV Testing Initiative (ETI), launched in 2007 to facilitate HIV diagnosis and linkage to medical care among populations at risk, was expanded in 2010 to include PWID (CDC, 2011, 2012a).

We used NHBS data to understand factors associated with HIV testing among PWID (Gallagher et al., 2007). We hypothesized that there would be a positive association between the use of health/HIV prevention services and HIV testing, cementing the role that providers play in identifying risk behaviors and promoting HIV prevention services, including HIV testing.

2. Methods

NHBS data are collected in three-year rounds of annual rotating cycles which focus on one population per year; methods are described elsewhere (CDC, 2015b,c; Lansky et al., 2007). Data were collected from PWID participating in NHBS in 2012 in 20 cities—which together

comprised approximately 65% of AIDS cases in large urban areas in 2011 (CDC, 2013). Participants were recruited using respondent-driven sampling (Heckathorn, 1997; Salganik and Heckathorn, 2004). Participants who had injected drugs during the previous 12 months, were current residents of a participating city, were aged 18 years or older, and could complete the interview in spoken English or Spanish were eligible to participate. Those who were eligible and provided informed consent were administered an anonymous, in-person interview. Self-reported HIV-positive participants who received their HIV-positive result more than 12 months before interview (n = 562) were excluded from this analysis.

The standardized interview included questions regarding demographic characteristics, sexual and drug-use behaviors, and use of HIV prevention services. Participants were asked the month and year of their most recent HIV test. Those who reported an HIV test during the 12 months before interview were considered to have tested recently; no other testing interval is discussed in this analysis. The time period measured for all other behavioral variables was also 12 months before interview. All participants were offered anonymous HIV testing, although information regarding HIV testing on the date of interview was not incorporated into this analysis. Incentives were offered for interview completion, HIV testing, and recruitment, with amounts determined locally. Activities for NHBS were approved by local institutional review boards for each participating city and by the CDC.

“Received HIV prevention intervention” is a composite measure based on having received individual- or group-level HIV prevention interventions. “Received free sterile syringes” refers to having received new sterile syringes for free—excluding those given by friends, relatives, or sex partners. “Receptive sharing of syringes” is defined as “using needles that someone else had already injected with.” A “healthcare provider” is any person providing care in a clinical setting.

We performed bivariate analysis using the chi-square test to examine the percentages of PWID who reported having an HIV test by key characteristics. To determine if recent HIV testing varied by selected characteristics, we used a Poisson model with robust standard errors clustered on recruitment chain to calculate adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs; Zou, 2004). We included variables with significant bivariate differences ($P < 0.05$) plus gender (Table 2). To adjust for respondent-driven sampling methods, we included peer network size, as determined by asking participants how many people they know locally who inject drugs. To compare HIV testing in cities that did and did not receive ETI funding for HIV testing among PWID, we incorporated city as a dichotomous variable based on receipt of ETI funding; 17 of 20 NHBS cities were in ETI jurisdictions (Table 1). All analyses were performed in SAS 9.3 (SAS Institute, Inc., Cary, NC).

Having health insurance increases the probability of visiting a healthcare provider which, as an intermediate step, obscures the relationship between health insurance status and HIV testing. We included both health insurance status and healthcare provider visit as covariates in our primary multivariable model, based on statistical significance in bivariate analysis. We then estimated a secondary model excluding healthcare provider visit to better understand the relationship between health insurance status and HIV testing.

3. Results

Demographic and other characteristics of the 9555 participants included in this analysis are described in Table 1. Among participants, 53% reported HIV testing (Table 2). HIV testing was more common among participants who visited a healthcare provider (aPR 1.50, $P < 0.001$), who participated in alcohol or drug treatment (aPR 1.21, $P < 0.001$), and who received an HIV prevention intervention (aPR 1.26, $P < 0.001$). Participants who received free sterile syringes more frequently reported HIV testing than those who did not (aPR 1.12, $P < 0.001$). HIV testing was less common among participants who reported receptive syringe sharing than among those who did not (aPR 0.87, $P < 0.001$).

A higher proportion of participants with health insurance visited a healthcare provider compared with those without health insurance (89% versus 62%, $P < 0.001$). There was no significant difference in HIV testing for participants with health insurance versus those without when using the primary model that included healthcare provider visit (aPR 1.01, $P = 0.8$), however having health insurance *was* positively associated with HIV testing when using the secondary model that excluded healthcare provider visit (aPR 1.09, $P = 0.001$) (Table 2). No interaction was noted between healthcare provider visit and health insurance status.

