Correlates of HIV Risk Behaviors Among Homeless and Unstably Housed Young Adults

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ABSTRACT

Objectives. Homeless young adults are exposed to multiple risk factors for HIV infection. We identified HIV risk behaviors and their correlates among homeless young adults in Portland, Oregon.

Methods. We conducted a community-based, cross-sectional survey of HIV risk behaviors among homeless young adults aged 18–25 years in 2010. Participants completed three study components: (*1*) an interviewer-administered survey of HIV risk behaviors; (*2*) a brief, client-centered HIV risk-based counseling session; and (*3*) rapid HIV testing.

Results. Among 208 participants, 45.8% identified as racial/ethnic minority groups, 63.8% were male, and 35.7% self-identified as nonheterosexual. Six participants, all from sexual minority groups, had positive HIV screening results (two newly identified, four previously known) for a seropositivity rate of 2.9%. Female sex, belonging to a sexual minority group, frequent traveling between cities, depression, and alcohol use to intoxication were significantly associated with unprotected sex in univariate analysis. Female sex and high perceived risk of HIV were significantly associated with unprotected sex in multivariate analysis.

Conclusions. Our findings support the need for enhanced HIV prevention interventions for homeless young adults.

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In the Portland, Oregon, metropolitan area, an estimated 1,500–2,000 homeless young people are living on the street (Personal communication, Caitlin Campbell, Homeless Youth Continuum Coordinator, Multnomah County, Oregon, July 2009). Young adults and adolescents are at particularly high risk of human immunodeficiency virus (HIV) infection. In 2008, the Centers for Disease Control and Prevention (CDC) reported that 13% of all new HIV infections in the U.S. occur among people aged 13–24 years.[1] Statistical modeling estimates that approximately half of HIV infections in the U.S. occur before 25 years of age.[2] The young adult years are accompanied by escalating risk due to sexual contact and initiation of drug use in certain populations.

Homeless young people live at the intersection of multiple risk factors and are especially at risk for HIV infection. Up to 35% of homeless young people identify as gay, lesbian, bisexual, or transgender.[3–6] Homeless populations frequently exchange sex for money, drugs, or a place to stay;[7] have high rates of substance use;[8] and experience substantial unmet needs for multiple types of health care,[9] further increasing their risk for HIV infection. Mental illness, such as depression, has been shown to be associated with infrequent condom usage among homeless adolescents in the U.S. Pacific Northwest.[10] In 1994, Allen et al. reported findings from a 16-city CDC-sponsored seroprevalence study that showed an HIV prevalence of 2.3% among runaway young people aged 15–24 years and 3.4% among homeless adults.[11] More recent studies demonstrate HIV prevalence proportions of 5%–16% among homeless adolescents and young adults.[12,13]

An updated account of HIV prevalence among homeless young adults is essential to inform HIV prevention programs, reduce HIV transmission by educating about behaviors that put people at risk for infection, and connect affected people with resources. Additionally, little is known about current risk-taking behaviors among homeless young adults. The purpose of this study was to identify HIV risk behaviors and their correlates among homeless young adults in the Portland, Oregon, metropolitan area.

METHODS

We conducted a community-based, cross-sectional survey of HIV risk behaviors among homeless young adults aged 18–25 years in Portland in 2010. Our study team included university researchers and staff from two local community-based organizations (CBOs) that had significant experience with homeless young people and HIV prevention. Outside In is a Federally Qualified Health Center and Social Service Agency specializing in work with homeless transition-age young people. Cascade AIDS Project is the oldest and largest acquired immunodeficiency syndrome (AIDS) service organization in Oregon and Southwest Washington. Its mission is to prevent HIV infections, support and empower people affected by and infected with HIV/AIDS, and eliminate HIV/AIDS-related stigma. Cascade AIDS Project provides services through two main program departments: (*1*) prevention and education and (*2*) housing and support services. Services run the gamut from HIV prevention programs for young people and men who have sex with men, to HIV testing, connecting people to HIV care services, providing supportive housing, and staffing the Oregon HIV/STD Hotline.

University researchers provided methodological and analytical expertise, and CBO staff provided expertise regarding recruitment, study venues, and refinement of study instruments and procedures for the target population. Partners collaborated on study design, taking into consideration cultural and other factors to maximize participation by additional community partners, study enrollment, and benefit to study participants. CBOs collaborated to lead study implementation, arrange data collection points, conduct interviews, and administer HIV counseling and testing. University researchers conducted the analyses.

