Published in final edited form as:
Sex Transm Dis. 2011 August ; 38(8): 691–696. doi:10.1097/OLQ.0b013e318214bb70.

Correlates of HIV Testing History among Urban Youth Recruited through Venue-Based Testing in 15 US Cities

Diane M. Straub, MD, MPH[1], **Renata Arrington-Sanders, MD, MPH**[2], **D. Robert Harris, PhD**[3], **Nancy Willard, BA**[2], **Bill Kapogiannis, MD**[4], **Patricia Emmanuel, MD**[1], **Donna Futterman, MD**[5], **Jonathan M. Ellen, MD**[2], and **and the Adolescent Trials Network for HIV/AIDS Interventions (ATN)**

[1]University of South Florida

[2]Johns Hopkins University

[3]Westat, Rockville, MD

[4]Pediatric, Adolescent and Maternal AIDS Branch, National Institute of Child Health and Human Development, Bethesda, MD

[5]Montefiore Medical Center

Abstract

Background—Adolescents and young adults comprise disproportionately high percentages of individuals living with HIV and those with undiagnosed HIV. Our objective was to determine factors associated with history of HIV testing and receipt of results among a sample of urban, high-risk, sexually active adolescents in 15 U.S. cities.

Methods—20–30 sexually active youth, aged 12–24 years, were recruited to participate in an anonymous survey and HIV antibody testing at 2–3 venues per city identified by young men who have sex with men, young women of color, or intravenous drug users.

Results—Of the 1457 participants, 72% reported having been previously tested for HIV (89% of whom were aware of their test results). Our sample was diverse in terms of gender, race/ethnicity, and sexual orientation. Factors found to be predictive of testing typically reflect high risk for HIV, except for some high risk partner characteristics, including having had a partner that made the youth have sex without a condom or had a partner with unknown HIV status. Factors associated with knowledge of serostatus are reported. HIV testing appears to be tied more to STI testing services than to primary care.

Conclusions—More strategies are needed that increase testing, including targeting partners of high-risk individuals, insuring receipt of test results, and increasing testing in primary care settings.

BACKGROUND

Adolescents and young adults aged 13–24 years represented 4.4% of the total estimated persons living with HIV at the end of 2006, yet they disproportionately comprised an

Please address all correspondence to: Diane Straub, Division of Adolescent Medicine, USF, 2 Tampa General Circle, Suite 500, Tampa, FL 33606, (813) 259-8713, (813) 259-8792 FAX, dstraub@health.usf.edu.

estimated 9.9% of the undiagnosed cases[1]. Furthermore, among 56,300 estimated new infections in 2006, 19,200 (34%) were attributed to youth, aged 13–29 years, which represented the largest proportion of new infections among all age strata[2].

Early diagnosis of HIV has implications for preventing transmission, both at the individual and community level[3]. The Centers for Disease Control and Prevention (CDC) recommendations for universal, routine, HIV testing among adolescents and young adults may lead to decreased secondary transmission and lower rates of HIV in this population[4]. Yet, many adolescents fail to seek testing until HIV symptoms appear and often cite low perception of risk as a reason for not being tested[5,6]. Studies have demonstrated that risk factors associated with HIV, such as having same sex partners (among men), symptoms of a sexually transmitted infection (STI), homelessness, history of STI and poor condom use have been associated with self-reported HIV testing[5,7,8,9,10,11,12]. Minority status, gender and poor health care utilization are also important contributors to receipt of HIV testing services among adolescents[13,14,15,16,17]. Furthermore, lower rates of self-reported testing may be exacerbated when youth assume that HIV testing occurs as part of routine primary care when recent evidence suggests it is still tied to risk-based STI testing[18,19].