Among participants who did not undergo HIV testing in the 12 months before interview, 38% reported no particular reason for not testing; 27% reported fear of an HIV diagnosis, 19% thought they were low risk for infection, and 12% reported not having time.

4. Discussion

Despite the recommendation for at least annual HIV screening among PWID (CDC, 2006), only half of the PWID participating in NHBS in 2012 reported recent HIV testing. Recent HIV testing was more common among participants who utilized health and HIV prevention services such as healthcare providers, alcohol or drug treatment, and HIV prevention interventions. HIV testing was also more common among participants who received free sterile syringes and less common among participants who reported receptive syringe-sharing partners, highlighting the importance of services provided by syringe service programs. Even in healthcare and HIV prevention settings, though, there is much work to be done; a third to nearly a half of participants who visited a healthcare provider, participated in alcohol or drug treatment, received an HIV prevention intervention, or received free sterile syringes reported not undergoing recent HIV testing.

Primary care settings, emergency rooms (where nearly 40% reported they receive routine medical care), alcohol and drug treatment programs, community-based organizations, and syringe service programs all represent opportunities to engage PWID and offer HIV prevention services, such as HIV testing. According to our data, HIV testing was more frequent among participants with health insurance only once healthcare provider visit was excluded, possibly due to the large overlap in the participants reporting health insurance and the participants reporting a recent health-care provider visit. This suggests that one route by which health insurance increases HIV testing may be via increased opportunities to interact

with healthcare providers, where HIV testing can be offered. For PWID who encounter the healthcare system, a lack of HIV testing represents a missed opportunity.

The findings here are subject to several limitations. Because this study is cross-sectional, it is not possible to establish causality; the likelihood of undergoing HIV testing may be influenced by other factors, such as an intrinsic propensity for health seeking and risk avoidance behaviors. Also, because date of most recent HIV test was self-reported, social desirability and recall biases may affect estimates. Furthermore, because the true characteristics of the PWID population are unknown, the representativeness of the NHBS sample cannot be determined. The lack of standard methods for multivariable analysis of respondent-driven sampling data precluded a weighted analysis; our models were clustered on recruitment chain and included peer network size to control for respondent-driven sampling methods. No behavioral models or theories were applied to this study. Finally, because PWID were interviewed in 20 cities with high AIDS prevalence, findings from these cities might not be generalizable to other cities or circum-stances.

To reduce new HIV infections, it is essential to increase HIV testing. HIV testing among PWID participating in NHBS in 2012 was suboptimal. Nearly 40% of participants who did not report HIV testing cited no particular reason, indicating that perhaps increasing opportunities for HIV testing would increase uptake. Indeed, HIV testing was more frequent among PWID in NHBS cities that received funding for HIV testing as part of the CDC's ETI. While linking persons at increased risk for HIV to health and HIV prevention services can increase HIV testing, the process of linkage is complicated and is not addressed here; what *is* apparent through this analysis is that HIV testing in healthcare and HIV prevention settings is underutilized. Obvious first steps to increasing rates of HIV testing among PWID are for providers in healthcare and HIV prevention settings to be more proactive in assessing risk factors for HIV (including injection drug use), to understand the complex social, medical, and structural factors that often accompany injection drug use, and to offer HIV prevention interventions, including HIV testing, where appropriate.

Acknowledgments

The authors would like to thank Binh Le, MD, for his assistance with data analysis. We would also like to thank all NHBS participants in 2012, as well as members of the NHBS Study Group: Atlanta, GA: Jeff Todd, Greg Bautista; Baltimore, MD: Colin Flynn, Danielle German; Boston, MA: Maura Miminos, Rose Doherty, Chris Wittke; Chicago, IL: Nikhil Prachand, Nanette Benbow; Dallas, TX: Sharon Melville, Shane Sheu, Alicia Novoa; Denver, CO: Mark Thrun, Alia Al-Tayyib, Ralph Wilmoth; Detroit, MI: Vivian Griffin, Emily Higgins, Karen MacMaster; Houston, TX: Marcia Wolverton, Hafeez Rehman, Paige Padgett; Los Angeles, CA: Trista Bingham, Ekow Kwa Sey; Miami, FL: Marlene LaLota, Lisa Metsch, David Forrest; Nassau-Suffolk, NY: Bridget Anderson, P. Tyler French, Lou Smith; New Orleans, LA: DeAnn Gruber, William T. Robinson, Narquis Barak; New York City, NY: Alan Neaigus, Kathleen H. Reilly, Travis Wendel; Newark, NJ: Barbara Bolden, Afework Wogayehu, Henry Godette; Philadelphia, PA: Kathleen A. Brady, Jennifer Shinefeld; San Diego, CA: Vanessa Miguelino-Keasling, Veronica Tovar; San Francisco, CA: H. Fisher Raymond; San Juan, PR: Sandra Miranda De León, Yadira Rolón-Col00F3;n, Melissa Marzan; Seattle, WA: Tom Jaenicke, Hanne Thiede, Richard Burt; Washington, DC: Manya Magnus, Irene Kuo, Tiffany West; CDC: Behavioral Surveillance Team.