A certificate of confidentiality was obtained from the Health Resources and Services Administration to protect study participants from disclosure of study data pertaining to illicit activities. Prior to study implementation, interviewers, outreach workers, testers, and other study team members were trained in human subjects research, including confidentiality; cultural sensitivity in working with homeless young people; study protocol; and interviewing skills, including interview practice sessions and role-playing.

Eligibility and participant recruitment

We aimed to recruit 200 participants for this pilot study, based on available funding and projected community outreach worker availability from the CBOs. Young adults aged 18–25 years who accessed homeless youth services from January to May 2010 were eligible to participate. Community partners posted informational flyers and recruited participants during regularly scheduled daytime, evening, and weekend homeless youth services at seven local venues. The venues included the only homeless youth shelter in the city, several drop-in sites for homeless young people at local CBOs, a community-run and church-supported weekly hot meal service, and a stationary outreach site

for homeless young people. Participants received a $10 grocery store gift card as compensation.

Study procedures

Participants completed three study components: (*1*) an interviewer-administered survey of HIV risk behaviors; (*2*) a brief, client-centered HIV risk-based counseling session; and (*3*) rapid HIV-1/2 antibody testing.

Interviewer-administered survey. We developed a 44-item interviewer-administered survey to assess HIV risk behaviors and associated characteristics. We assessed the following domains with items adapted from previously validated instruments: (*1*) housing status and mental health (Buprenorphine-HIV Evaluation Support [BHIVES] Collaborative Baseline Client Interview);[14] (*2*) testing history and risk perception (Simple Screening Instruments for Outreach for Alcohol and Other Drug Abuse and Infectious Diseases: Treatment Improvement Protocol Series 11);[15] (*3*) sexual behaviors and injection drug behaviors (Texas Christian University HIV/AIDS Risk Assessment);[16] (*4*) alcohol and drug use (Addiction Severity Index Lite);[17] and (*5*) receipt of HIV test results.[18] We also included items regarding service utilization specific to the metropolitan area to help inform programming efforts for partnering CBOs.

We conducted cognitive interviews with formerly and currently homeless young adults to assess the instrument for content domains and gather feedback regarding wording of new items and response choices specifically related to sexual orientation (pansexual) and sexual behaviors, as well as the concept of the homeless traveler (i.e., a homeless person who moves frequently between cities). We consulted the Steering Committee from the Sexual & Gender Minority Youth Resource Center, a youth-based group that reviewed our interview tool and provided extensive feedback on modifications to make our study more relevant to homeless young adults. Young adults and CBO outreach workers alerted us to the possibility that there was a prevalent misconception among homeless young adults that non-barrier contraception (e.g., birth control pills, Depo-Provera®, and intrauterine devices [IUDs]) were effective means of HIV prevention. Therefore, we included a question using answer choices plus a write-in option, "What do you do to decrease your risk of HIV?" We pilot-tested the instrument with homeless young adults prior to survey initiation. Community outreach workers administered the final 20-minute paper survey to minimize problems related to varying literacy levels among participants.

HIV risk-based counseling. Using the CDC model for client-centered risk-based counseling,[19] community outreach workers provided brief, tailored counseling sessions following survey completion. Counseling sessions included assessing individual HIV risk factors, providing education about the participants' risk factors, assessing readiness and willingness to adopt behaviors to lower participants' risk, and developing action plans to carry out those behavioral changes.

Rapid HIV testing. HIV testing was conducted by outreach staff and trained volunteers using the OraQuick® ADVANCE Rapid HIV-1/2 Antibody Test (OraSure Technologies, Inc., Bethlehem, Pennsylvania). Participants could choose confidential or anonymous testing and were instructed to return to the tester in 20 minutes, if they chose, to receive their results. Participants with positive screening tests were scheduled for confirmatory testing and follow-up at one of the CBO's outpatient clinics. Outreach workers provided de-identified HIV testing results to study investigators.

Data management and statistical analysis

All data were entered from the paper survey and HIV testing result forms into a Microsoft® Excel database by a single investigator. Data quality control was performed by selecting a 10% random sample of participants for manual verification of data elements.