The Connect to Protect (C2P) research protocol offers a unique opportunity to learn about patterns and predictors of HIV testing in a venue-based sample of youth at high risk for infection through sampling of asymptomatic youth not known to be in medical care. C2P is the primary prevention infrastructure of the Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN), a multi-center, NIH-funded collaborative research network of fifteen sites nationwide that are addressing HIV/AIDS among adolescents and young adults. Prior analyses of C2P data have focused on estimation of the proportion and description of subjects who are HIV-positive[20]. The primary objective of the current analysis was to determine factors associated with self-reported HIV *testing* among urban, high-risk, serostatus unselected, sexually active adolescents recruited during venue-based sampling from street venues in 15 urban cities.

METHODS

Although the primary goal of C2P is to develop viable community-based HIV prevention interventions, a secondary objective is to identify specific community venues where youth at high risk for HIV could be recruited for research activities. Venues were identified by young men who have sex with men (YMSM), young women of color, or intravenous drug abusers (IDU), depending on the population of research focus at each site. Approximately 20–30 sexually active young men or women (at some sites 20–30 of *each* sex) of unselected HIV status were enrolled at two to three street venues per site (projected sample size of 40–180 individuals per ATN site) in 15 urban cities. Individuals meeting eligibility criteria (verbal confirmation of age 12 to 24 and history of consensual vaginal, anal and/or oral sex within the past 12 months) were verbally consented for participation. Enrolled participants completed an anonymous Audio Computer-Assisted Self-Administered Interview (ACASI) including questions on the following constructs: demographics, HIV risk, HIV testing history, social and sexual networks, sexual contacts, social support, substance use, and recreation locations, and received anonymous HIV antibody (OraSure swab) testing. YMSMs were categorized by behavior (reported having had same sex behavior) rather than by orientation (consider themselves “gay” rather than “heterosexual/straight”). All participating institution’s Institutional Review Boards approved the protocol. Methodology and HIV prevalence rates have been published elsewhere[20,21].

Statistical Analysis

Simple descriptive statistics (frequencies, proportions) were used to describe the relationship of HIV testing status with subject characteristics and the HIV risk behaviors they and their sex partners engaged in. Since each participant could provide information concerning up to four sex partners, a generalized estimating equations (GEE) approach was used to fit logistic regression models for examining associations of these characteristics with HIV testing status. This approach is capable of addressing possible correlations in HIV risk behaviors study participants engaged in with their different sexual partners and possible correlations in responses given by interviewees recruited from the same venue, thus yielding more precise estimates of the p-values and confidence intervals than would have been obtained had these possible sources of correlation been ignored.

Separate logistic regression models were fit to assess (1) associations of subject characteristics and HIV risk behaviors with 'HIV tested' vs. 'No prior HIV testing', regardless of the subject's knowledge of their results, and (2) associations with 'Tested, known HIV status' vs. 'Tested, unknown status'. Given the cross-sectional design of the study, model results are interpreted in terms of the probability (or odds) of the outcome of interest associated with the characteristics investigated.

All analyses were carried out using SAS, Version 9.13, with p-values of 0.05 or less used to define statistical significance.

RESULTS

Of 1,810 youth screened, 238 did not meet study eligibility criteria; among the 1572 eligible subjects, 61 (3.9%) refused to participate and 54 (3.4%) were excluded because of missing data, leaving 1457 for the analyses. A total of 1047 (71.9%) reported having been previously tested (934 or 64.1% who had been previously tested and knew their test results to be either HIV positive or negative and 113 or 7.8% who had been tested, but did not know their test result, either because they "did not know" or did not go back for their test result) and 410 (28.1%) had not been previously tested for HIV infection. Preliminary analyses found that subjects that had been tested but did not know their results did not differ from those that had been tested but did not go back for their results, so they were combined for these analyses. Basic demographic characteristics of the sample are shown in Table 1, overall and according to self-reported HIV testing status.

Factors Associated with Testing

Individual Factors (Tables 1 and 2)—The probability of having been previously tested for HIV among those of Black/African-American race was nearly twice that of "other" races and those reporting gay/lesbian/bisexual sexual behavior had nearly three times the odds of having been previously tested, whereas testing was less likely to have occurred in those <18 years of age and currently attending school ($p<0.001$). Having been tested for HIV was more common among those reporting ≥3 sex partners in the previous three months, ever having had a STI, having used a condom "half of the time" or less during sex, having used substances during the last sexual encounter, being a male participant with any previous MSM activity or a female participant who had sexual activity with an MSM, having had an IDU sex partner, and having had sex with an HIV-infected partner ($p<0.025$).