Role of funding source

The National HIV Behavioral Surveillance (NHBS) system is funded by CDC. Data collection is conducted by funded sites in accordance with a standardized protocol developed by CDC.

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Table 1

Characteristics among persons who inject drugs—National HIV Behavioral Surveillance System, 20 U.S. Cities, 2012.

	2012	
Characteristic	**No.**	**%**
Gender		
Male	6850	(72)
Female	2705	(28)
Race or ethnicity		
American Indian or Alaska Native	89	(1)
Asian, Native Hawaiian, or other Pacific Islanders	43	(0.5)
Black or African American	4159	(44)
Hispanic or Latino[a]	2306	(24)
White	2611	(27)
Other or multiple races	332	(3)
Age group (years)		
18–24	368	(4)
25–29	654	(7)
30–39	1826	(19)
40–49	2591	(27)
≥50	4116	(43)
From city in ETI[b] jurisdiction		
No	1549	(16)
Yes	8006	(84)
Education		
<High school	3263	(34)
High school diploma or GED	3810	(40)
>High school	2479	(26)
Annual household income[c]		
At or below federal poverty level	7465	(79)
Above federal poverty level	2019	(21)
Insurance status		
None	3831	(40)
Some[d]	5711	(60)
Visited healthcare provider		
No	2124	(22)
Yes	7427	(78)
Participated in alcohol or drug treatment		
No	6112	(64)
Yes	3443	(36)
Received an HIV prevention intervention		

	2012	
Characteristic	**No.**	**%**
No	7215	(76)
Yes	2325	(24)
Received free sterile syringes		
No	4749	(50)
Yes	4804	(50)
No. of receptive syringe-sharing partners		
None	6172	(65)
At least one	3371	(35)
Frequency of injection		
Less than once a day	2766	(29)
At least once a day	6786	(71)
Total	9555	

Each variable may not add to total, due to missing values. All reported behaviors occurred during the 12 months before interview.

[a] Hispanics or Latinos can be of any race.

[b] CDC's Expanded Testing Initiative: ETI jurisdictions: Atlanta, GA; Baltimore, MD; Boston, MA; Chicago, IL; Dallas, TX; Detroit, MI; Houston, TX; Los Angeles, CA; Miami, FL; Nassau, NY; New Orleans, LA; New York, NY; Newark, NJ; Philadelphia, PA; San Diego, CA; San Francisco, CA; Washington, DC; *Not* ETI jurisdictions: Denver, CO; San Juan, PR; Seattle, WA.

[c] Poverty level is based on household income and household size.

[d] Includes public, private, other, and multiple insurances.

Table 2

Recent HIV testing by selected characteristics among persons who inject drugs—National HIV Behavioral Surveillance, 20 U.S. Cities, 2012.