We conducted statistical analyses using Stata® version 11.[20] Descriptive frequencies and measures of central tendency were used for univariate measures. Chi-square and Fisher's exact tests were used to test bivariate associations. We used logistic regression to test multivariable associations between subject characteristics (gender, race/ethnicity, sexual orientation, traveler status, perceived HIV risk, use of non-barrier contraception for HIV prevention, illicit drug use, alcohol use to intoxication, and depression) and the outcome of unprotected sex (vaginal or anal sex without a barrier) in the past 30 days. These variables were chosen for multivariable logistic regression models based on a bivariate significance at the $p<0.1$ level and a priori hypotheses.

RESULTS

Demographics

We recruited 208 participants from January to May 2010. Participant characteristics are shown in Table 1. Of those surveyed, 76.9% (160 participants) reported that they considered themselves homeless. Of the 48 participants reporting they were not homeless, only 4.2% reported that they had permanent housing and 19.7% reported subsidized/public housing or

Table 1. Characteristics of participants in a survey of HIV risk behaviors among homeless young adults aged 18–25 years (*n*=208):[a] January–May 2010, Portland, Oregon

Characteristic	N *(percent)*
Age in years: median (range)	21 (18–25)
Race/ethnicity[b]	
White	111 (54.2)
Native American/Alaska Native	28 (13.7)
African American	19 (9.3)
Hispanic	13 (6.3)
Other	34 (16.6)
Education	
<High school	100 (48.1)
High school graduate	56 (26.9)
Some college	52 (25.0)
Sex at birth[b]	
Male	132 (63.8)
Female	74 (35.8)
Intersex	1 (0.5)
Self-perceived gender[b]	
Male	127 (61.4)
Female	71 (34.3)
Transgender/other	9 (4.4)
Sexual orientation[b]	
Heterosexual	128 (64.3)
Bisexual	47 (23.6)
Gay or lesbian	13 (6.5)
Pansexual	11 (5.5)
Traveler	75 (36.4)
High perceived risk of HIV	12 (5.8)
Non-barrier contraception for HIV prevention[c]	17 (8.2)
Alcohol use to intoxication	121 (60.2)
Illicit drug use, past 30 days	171 (82.2)
Depression	134 (64.4)

[a]Not all respondents answered each survey item. As such, totals may not equal 208.

[b]Percentages may not total 100 due to rounding.

[c]Some participants responded that they used non-barrier contraceptive methods (e.g., birth control pills, Depo-Provera®, or Mirena®) to prevent HIV infection.

HIV = human immunodeficiency virus

transitional/time-limited housing. For those reporting homelessness, the median age at first homelessness was 17 years (data not shown).

A total of 75 (36.4%) participants identified themselves as travelers. This group reported living in a median of two cities (range 1–150) during the past 12 months. Travelers were predominantly white (54.7%) and biologically male (66.7%). Half of those identifying as travelers were from sexual minority groups (i.e., nonheterosexual) and half had completed high school. Participants reported chronic illnesses including hepatitis C (4.8%), depression (64.4%), and posttraumatic stress disorder (35.1%) (data not shown).

Eleven (5.5%) participants identified themselves as pansexual, a sexual orientation they variously defined as a rejection of conventional labels (e.g., "Don't define people by gender. No difference between the two") or as a more inclusive term to explain attraction to more diverse groups of people (e.g., "Doesn't matter what the gender of the person is, what matters is their personality") (Table 1).

HIV testing

Of 207 participants who provided oral fluid specimens for HIV screening, 89.4% elected to receive confidential testing and 82.1% waited onsite to receive their screening results. Of those not wishing to wait for results, 54.1% reported that they did not have time to wait and 29.7% reported that they had been recently tested or already knew their HIV status (data not shown).

Six participants (2.9%) had preliminary positive HIV screening tests, including four who reported knowing their positive status prior to study participation; these four elected not to receive confirmatory testing. For the two participants with newly positive HIV screening results, one had a positive confirmatory test result and the second had confirmatory testing but did not consent to release confirmatory results to study personnel.

