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HIV Testing Behaviors and Attitudes Among Community Recruited Methamphetamine Users in a South African Township

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Abstract Methamphetamine users in South Africa are at high risk for HIV infection and transmission, but little is known about HIV testing in this population. We examined HIV testing behaviors and attitudes in 362 methamphetamine users recruited using chain referral sampling from one peri-urban community. Many (44 %) had not been HIV tested in the past year. HIV testing was associated with positive testing attitudes, less AIDS stigma, and greater methamphetamine stigma. Among participants who reported HIV infection (8 %), less than half were linked to care. Findings highlight the need to identify barriers to HIV service uptake for methamphetamine users.

Resumen Los usuarios de metanfetamina en Sudáfrica están en alto riesgo de infección y transmisión del VIH,

pero se sabe poco acerca de pruebas del VIH en esta población. Hemos examinado los comportamientos y actitudes frente a pruebas del VIH en 362 usuarios de metanfetamina reclutados utilizando muestreo por encuestado conducido de una comunidad periurbana. Muchos (44 %) no habían sido probados por el VIH en el último año. Pruebas de VIH se asoció con una actitud positiva frente a la prueba, menos estigma del SIDA, y mayor estigma de metanfetamina. Entre los participantes que reportaron infección por VIH (8 %), menos de la mitad estaban vinculados a la atención. Los resultados ponen de manifiesto la necesidad de identificar las barreras a la adopción de servicios de VIH para los usuarios de metanfetamina.

Keywords Methamphetamine · Drug abuse · HIV testing · HIV/AIDS · South Africa

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Introduction

South Africa has the largest number of HIV-infected persons (5.6 million) of any country in the world, with an estimated adult HIV prevalence of 17 % [1]. Over the past decade, South Africa has also experienced a dramatic increase in the use of methamphetamine, a highly addictive psychostimulant that is consistently associated with sexual risk behaviors [2, 3]. In South Africa, methamphetamine is typically smoked and is locally called “tik” because of the sound produced when it is smoked. Methamphetamine use is most prevalent in the Western Cape province, particularly among individuals who are “Coloured” (a mixed race ancestry that forms a particular cultural grouping), and is prevalent across genders and sexual orientations [2]. To date, the Western Cape has the lowest HIV prevalence of

any province in South Africa, with an estimated adult prevalence of 5 % [1], and HIV infection rates are far lower among Coloured compared to Black African populations [4]. South Africa's emerging methamphetamine epidemic may fuel a second wave of infections in the country, including in Coloured communities around Cape Town.

It is well established that HIV treatment with antiretroviral therapy not only improves clinical outcomes in HIV-infected persons, but also prevents the forward transmission of HIV to others in the community (i.e., "Treatment as Prevention") [5]. However, realizing the benefits of Treatment as Prevention depends upon our ability to identify individuals who are not yet aware of their HIV infection and to fully engage these HIV-infected persons in HIV treatment. The Seek, Test, Treat, and Retain (STTR) Model emphasizes the need to aggressively seek out hard-to-reach groups who are at risk for HIV infection, to provide regular HIV testing for these high-risk groups, to immediately engage HIV-infected persons in HIV care for timely initiation of antiretroviral therapy, and to retain them in HIV care over time for optimal outcomes. Specifically, the World Health Organization has recommended that individuals of high-risk groups, such as drug users, be tested for HIV every 6–12 months [6]. In South Africa, methamphetamine users living in peri-urban township communities are a population that could benefit from STTR efforts. In this setting, methamphetamine users are a hard-to-reach group due to the illegal nature of the behavior and a strong stigma against users [7]. To date, there is very little data on HIV testing behaviors, attitudes towards testing, and HIV prevalence in this population.

The aim of this study was to examine HIV testing behaviors and attitudes among active methamphetamine users recruited from a township community in Cape Town, South Africa. First, we describe lifetime and past year HIV testing behaviors and provide estimates of self-reported HIV prevalence in the sample. Second, we identify factors associated with HIV testing in the past year and willingness to be tested for HIV in the future.