Partner-related Factors (Table 3)—Participants were more likely to have been tested for HIV if they had a partner who used hard drugs during the last sexual encounter or had a sexual partner who themselves had other sexual partners outside of the index relationship ($p<0.001$). Participants were less likely to have been tested if they reported ≥1 episodes

when a partner made them have sex without a condom or had a partner with unknown HIV status compared to encounters with HIV negative partners ($p<0.0001$).

Factors Associated with Knowledge of HIV Serostatus Among Those Tested

Individual Factors (Tables 1 and 2)—Among those who reported having been tested (n=1047), Hispanics had a higher probability of knowing their test results than non-Hispanics ($p<0.002$). Knowledge of HIV test status varied according to education ($p<0.03$), with those having completed high school or receiving a GED having a lower probability of knowing their serostatus than those with greater than a high school education. Knowledge of serostatus was positively associated with MSM activity in males and females who self-reported sexual activity with an MSM ($p<0.025$). Participant risk behaviors associated with a lower probability of knowing their serostatus included having an STI history and having had sex with an IDU ($p<0.025$).

Partner-related Factors (Table 3)—Among those who reported having been tested, participants were less likely to know their HIV status if they had a partner who made them have sex without a condom, used force ("like hitting, holding down, or using a weapon") to make them have sex, used hard drugs during their last sexual encounter, or was HIV positive or of unknown serostatus ($p<0.05$).

Health Care Utilization (Table 4)

Study participants who had gone to a health care facility in the past year to check for STIs had a higher probability of reporting having been tested for HIV infection ($p<0.001$) and (among those who had been HIV tested) had a higher probability of knowing their HIV test results ($p<0.001$) than those who had not gone for such a check-up. Participants who had received any health care in the past year had a higher probability of reporting having been HIV tested than those who had not received any health care ($p<0.02$), but receipt of any health care in the past year was not associated with knowledge of test results among those tested ($p=0.9$).

DISCUSSION

Most (72%) of the youth tested at the venues reported having a history of HIV testing in the past. Clearly, our sample is of very high risk, as evidenced by Barnes' findings that the prevalence of HIV in our sample was high, with 15.3% of YMSM and 0.3% of young women positive for HIV. Furthermore, 60% of the YMSMs diagnosed with HIV and all of the young women were newly diagnosed[20]. Given the very high risk for HIV and the lack of awareness of serostatus by the majority of those who were positive in this study population, clearly these youth are not being *adequately* tested.

In general, factors found in our study to be predictive of testing reflect highest risk for HIV, which is consistent with the literature. There were a few notable exceptions. Youth who had a partner that made them have sex without a condom or had a partner with unknown HIV status were less likely to be tested. This latter finding may reflect the saliency of the issue, in that both index youth and partners with testing history may be more sensitized to the importance of HIV testing than index youth without a history of testing and partners with unknown serostatus. However, these results are based on information concerning up to four sex partners, with the possibility of the behaviors differing among partners and partner types (main vs. casual). YRBS data demonstrate significant discrepancies in history of HIV testing by race/ethnicity and gender[13]. Since our recruitment strategies focused primarily on YMSMs and young women of color, we were unable to adequately assess these factors with our data. Youth currently in school had a lower probability of having been tested, adjusting

for age, which might imply that venue-based testing may be achieving the important goal of testing high-risk youth not in school, as the literature suggests that not being in school has been associated with HIV infection[22].