Drug use

Alcohol use to intoxication and illicit drug use during the past 30 days were highly prevalent among study participants (Table 2). Although 87.5% of the 24 recent injection drug users reported using needle-exchange programs, 50% reported sharing needles or

Table 2. Alcohol and illicit drug use, past 30 days, in a survey of HIV risk behaviors among homeless young adults aged 18–25 years (*n*=208): January–May 2010, Portland, Oregon

Alcohol and illicit drug use	N *(percent)*
Alcohol use to intoxication	121 (60.2)
Any illicit substance[a]	171 (82.2)
Marijuana	148 (71.2)
Amphetamines	24 (11.7)
Heroin	22 (10.6)
Buprenorphine (nonprescription)	22 (10.6)
Sedatives	20 (9.7)
Cocaine	17 (8.3)
Methadone (nonprescription)	7 (3.4)
Barbiturates	3 (1.5)
Any injection drug use	24 (11.5)
Polysubstance	123 (59.1)

[a]The number of substances may not total 171 because respondents could indicate using more than one substance.

works (i.e., equipment for injecting drugs) in the past 30 days (data not shown). In bivariate analyses, a past diagnosis of hepatitis C was significantly associated with recent needle or works sharing ($p<0.001$).

Sexual risk behaviors

Vaginal or anal sex without barrier protection was common, with 53.4% reporting having unprotected sex (sex without using a condom) at least once during the past 30 days. For those reporting any sex during the past 30 days, the median number of episodes of unprotected sex was four (range 0–140) (data not shown). Rates of unprotected sex, by participant characteristic, are shown in Table 3. Females, travelers, those with a high perceived risk of HIV, those who reported using non-barrier contraception (e.g., birth control pills, IUD, or injectable hormonal contraception) to prevent HIV, as well as those reporting alcohol use to intoxication and a history of depression, all showed significant univariate associations for unprotected sex. However, only females and those who perceived their HIV risk as high showed a significant association with unprotected sex in the multivariable model.

Perceived HIV risk, as assessed by the question "How would you judge your own risk for being infected with HIV?", was associated with reported sexual risk behaviors, as those with higher perceived risk were more likely to engage in unprotected sex in the past 30 days. However, unadjusted analyses showed that a substantial proportion of those who perceived themselves to be at low risk (55.0%) and no risk (45.8%) for HIV infection also engaged in unprotected sex in the past 30 days. In adjusted analyses, those who perceived their HIV risk as high were more likely to report sex without

Table 3. Univariate and multivariable associations between participant characteristics and unprotected sex, past 30 days, in a survey of HIV risk behaviors among homeless young adults aged 18–25 years (*n*=208): January–May 2010, Portland, Oregon

Independent variable	*Unprotected sex, past 30 days* N *(percent)*	*OR (95% CI)*	*AOR[a] (95% CI)*
Race/ethnicity			
White	62 (55.9)	Ref.	
Native American/Alaska Native	13 (46.4)	0.7 (0.2, 2.1)	
African American	9 (47.4)	0.7 (0.3, 1.9)	
Hispanic	6 (46.2)	0.7 (0.2, 2.1)	
Sex at birth[b]			
Male	59 (44.7)	Ref.	
Female	51 (68.9)	2.7 (1.5, 5.0)[c]	3.3 (1.5, 7.2)[c]
Sexual orientation			
Heterosexual	66 (51.6)	Ref.	
Bisexual	26 (55.3)	1.2 (0.6, 2.3)	0.5 (0.2, 1.2)
Gay or lesbian	9 (69.2)	2.1 (0.6, 7.2)	1.6 (0.4, 6.4)
Pansexual	7 (63.6)	1.6 (0.5, 5.9)	0.4 (0.1, 1.9)
Traveler	47 (62.7)	1.8 (1.0, 3.1)[c]	1.7 (0.9, 3.2)
High perceived risk of HIV	11 (91.7)	10.6 (1.3, 83.4)[c]	10.8 (1.3, 92.8)[c]
Non-barrier contraception for HIV prevention	14 (9.1)	4.5 (1.3, 16.2)[c]	3.3 (0.8, 13.6)
Alcohol use to intoxication	71 (58.7)	1.7 (1.0, 3.1)[c]	1.6 (0.8, 2.9)
Illicit drug use	95 (55.6)	1.6 (0.8, 3.4)	NA[d]
Depression	78 (58.2)	1.7 (1.0, 3.1)[c]	1.4 (0.7, 2.8)

[a]Multivariable ORs were adjusted for self-perceived gender, race/ethnicity, sexual orientation, traveler status, perceived HIV risk, alcohol use to intoxication, illicit drug use, and depression.