Methods

Procedures

Data were collected in Delft, a peri-urban township approximately 15 miles outside of Cape Town's city center. This township has a fairly equal number of Black African residents (primarily Xhosa-speaking) and Coloured residents (primarily Afrikaans-speaking). Chain referral sampling, informed by the strategies used in respondent driven sampling [8], was used to recruit a convenience

sample of 362 persons who use methamphetamine. The sample was recruited from May to October 2013. Eligibility criteria were: age 18 years or older, residence in the township, and current use of smoked methamphetamine ("tik," as verified by a positive urine drug screen). Exclusion criteria were: acute intoxication, impaired mental status, and/or inability to provide informed consent.

Recruited individuals presented to the study site with a recruitment coupon that they received from a prior participant. After reviewing preliminary eligibility, participants provided written informed consent and were then enrolled into the study. Upon enrollment, participants provided a urine sample for drug testing. Only participants who tested positive for methamphetamine were eligible for continued participation. The vast majority of the sample (96 %, $n = 362$) tested positive for methamphetamine and completed all assessments. Eligible participants completed an audio computer-assisted self-interview (ACASI), followed by a face-to-face interview. All study activities were conducted in the participant's language of choice (Afrikaans, Xhosa or English). The entire visit took approximately 2 hours to complete, and participants were compensated 70 South African Rand (ZAR, ~US\$7) in the form of gift cards to a local grocery store. Participants were compensated an additional incentive of ZAR20 (~US\$2) for each person they successfully referred to the study (up to two referrals). This study was approved by the Institutional Review Boards at Duke University Medical Center and Stellenbosch University Faculty of Medicine and Health Sciences.

Measures

The assessment battery was translated from English to Afrikaans and Xhosa. All of the following measures, with the exception of methamphetamine stigma, had been previously used in studies in this setting [9–11].

Demographics

Participants reported their age, gender, race, and education. They also reported whether or not they had ever been diagnosed with tuberculosis or a sexually transmitted infection.

HIV Testing Experience and HIV Status

All participants were asked: *Have you ever been tested for HIV?*, and *If you were offered an HIV test, would you be willing to get tested?* Participants who reported a previous HIV test were asked when they had their most recent test and the results of the most recent test. Four individuals did not report an HIV-positive status on the ACASI but

disclosed it later during a face-to-face interview; we recoded their HIV status as positive.

Attitudes Toward HIV Testing

Five items, adapted from a previous study conducted in a township in the Western Cape, assessed attitudes toward HIV testing [9]. The items were: *Getting tested for HIV helps the person feel better*; *Getting tested for HIV helps prevent the spread of HIV*; *People who test positive for HIV should be supported by people in their community*; *People who test positive for HIV should feel comfortable telling others about their status*; and *It is better for people to know if they have HIV*. Item responses were rated on a 4-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (4). A mean scale score was computed (ranging from 1 to 4), with higher scores indicative of more positive attitudes toward HIV testing ($\alpha = 0.83$).

Perceived HIV Risk

Participants responded to the item: *Based on your behavior over the past 3 months, how much do you think you are at risk for getting HIV?* Response options were: very much at risk, somewhat at risk, a little bit at risk, and not at risk. This item has been previously used to assess personal HIV risk perception among persons living in Cape Town [10]. For analyses, perceived HIV risk was dichotomized into either “no risk” or “any risk” by collapsing very much at risk, somewhat at risk, and a little bit at risk into a single category.

Sexual Risk Behaviors

Participants reported the following sexual behaviors for the past 3 months: number of male and female partners, unprotected intercourse, sex trading (exchanging sex for money or drugs, and vice versa), and having sex while high on methamphetamine.

AIDS Stigmatizing Attitudes

Six statements, adapted slightly from the AIDS-Related Stigma Scale that was developed for a South African context, assessed repulsion, blame, avoidance and social sanction dimensions of stigma towards people living with HIV/AIDS [11]. The items were: *People who have AIDS are dirty*; *People who have AIDS are cursed*; *People who have AIDS should be ashamed*; *A person with AIDS must have done something wrong and deserves to be punished*; *People who have HIV should be isolated*; and *I do not want to be friends with someone who has AIDS*. Responses were on a 4-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (4). A mean scale score was

computed (ranging from 1 to 4), with higher scores indicative of more HIV/AIDS stigma ($\alpha = 0.90$).