Many adolescents who are tested do not return for their results. In our study, 89% of those reporting a history of testing *claim* to know their results, but we have no way of verifying such. Tolou-Shams[8] found in a community sample of nearly 1000 sexually active adolescents, that 74% of adolescents reporting HIV testing had received their results within three months of testing. In our study we found that Hispanic identity, same sex activity, and recent STI evaluation were positively associated and increased partner risk was negatively associated with knowledge of serostatus. Regarding Hispanic identity, CDC data indicate that Hispanics/Latinos are more often testing for HIV within one year of being diagnosed with AIDS (42%) than either African Americans (38%) or Caucasions (35%)[23]. This testing later in the course of the disease may help explain our finding that Hispanics had higher knowledge of serostatus, in that their motivation for testing may have been symptoms rather than screening. It is possible that variability in knowledge of serostatus reflects testing strategies and venues, as well as self-perceived risk and resultant motivation to return for results. Further research is needed to explore whether factors that determine being tested in a venue setting are also associated with individual and partner-specific factors that may affect whether adolescents return for their test results. These findings also highlight the importance of making rapid HIV testing available in a variety of settings.

A higher percentage of youth receiving STI testing than those who did not, report HIV testing (88% vs. 45%), suggesting that HIV testing is more strongly tied to STI services than primary care. We observed similar rates in reported HIV testing between those who did and did not receive any health care (73% vs. 68%), perhaps suggesting that adolescents do not assume HIV testing occurs as part of routine primary care. Given the fact that our measure of HIV testing is self-reported, independent corroboration of testing would much more effectively address questions of whether this represents targeted testing rather than universal screening and real vs. assumed testing and should be considered in future research.

There are several important implications of this study. First, a high percentage of youth who engage in high-risk HIV behaviors and who congregate at venues associated with high prevalence of infection or located in high prevalence communities report having been tested for HIV and are aware of their results. Although this does not necessarily constitute *adequate* testing, it is nevertheless a marker of some success. Provision of adequate testing services for this population might include alternative testing strategies in addition to venue-based testing. Second, our findings suggest that testing appears be more strongly associated with receipt of STI services than health services. This is similar to other evidence that suggests that HIV testing continues to occur in the context of STI testing rather than as part of routine primary care[18]. Finally, the public health community may be less effective at reaching individuals with high-risk sex partners. Given that many individuals may only be at risk for HIV because of their sex partners, this is a concerning finding. Overall our findings suggest the need for development of new strategies for testing high-risk individuals and their partners, such as social network recruitment, support for universal screening, rapid testing, and development of social marketing messages that encourage the partners of high-risk individuals to get tested.

Among the study limitations, the cross sectional nature of the data collection requires some caution in interpreting cause-effect relationships, since it may not be possible to establish temporal associations between the factors. The large sample size available for this analysis provides ample statistical power to identify even small differences between groups as significant. Thus, the study findings should be interpreted in light of the clinical importance

of the magnitude of the differences observed between HIV testing status groups, along with any corroborating evidence from the literature, as a small difference, though statistically significant, may be of little or no importance in developing strategies to target partners of high-risk individuals to get tested and for individuals to receive their results. The information collected relied upon subject recall, without independent corroboration of HIV testing status. Such information would have been helpful to tease out the relationships between health care utilization and HIV and STI testing. Finally, subjects could only provide information on up to four sex partners, even though there could have been more partners during the time period in question.

In conclusion, venue-based testing remains an important strategy to test high-risk youth in urban settings. However, more strategies are needed that target high-risk individuals and their partners to get tested and insure that individuals tested in such settings receive their results. The utilization of field-based, rapid testing in youth-friendly venues, such as in social networks, clubs or bars, would improve knowledge of serostatus for all youth and would further combat this public health challenge.

Acknowledgments

Funding support and additional acknowledgements

The Adolescent Trials Network for HIV/AIDS Interventions (ATN) and Connect to Protect® were funded, at the time of this study, through the National Institute of Child Health and Human Development (Bill Kapogiannis, Audrey Rogers, Robert Nugent, Leslie Serchuck, Sonia Lee), with supplemental funding from the National Institutes on Drug Abuse (Nicolette Borek), Mental Health (Andrew Forsyth, Pim Brouwers), and Alcohol Abuse and Alcoholism (Kendall Bryant).