	Bivariate Analysis		Primary Multivariable Analysis			Secondary Multivariable Analysis		
	% tested[a]	*P*-value[a]	aPR[b]	*P*-value[b]	95% CI[b]	aPR[c]	*P*-value[c]	95% CI[c]
Characteristic								
Gender		0.3						
Male	(52)		Ref			Ref		
Female	(54)		0.99	0.5	(0.94, 1.03)	1.00	0.8	(0.96, 1.05)
Race or ethnicity		**0.03**						
Black or African American	(54)		**1.14**	**<0.001**	**(1.07, 1.22)**	**1.13**	**<0.001**	**(1.06, 1.20)**
Hispanic or Latino[d]	(53)		**1.09**	**0.01**	**(1.02, 1.15)**	**1.07**	**0.03**	**(1.01, 1.14)**
White	(51)		Ref			Ref		
Other or multiple races[e]	(51)		1.02	0.6	(0.94, 1.10)	1.01	0.7	(0.94, 1.10)
Age group (years)		**<0.001**						
18–24	(52)		**1.19**	**<0.001**	**(1.10, 1.29)**	**1.16**	**0.001**	**(1.06, 1.27)**
25–29	(60)		**1.35**	**<0.001**	**(1.25, 1.47)**	**1.32**	**<0.001**	**(1.21, 1.43)**
30–39	(55)		**1.24**	**<0.001**	**(1.16, 1.31)**	**1.21**	**<0.001**	**(1.14, 1.29)**
40–49	(55)		**1.14**	**<0.001**	**(1.07, 1.20)**	**1.12**	**<0.001**	**(1.06, 1.19)**
>50	(49)		Ref			Ref		
From city in ETI[f] jurisdiction		**<0.001**						
No	(48)							
Yes	(54)		**1.11**	**0.03**	**(1.01, 1.22)**	**1.13**	**0.01**	**(1.03, 1.24)**
Education		**0.04**						
<High school	(51)		Ref			Ref		
High school diploma or GED	(53)		1.02	0.5	(0.97, 1.06)	1.03	0.2	(0.98, 1.07)
>High school	(55)		1.04	0.1	(0.99, 1.10)	**1.07**	**0.01**	**(1.01, 1.12)**
Annual household income[g]		0.2						
At or below federal poverty level	(52)		–	–	–	–	–	–
Above federal poverty level	(54)		–	–	–	–	–	–
Insurance status		**<0.001**						

Characteristic	Bivariate Analysis		Primary Multivariable Analysis			Secondary Multivariable Analysis		
	% tested[a]	*P*-value[a]	aPR[b]	*P*-value[b]	95% CI[b]	aPR[c]	*P*-value[c]	95% CI[c]
None	(47)		Ref			Ref		
Some[h]	(56)		1.01	0.8	(0.95, 1.06)	**1.09**	**0.001**	**(1.03, 1.15)**
Visited healthcare provider		**<0.001**						
No	(35)		Ref			–	–	–
Yes	(58)		**1.50**	**<0.001**	**(1.40, 1.61)**	–	–	–
Participated in alcohol or drug treatment		**<0.001**						
No	(47)		Ref			Ref		
Yes	(63)		**1.21**	**<0.001**	**(1.16, 1.26)**	**1.25**	**<0.001**	**(1.19, 1.31)**
Received an HIV prevention intervention		**<0.001**						
No	(48)		Ref			Ref		
Yes	(69)		**1.26**	**<0.001**	**(1.20, 1.32)**	**1.29**	**<0.001**	**(1.23, 1.35)**
Received free sterile syringes		**<0.001**						
No	(47)		Ref			Ref		
Yes	(59)		**1.12**	**<0.001**	**(1.07, 1.16)**	**1.12**	**<0.001**	**(1.08, 1.17)**
No. of receptive syringe-sharing partners		**<0.001**						
None	(56)		Ref			Ref		
At least one	(47)		**0.87**	**<0.001**	**(0.83, 0.92)**	**0.87**	**<0.001**	**(0.83, 0.92)**
Frequency of injection		0.1						
Less than once a day	(52)		–	–	–	–	–	–
At least once a day	(53)		–	–	–	–	–	–
Total (n = 9555)	(53)							

aPR = Adjusted Prevalence Ratio and CI = Confidence Interval. All reported behaviors occurred during the 12 months before interview, including recent HIV testing.

[a]Unadjusted.

[b]Adjusted for gender, race or ethnicity, age group, ETI jurisdiction, education, insurance status, healthcare provider visit, alcohol or drug treatment, HIV prevention intervention, receipt of free sterile syringes, number of receptive syringe-sharing partners, number of condomless sex partners, and peer network size.

[c]Adjusted for gender, race or ethnicity, age group, ETI jurisdiction, education, insurance status, alcohol or drug treatment, HIV prevention intervention, receipt of free sterile syringes, number of receptive syringe-sharing partners, number of condomless sex partners, and peer network size.

[d]Hispanics or Latinos can be of any race.

[e]Includes American Indian, Alaska Native, Asian, Native Hawaiian, other Pacific Islander, and multiple-race participants.

[f]CDC's Expanded Testing Initiative.

[g]Poverty level is based on household income and household size.

[h]Includes public, private, other, and multiple insurances.