Experienced Methamphetamine Stigma

The Stigma of Drug Use Scale assesses beliefs about drug use and experiences with family, friends, and people in the community as a drug user [12]. For the current study, focus group discussions informed the adaptation of the measure for methamphetamine use specifically, rather than drug use generally. The five items assessed how much they felt ashamed of their methamphetamine use, felt they needed to hide their methamphetamine use, felt other people avoided them or were uncomfortable around them because of their methamphetamine use, feared they would lose friends because they of their methamphetamine use, and feared family would reject them because of their methamphetamine use. Responses were on a 4-point scale ranging from “not at all” (1) to “very much” (4). A mean scale score was computed (ranging from 1 to 4), with higher scores indicative of more methamphetamine stigma ($\alpha = 0.80$).

HIV/AIDS Treatment Experiences

Individuals who reported being HIV-positive indicated whether or not they were currently registered as a patient at an HIV clinic, and whether or not they were currently taking antiretroviral therapy medications. They were also asked the number of people to whom they had disclosed their HIV status, if any.

Data Analysis

Quantitative analysis was conducted using SPSS 21.0.0 (SPSS Inc., Chicago, IL). Preliminary analyses compared participants across race and gender on other demographic characteristics, HIV testing behaviors, and attitudinal variables using univariate analysis of variance (ANOVA) for continuous and Chi square tests for categorical variables. Logistic regressions were used to identify factors associated with not being HIV tested in the past year and unwillingness to be tested for HIV in the future. The predictor variables considered were HIV testing attitudes, AIDS stigma, methamphetamine stigma, and perceived HIV risk. Gender and race were entered in the first step of each regression model as control variables, and adjusted odds ratios (AORs) with 95 % confidence intervals (CIs) are reported.

Results

The sample included 202 men and 160 women who had smoked methamphetamine in the past week. Table 1

Table 1 Sample characteristics and description of HIV testing behaviors and attitudes (N = 362)

	Coloured		Black		Total N = 362
	Men N = 125	Women N = 139	Men N = 77	Women N = 21	
Age, M (SD)	31.33 (7.76)	29.63 (6.95)	25.05 (5.44)	25.43 (5.91)	28.99 (7.30)
Gay/lesbian or bisexual, n (%)	13 (10)	17 (12)	9 (12)	5 (24)	44 (12)
High school education, n (%)	14 (11)	18 (13)	8 (10)	2 (10)	42 (12)
Tuberculosis, n (%)	19 (15)	34 (25)	16 (21)	3 (14)	72 (20)
Sexually transmitted infection, n (%)	22 (18)	26 (19)	23 (30)	3 (14)	74 (20)
Ever tested for HIV, n (%)	91 (73)	127 (91)	41 (53)	17 (81)	276 (76)
HIV-positive status ^a , n (%)	3 (3)	9 (7)	7 (17)	3 (18)	22 (8)
Testing History ^b , n (%)					
Less than 1 year ago	61 (50)	93 (72)	23 (33)	13 (72)	190 (56)
Over 1 year ago	27 (22)	25 (19)	11 (16)	1 (6)	64 (19)
Never tested	34 (28)	12 (9)	36 (51)	4 (22)	86 (25)
Unwilling to be tested for HIV ^b , n (%)	18 (15)	15 (12)	22 (31)	4 (22)	59 (17)
Perceived HIV risk ^b , n (%)	50 (41)	49 (38)	35 (50)	11 (61)	145 (43)
Attitudes toward HIV testing, M (SD)	3.64 (0.62)	3.67 (0.69)	3.56 (0.67)	3.54 (0.83)	3.63 (0.67)
AIDS stigma, M (SD)	1.87 (0.91)	1.70 (0.86)	1.80 (0.92)	1.86 (0.97)	1.79 (0.90)
Methamphetamine stigma, M (SD)	2.63 (0.93)	2.92 (0.90)	2.97 (0.84)	3.02 (0.93)	2.84 (0.91)

^a Among those ever tested for HIV

^b Excluding those with an HIV-positive diagnosis

describes the sample characteristics. Participants ranged in age from 18 to 66 (M = 28.99, SD = 7.30). The majority of participants were Coloured (73 %), 35 years or younger (83 %), heterosexual (88 %), and had less than a high school education (88 %). Of note, 20 % of the sample had been previously diagnosed with tuberculosis and 20 % with a sexually transmitted infection. Black participants were younger than Coloured participants (Mean age: 25.13 vs. 30.43, $t(359) = 6.47$, $p < 0.001$) and more likely to be male (79 vs. 47 %, $\chi^2(1) = 28.25$, $p < 0.001$), but there were no other differences by race or gender groups on demographic characteristics.