The authors would like to acknowledge the National Coordinating Center for Connect to Protect® at Johns Hopkins School of Medicine including Nancy Willard and Mauri Ziff, Project Directors, as well as the support of Craig Wilson and Cindy Partlow at the ATN Coordinating Center and Jim Korelitz, Barbara Driver, Lori Perez, Rick Mitchell, Stephanie Sierkierka, and Dina Monte at the ATN Data and Operations Center at Westat. The following ATN sites and personnel participated in this study: University of Maryland: Ligia Peralta, MD, Bethany Griffin Deeds, MA, PhD, Kalima Young, Montefiore Medical Center: Donna Futterman, MD, Sharon S. Kim, MPH, Children's Hospital of Los Angeles: Marvin Belzer, MD, Miguel Martinez, MSW/MPH, Veronica Montenegro, The Children's Hospital of Philadelphia: Bret J. Rudy, MD, Antonio Cardoso, Marne Castillo, Children's National Medical Center: Larry D'Angelo, MD, William Barnes, PhD, Bendu Cooper, MPH, Children's Hospital (Boston): Cathryn Samples, MD, Judith Palmer-Castor, PhD, Stroger Hospital of Cook County: Jaime Martinez and Lisa Henry-Reed, Children's Diagnosis and Treatment Center: Ana Puga, MD, Jessica Roy, MSW, Dianne Batchelder, RN, University of Miami: Lawrence Friedman, MD, Kenia Sanchez, MSW, Ben Quiles, University of South Florida: Patricia Emmanuel, MD, Diane Straub, MD, MPH, Georgette King, MPA, Chodasessie Morgan, Tulane University: Sue Ellen Abdalian, MD, Sybil Schroeder, MSW, GSW, PhD, Mount Sinai Adolescent Health Center: Linda Levin, MD, Christopher Moore, MPH, Kelly Sykes, PhD, University of Puerto Rico: Irma Febo, MD, Ileana Blasini, MD, MPH, Ibrahim Ramos-Pomales, MPHE, Carmen Rivera-Torres, RN, MPH, University of California, San Diego: Stephen A. Spector, MD, Stephanie Lehman, PhD, University of California, San Francisco: Anna Barbara Moscicki, MD, Colette Auerswald, MD, Kevin Sniecinski. We would also like to acknowledge the contributions of the youth who participate in our national and local youth community advisory boards for their thoughtful contributions to the work of Connect to Protect® and the staff at the local public health departments, police departments, state agencies, and other sources who provided the data used in this project.

REFERENCES

1. Campsmith, M.; Rhodes, P.; Hall, I. Estimated Prevalence of Undiagnosed HIV Infection in the United States at the End of 2006. 16th Conference on Retroviruses and Opportunistic Infections; 2009 Feb 16–20. Abstract
2. Hall HI, Song R, Rhodes P. Estimation of HIV Incidence in the United States. JAMA. 2008; 300(5): 520–529. [PubMed: 18677024]
3. Marks G, Crepaz N, Senterfitt, et al. Meta-Analysis of High-Risk Sexual Behavior in Persons Aware and Unaware they are Infected with HIV in the United States: Implications for HIV Prevention Programs. J Acquir Immun Defic Syndr. 2005; 39:446–453.