[b]One participant reporting sex at birth as intersex was not included in these analyses.

[c]Results significant at $p\leq0.5$

[d]The illicit drug use variable was not included in the multivariable logistic regression models because bivariate significance did not meet the $p<0.1$ significance level of the a priori hypotheses.

HIV = human immunodeficiency virus

OR = odds ratio

CI = confidence interval

AOR = adjusted odds ratio

Ref. = reference group

NA = not applicable

barrier protection in the past 30 days (adjusted odds ratio [AOR] = 10.8, 95% confidence interval [CI] 1.3, 92.8) (Table 3).

Only 53.1% of participants reported discussing HIV and other sexually transmitted infections (STIs) with their partners prior to engaging in sex, with 35.4% stating that they do not discuss HIV or STIs at all with sexual partners (data not shown).

When asked about methods to decrease personal HIV risk, 8.2% incorrectly identified non-barrier contraception (e.g., IUD, Depo-Provera®, or birth control pills) as an HIV risk-reduction tool. In unadjusted analyses, those who reported using non-barrier contraception for HIV prevention were more likely than those who did not report this behavior to have had sex without barrier protection in the past 30 days (82.4% v. 50.8%, AOR=4.5, 95% CI 1.3, 16.2). High school graduates were 4.8 times more likely than those who did not graduate from high school to report using non-barrier contraception for HIV (OR=4.8, 95% CI 1.3, 17.7) (data not shown).

DISCUSSION

This study provides additional insight into the HIV risk behaviors among homeless young adults and suggests areas for improving HIV prevention services in CBOs. The HIV prevalence in the study population, based on preliminary rapid HIV testing results, was 2.9%, which is similar to the 1994 multicity CDC-sponsored seroprevalence study among runaway young people,[11] but is low compared with more recent studies of homeless young adults and adolescents.[12,13] The low prevalence may be particular to this sample, which included young adults who were connected with homeless services, such as health and wellness education.

In the current study, 89.4% of participants chose confidential testing. Our rate was higher than a 1986–1992 Seattle study in which 66% of men and 64% of women sought anonymous testing.[21] This difference may reflect established relationships between study participants and CBO partner organizations and health workers in our study. The high proportion of participants receiving HIV testing results in the current study (82.1%) is consistent with a recent study in which 88.8% of homeless people with serious mental illness returned to receive HIV test results; younger patients were even more likely to receive HIV test results in that study.[22] Our proportion of young adults who received test results was slightly lower than that demonstrated by the 1986–1992 Seattle study in which 93.7% returned for standard HIV test results.[21]

Substance use rates in this study were similar to those reported among homeless young people in Denver[23] and Washington, D.C.,[24] but lower compared with homeless young people in Northern California.[5] Although other studies have reported an association between illicit drug use and risky sexual activity,[25] our study did not determine this association, perhaps due to its small sample size. However, we did find a nonsignificant trend toward increased risk of unprotected sex for those who used alcohol to intoxication. This trend suggests the need for HIV prevention interventions for homeless young adults that should include screening for alcohol and drug use with linkage to substance use treatment when indicated.

We found a high rate of sex without barrier protection, particularly among women. Of additional concern was the number of young adults who identified non-barrier contraception (e.g., oral contraceptive pills and Depo-Provera) as an effective means of HIV prevention. This finding highlights an important target in education messaging for homeless young adults, a particularly vulnerable group for HIV infection. Given this misinformation about HIV prevention, it is not surprising that we discovered a substantial discrepancy between actual and perceived HIV risk. Those self-identifying as high risk reported unprotected sex most often. However, approximately half of those reporting no risk, low risk, or unknown risk also engaged in unprotected sex. Enhancing client knowledge of effective HIV prevention strategies and self-risk assessment in CBOs may decrease risky sexual behaviors in homeless young adults.