The majority of the sample (76 %) reported that they had ever been tested for HIV. HIV testing was more common in women (90 %) than men (65 %) ($\chi^2(1) = 29.99$, $p < 0.001$) and in Coloured participants (83 %) than Black participants (59 %) ($\chi^2(1) = 21.59$, $p < 0.001$). Of those who had ever been tested for HIV, the self-reported HIV prevalence was higher among Black participants (17 %) compared to Coloured participants (6 %) ($\chi^2(1) = 8.60$, $p = 0.003$).

Excluding individuals who reported being HIV-positive, 44 % had not tested in the past year. Participants who had not been tested in the past year were more likely to be Black (59 %) than Coloured (39 %; $\chi^2(1) = 10.80$, $p < 0.001$) and male (56 %) than female (28 %; $\chi^2(1) = 26.33$, $p < 0.001$). Not being tested in the past year was associated with less positive attitudes toward HIV testing (AOR = 0.69, 95 % CI 0.49–0.96, $p = 0.028$), more AIDS stigma (AOR = 1.29,

95 % CI 1.01–1.66, $p = 0.045$), and less methamphetamine stigma (AOR = 0.76, 95 % CI 0.59–0.98, $p = 0.032$). When asked whether they would be willing to test for HIV, 17 % said they were unwilling. Participants who were unwilling to be tested were more likely to be Black (30 %) than Coloured (13 %; $\chi^2(1) = 12.31$, $p < 0.001$) and male (21 %) than female (13 %; $\chi^2(1) = 3.73$, $p = 0.054$). Unwillingness to test was related to less positive attitudes toward HIV testing (AOR = 0.50, 95 % CI 0.35–0.71, $p < 0.001$) and less methamphetamine stigma (AOR = 0.64, 95 % CI 0.46–0.89, $p = 0.007$), but not AIDS stigma (AOR = 1.22, 95 % CI 0.90–1.65, $p = 0.207$).

Nearly half of the sample (43 %) perceived themselves to be at risk for HIV. Participants who perceived themselves at risk were more likely than those who did not to have multiple sex partners (46 vs. 20 %, $\chi^2(1) = 26.31$, $p < 0.001$), to have engaged in sex trading (55 vs. 30 %, $\chi^2(1) = 20.12$, $p < 0.001$), and to have had sex while high on methamphetamine (59 vs. 47 %, $\chi^2(1) = 4.56$, $p = 0.033$). Reporting any unprotected sex was not significantly associated with perceived HIV risk (43 vs. 37 %, $\chi^2(1) = 1.39$, $p = 0.238$). Additionally, perceived HIV risk was unrelated to not being tested for HIV in the past year (AOR = 0.82, 95 % CI 0.52–1.30, $p = 0.404$) or unwillingness to be tested for HIV in the future (AOR = 1.13, 95 % CI 0.64–2.02, $p = 0.676$).

Of the 22 participants who reported being HIV-positive, only 46 % (N = 10) reported that they were engaged in HIV care, and 41 % (N = 9) reported currently taking

antiretroviral medication. Among these HIV-positive participants, 27 % said they had not disclosed their status to anyone.

Discussion

This is the first study to describe HIV testing behaviors and attitudes among active methamphetamine users in South Africa. While it was encouraging that the majority of participants (76 %) had a lifetime history of HIV testing, nearly half (44 %) of the sample had not been tested in the past year. Moreover, 17 % of participants reported that they were unwilling to have an HIV test. This lack of regular HIV testing is cause for concern, given the World Health Organization's guidelines recommending that drug users and other high-risk individuals have repeat HIV tests every 6–12 months [6]. While South Africa has a national HIV counselling and testing program, making free HIV testing widely available in both clinic and community settings, our results indicate that a substantial proportion of methamphetamine users are not accessing these services.