4. CDC. Divisions of HIV/AIDS Prevention, National Center for HIV/AIDS Viral Hepatitis, STI, and TB Prevention. Advancing HIV Prevention: New Strategies for a Changing Epidemic. (http://www.cdc.gov/hiv/topics/prevprog/ahp/default.htm). Advancing HIV Prevention: New Strategies for a Changing Epidemic. Unites States, 2003. MMWR, Morb Mortal Wkly Rep. 2003; 52(15):239–332.
5. Murphy DA, Mitchell R, Vermund SH, et al. and the Adolescent Medicine HIV/AIDS Research Network. Factors Associated with HIV Testing Among HIV-Positive and HIV-Negative High-Risk Adolescents: The Reach Study, Reaching for Excellence in Adolescent Care and Health. Pediatrics. 2002; 110:e36. [PubMed: 12205286]
6. Peralta L, Deeds BG, Hipszer S. Barriers and Facilitators to Adolescent HIV Testing. AIDS Patient Care and STIs. 2007; 21:400–408.
7. Goodman E, Berecochea A. Predictors of HIV Testing Among Runaway and Homeless Adolescents. J Adolesc Health. 1994; 15(7):566–572. [PubMed: 7857955]
8. Tolou-Shams M, Payne N, Houck C, et al. and the Project Shield Study Group. HIV Testing Among At-Risk Adolescents and Young Adults: Prospective Analysis of a Community Sample. J Adolesc Health. 2007 Dec; 41(6):586–593. [PubMed: 18023788]
9. Samet J, Winter M, Grant L, et al. Factors Associated with HIV Testing Among Sexually Active Adolescents: A Massachusetts Survey. Pediatrics. 1997; 100:371–377. [PubMed: 9282708]
10. Henry-Reid LM, Rodriguez F, Bell MA, et al. Youth Counseled for HIV Testing at School and Hospital Based Clinics. J Natl Med Assoc. 1998; 90:287–292. [PubMed: 9617069]
11. Stein JA, Nyamathi A. Gender Differences in Behavioral and Psychosocial Predictors of HIV Testing and Return for Test Results in a High-Risk Population. AIDS Care. 2000; 12:343–356. [PubMed: 10928212]
12. Swenson RR, Rizzo CJ, Brown LK, et al. Prevalence and Correlates of HIV Testing Among Sexually Active African American Adolescents in 4 US Cities. Sexually Transmitted Diseases. 2009 Nov, Sept.vol. 36
13. CDC. Youth Risk Behavior Surveillance. United States, 2007. MMWR. 2008; 57(No. SS-4)
14. Arrington-Sanders R, Ellen J. Prevalence of Self-Reported HIV Testing Among a Population-Based Sample of Urban African America Adolescents. J Adolesc Health. 2008 Sept; 43(3):306–308. [PubMed: 18710686]
15. Schappert SM, Burt CW. Ambulatory Care Visits to Physician Offices, Hospital Outpatient Departments, and Emergency Departments: United States, 2001–2002. National Center for Health Statistics. Vital Health Stat. 2006; 13(159):1–66.
16. US Department of Health and Human Services. Medical Expenditure Panel Survey. 2008 July. www.mepsahrq.gov/medpweb/data_stats
17. Weinick RM, Zuvekas SH, Cohen JW. Racial and Ethnic Differences in access To and Use of Health Care Services. 1977–1996 Med Care Res Rev. 2000; 57:36–54.
18. Arrington-Sanders R, Ellen J, Trent M. HIV Testing in Adolescents and Young Adults Receiving STI Testing in an Urban Primary Care Setting. Sex Transm Dis. 2008 Jul; 35(7):686–688. [PubMed: 18449070]
19. Marcell AV, Bell DL, Lindberg LD, Taruri A. Prevalence of sexually transmitted infection/human immunodeficiency virus counseling services received by teen males, 1995–2002. J Adolesc Health. 2010 Jun; 46(6):553–559. [PubMed: 20472212]
20. Barnes W, D'Angelo L, Yamazaki M, et al. and the Adolescent Trials Network for HIV/AIDS Interventions. Identification of HIV Infected 12 to 24 year Old Men and Women in 15 US Cities through Venue-Based Testing. Archives of Pediatrics & Adolescent Medicine. 2010; 164:273–276. [PubMed: 20194262]
21. Geanuracos CG, Cunningham SD, Weiss G, et al. Use of Geographic Information Systems for Planning HIV Prevention Interventions for High-Risk Youth. AJPH. 2007; 97(11):1974–1981.
22. Celentano DD, Sifakis F, Hylton J, Torian LV, Guillin V, Koblin BA. Race/ethnic differences in HIV prevalence and risks among adolescent and young adult men who have sex with men. J Urban Health. 2005 Dec; 82(4):610–621. [PubMed: 16221919]

23. Centers for Disease Control and Prevention. Vol. 18. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; HIV/AIDS surveillance report, 2006.