Young females were more likely than young males to report unprotected sex, which is consistent with a previous study by Clements and colleagues.[26] However, our survey did not elicit information about whether unprotected sex occurred with males, females, or partners with other gender identities. It is possible, therefore, that there were differences in condom use based on the partner's gender. For example, females may be less likely to use barrier protection during sex with females, whereas males may be more likely to use barrier protection during sex with males. Goodenow et al. reported from a statewide survey that adolescent males who have sex only with females or only with males were more likely to use condoms than adolescent males who had both male and female partners.[27]

Rich information about language used to describe sexuality and gender was obtained through pilot testing. This testing indicated the need for a sexual orientation category of pansexuality in addition to traditionally used categories such as heterosexual (straight), homosexual (gay or lesbian), or bisexual. Self-described pansexual young people rejected conventional gender

and sexual orientation labels in favor of this term that they felt more appropriately encompassed an inclusive sexual attraction to people from all genders and sexual orientations. Pansexuality, also known as omnisexuality, has been described by Lenning as the possibility of attraction across the gender identity spectrum.[28]

A trend toward changing views and perceptions of sexuality and orientation seems particularly evident among young adults, as discussed in a recent article by Russell et al., who suggest that contemporary adolescents may be espousing a "post-gay" orientation or sexual experience.[29] The implications of sexual identity on HIV risk can drastically change prevention and safer sex messaging, and young people accessing these services must feel that their unique identities are not just taken into consideration, but acknowledged and respected. Programs need to reassess their approaches to addressing sexuality and the sexual orientation spectrum to create a foundation of trust and safety for young people who may identify in nontraditional ways, so that our institutional systems do not become barriers in and of themselves for young people accessing the services they need in a manner that is respectful to their identities.

Finally, the current study identified a high proportion of young adults who self-identified as "travelers," also known as "nomads"[30] or homeless people who regularly move between cities. We observed a trend toward an increased risk of unprotected sex among participants who self-identified as travelers, a finding that is consistent with other research. For example, a recent study showed that nomadic homeless young people in New York City reported less frequent condom use with their serious partners compared with service-connected young people. Nomadic young people were also more likely to have injected drugs (recent and lifetime) and consumed more alcohol than service-connected homeless young people.[30] It is likely that the conventional venue-based strategies to reach homeless young people for HIV prevention would need modification to target this highly mobile group. One possible future study would be to longitudinally follow this traveling population to capture qualitative data about their experiences with respect to accessing services, issues of stigma, acceptance by their peers, evolution of their identities, and changes to their risk and protective factors over time.

Limitations

The current study should be interpreted in light of several limitations. First, we used a convenience sample of homeless young adults who were already engaged in homeless youth services. These young people are likely better connected with homeless services and may have different risk behaviors than those not engaged in services. Furthermore, social response bias may have occurred because of interviewer-administered surveys. However, computer-assisted self-interviewing was impractical given the venues in which the interviews were administered. Results also may not be generalizable to all homeless young adults. However, survey responses indicate that this group is at high risk for HIV infection, so results may be generalizable to other high-risk homeless young adult populations.

Second, we were unable to confirm HIV results in two participants with preliminary positive rapid HIV test results. Both participants, however, were engaged in services with CBO partners, who facilitated engagement in additional health care outside the context of the current study. Third, our interview items did not assess whether recent unprotected sex occurred with males, females, or transgendered partners; obtaining this information would have provided more information regarding HIV risk. Finally, the small sample size of this pilot study had limited power to detect statistically significant differences in trends between some participant characteristics (e.g., traveler status) and risky sexual behaviors.

CONCLUSIONS

Since study completion, a Cochrane Review highlighting the variability in programming and outcomes for preventing HIV in homeless young people pointed to the uncertainty inherent in designing effective HIV prevention intervention programs.[31] Our findings support the need for enhanced HIV prevention interventions for homeless young adults that particularly target females, those in sexual minority groups, travelers, depressed people, and alcohol users, and include enhanced education specific to reducing behaviors that put young adults at risk, as well as realistic HIV risk prevention tools. This research provides descriptive characteristics and information regarding HIV risk behaviors for a segment of homeless young people in Portland that may be cautiously generalized to other high-risk homeless young adult populations. Results from this study provide valuable updated information to CBOs and researchers as well as policy makers targeting young adult sexual health.

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The Institutional Review Board of the Oregon Health & Science University reviewed and approved the protocol for this study. All participants provided informed written consent for study participation and informed oral consent for human immunodeficiency virus testing, consistent with Oregon State statutes.

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