Among participants who had ever been tested for HIV, self-reported HIV prevalence was 17 % among Black participants and 5 % among Coloured participants. Given the low uptake of HIV testing, hesitancy to disclose HIV status, and high rates of lifetime tuberculosis and sexually transmitted infections, the true HIV seroprevalence in this population of active methamphetamine users may be much higher. Nevertheless, these self-reported HIV prevalence rates are equivalent to or greater than the prevalence in the general adult population in the Western Cape (estimated to be 5 %) [1].

Our data suggests that Black methamphetamine users, in particular, should be prioritized for HIV testing. Black participants were less likely than Coloured participants to have been HIV tested in the past year and were less willing to be HIV tested in the future. Among Black men, over half reported that they had never been tested for HIV, and nearly one third were unwilling to be tested, despite a relatively high prevalence of lifetime sexually transmitted infection. These findings are of particular concern because the prevalence of HIV is highest among Black Africans in South Africa [1].

Understanding attitudinal and contextual factors that pose barriers to HIV testing and care is essential for developing effective STTR strategies to increase the utilization of existing HIV services for individuals who use drugs in South Africa. As expected, participants who endorsed more negative attitudes toward HIV testing were less likely to have HIV tested in the past year and to be willing to be tested in the future. In addition, having more stigmatizing attitudes toward people living with HIV/AIDS

was also associated with lower uptake of HIV testing. These findings point to possible fears related to receiving an HIV diagnosis, which might be exacerbated by a lack of knowledge about the benefits of HIV treatment and negative perceptions of available care for active methamphetamine users. Surprisingly, individuals who experienced more stigma related to their methamphetamine use (i.e., shame and discrimination) were more likely to have been tested for HIV in the past year and to be willing to be tested in the future.

Although the number of participants who reported an HIV-positive status in our study was fairly small (only 22 participants), our data suggests that access to HIV care is poor in this population. Less than half of these individuals were currently engaged in HIV care, substantially less than the general population in South Africa. Recent estimates suggest that 83 % of HIV-infected individuals who were eligible for antiretroviral therapy initiated treatment [13], suggesting that methamphetamine users may face unique challenges that pose barriers to linkage and retention in HIV care.

While findings from this research have highlighted several important barriers to HIV testing and care among methamphetamine users in South Africa, additional research is needed to further our understanding of these barriers and to improve HIV prevention and treatment for this high risk population. Building upon our initial findings, qualitative in-depth interviewing would help to shed further light on the nature of stigmatizing experiences and how they may affect motivations for HIV testing, as well as barriers to HIV testing that are unique to methamphetamine users. Future research might also explore the settings in which HIV testing occurs (e.g., prison, antenatal clinics, voluntary testing and counselling centers) and how past experiences may influence willingness to be tested again. Larger epidemiological surveys with HIV testing are needed to draw more definitive conclusions about the relative HIV prevalence in methamphetamine users compared to the general population. Longitudinal studies could track frequency and reasons for HIV testing, and linkage to HIV care after diagnosis. To optimize health outcomes and reduce transmission among HIV-positive methamphetamine users, further research is needed to describe linkage to and retention in HIV care, including narrative accounts of how HIV-positive methamphetamine users navigate the HIV care system, and to identify barriers to successful engagement in HIV care. Finally, our success using a chain referral approach to seek out and enroll a large sample of active methamphetamine users in the community points to the potential of this strategy to seek and link methamphetamine users to HIV services, including both HIV testing and HIV treatment for those who are HIV-positive. Future STTR interventions for this population might

consider using peer-based strategies that build upon the strong social networks of methamphetamine users, including respondent driven sampling, to both seek out high-risk individuals and to overcome potential attitudinal barriers to HIV testing and treatment.

The current study had several limitations that should be noted. First, we recruited a convenience sample that may not be fully representative of the larger population of methamphetamine users living in South African townships. Nevertheless, this study is the largest assessment of community recruited methamphetamine users in South Africa to date and therefore provides valuable information about testing behaviors and attitudes in the population. Second, self-report data collection is subject to recall and social desirability bias. Notably, four participants disclosed their HIV status in the face-to-face interview but not in the ACASI survey. While ACASI is typically used to increase disclosure of sensitive information [14], many of our participants were not computer literate, and anecdotally our experience suggests that rapport with fieldworkers was important for increasing trust and more accurate self-disclosure. Of course, it is possible that additional participants chose not to disclose a known HIV status. Future research should include HIV testing to accurately capture prevalence. Finally, the current design did not include a comparison group of individuals who do not use methamphetamine.

In conclusion, this study has identified opportunities to apply the STTR model in a population of active methamphetamine users in South Africa who may be at high risk of HIV acquisition and transmission. Our findings suggest that *seeking* active methamphetamine users from the community may benefit from the use of peer recruitment methods, building on this study's success identifying and enrolling this population into an HIV-focused research study. Although the majority of participants had a lifetime history of HIV *testing*, the rate of past year HIV testing was low, suggesting that opportunities for routine testing must be offered and tailored to this population. Uptake of testing requires improving attitudes about HIV, particularly the individual and community level benefits of early identification and treatment of HIV, addressing perceived stigma and experienced discrimination that may be unique to methamphetamine users, and potentially considering an individual's perceived capacity to cope with an HIV diagnosis in the face of other more immediate life stressors related to drug abuse. Strikingly, we found that *treatment* uptake was low in this setting, signaling a missed opportunity to take advantage of free HIV treatment services that can both improve individual health and reduce transmission to others. It is important that future research identifies and addresses barriers of initial linkage to HIV care and long-term retention in care, which may include both behavioral and structural determinants. Ultimately, for

STTR models to be successful in this population, interventions need to address the unique barriers experienced by active drug users, and combine HIV care services with substance use treatment services, so that we can effectively engage individuals along the continuum of HIV care and ultimately reduce HIV incidence in this community.

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Conflicts of interest The authors declare no conflicts of interest.

References

1. South Africa National Department of Health. The 2011 national antenatal sentinel HIV and Syphilis prevalence survey in South Africa. Pretoria: National Department of Health; 2012.
2. Dada S, Pluddemann A, Parry C, et al. Monitoring alcohol & drug abuse trends in South Africa. *SACENDU Res Br*. 2012;15(1):1–15.
3. Parry CD, Pluddemann A, Myers B, Wechsberg WM, Flisher AJ. Methamphetamine use and sexual risk behaviour in Cape Town, South Africa: a review of data from 8 studies conducted between 2004 and 2007. *Afr J Psychiatry*. 2011;14(5):372–6.
4. Shaikh N, Smit L, Cloete K, et al. The 2005 HIV antenatal provincial & area surveys: Western Cape. Cape Town: Department of Health Western Cape; 2006.
5. Nosyk B, Audoin B, Beyrer C, et al. Examining the evidence on the causal effect of HAART on transmission of HIV using the Bradford Hill criteria. *AIDS*. 2013;27(7):1159–65.
6. World Health Organization. Guidance on provider-initiated HIV testing and counselling in health facilities. Geneva: WHO Press; 2007.
7. Watt MH, Meade CS, Kimani S, et al. The impact of methamphetamine (“tik”) on a peri-urban community in Cape Town, South Africa. *Int J Drug Policy*. 2014;25(2):219–25.
8. Salganik MJ, Heckathorn D. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociol Methodol*. 2004;34:193–239.
9. Kalichman SC, Simbayi LC. HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sex Transm Infect*. 2003;79(6):442–7.
10. Kalichman SC, Simbayi LC, Cain D, Jooste S. Perceived HIV/AIDS prevalence, burden, and risk, Cape Town, South Africa. *Am J Health Behav*. 2008;32(6):693–700.
11. Kalichman SC, Simbayi LC, Jooste S, et al. Development of a brief scale to measure AIDS-related stigma in South Africa. *AIDS Behav*. 2005;9(2):135–43.
12. Latkin C, Srikrishnan AK, Yang C, et al. The relationship between drug use stigma and HIV injection risk behaviors among injection drug users in Chennai, India. *Drug Alcohol Depend*. 2010;110(3):221–7.
13. World Health Organization, United Nations Children's Fund, Joint United Nations Programme on HIV/AIDS. Global update on HIV treatment: results, impact and opportunities. Geneva: WHO Press; 2013.
14. Perlis TE, Des Jarlais DC, Friedman SR, Arasteh K, Turner CF. Audio-computerized self-interviewing versus face-to-face interviewing for research data collection at drug abuse treatment programs. *Addiction*. 2004;99(7):885–96.