Table 1

Association of demographic characteristics with HIV testing status among venue-based study participants.

Demographic characteristic	Overall (N=1457)	HIV tested, known status (N=934)	Tested, unknown HIV status (N=113)	No prior HIV testing (N=410)	HIV Tested vs. No prior HIV testing OR (95% CI) [p-value]*	Tested, known HIV status vs. Tested, unknown status OR (95% CI) [p-value]*
Age:[1] n (%)						
< 18 years	395 (27.1)	171 (43.3)	29 (7.3)	195 (49.4)	0.33 (0.21, 0.53)	0.74 (0.43, 1.29)
≥ 18 years	1062 (72.9)	763 (71.9)	84 (7.9)	215 (20.2)	[<0.0001]	[0.29]
Gender: [2] n (%)						
Male	751 (51.6)	521 (69.4)	46 (6.1)	184 (24.5)	1.06 (0.55, 2.02)	1.62 (0.81, 3.23)
Transgender	27 (1.9)	23 (85.2)	3 (11.1)	1 (3.7)	7.26 (0.96, 54.80)	1.12 (0.37, 3.35)
Female	678 (46.6)	390 (57.5)	63 (9.3)	225 (33.2)	[0.15]	[0.37]
Hispanic ethnicity: n (%)						
Yes	478 (32.9)	302 (63.2)	25 (5.2)	151 (31.6)	0.77 (0.50, 1.20)	1.68 (1.22, 2.33)
No	976 (67.1)	631 (64.7)	88 (9.0)	257 (26.3)	[0.25]	[0.0017]
Race: [2] n (%)						
Blacks/African-Americans	871 (60.0)	567 (65.1)	77 (8.8)	227 (26.1)	1.81 (1.37, 2.38)	0.62 (0.30, 1.28)
Whites	135 (9.3)	80 (59.3)	12 (8.9)	43 (31.9)	0.97 (0.50, 1.90)	0.45 (0.22, 0.92)
Mixed race	282 (19.4)	183 (64.9)	17 (6.0)	82 (29.1)	1.21 (0.74, 1.97)	0.81 (0.45, 1.48)
Other races	163 (11.2)	101 (62.0)	7 (4.3)	55 (33.7)	[0.0002]	[0.11]
Highest level of education completed: 3 n (%)						
Less than high school	589 (40.6)	332 (56.4)	50 (8.5)	207 (35.1)	0.98 (0.52, 1.83)	0.62 (0.34, 1.14)
High school/GED	574 (39.5)	382 (66.6)	45 (7.8)	147 (25.6)	0.79 (0.50, 1.25)	0.72 (0.54, 0.95)
Greater than high school	289 (19.9)	217 (75.1)	18 (6.2)	54 (18.7)	[0.11]	[0.0206]
Currently attending school: [3] n (%)						
Yes	891 (61.3)	503 (56.5)	72 (8.1)	316 (35.5)	0.53 (0.41, 0.69)	0.73 (0.51, 1.03)
No	5662 (38.7)	430 (76.5)	41 (7.3)	91 (16.2)	[<0.0001]	[0.07]

Demographic characteristic	Overall (N=1457)	HIV tested, known status (N=934)	Tested, unknown HIV status (N=113)	No prior HIV testing (N=410)	HIV Tested vs. No prior HIV testing OR (95% CI) [p-value]*	Tested, known HIV status vs. Tested, unknown status OR (95% CI) [p-value]*
Sexual orientation: [2] n (%)						
Gay/lesbian/bisexual	753 (52.0)	555 (73.7)	54 (7.2)	144 (19.1)	2.70 (1.79, 4.07)	1.12 (0.58, 2.16)
Heterosexual	696 (48.0)	376 (54.0)	58 (8.3)	262 (37.6)	[<0.0001]	[0.74]

*P-values were derived from logistic regression modeling implemented using SAS Proc GENMOD that is capable of addressing possible correlations among subjects interviewed at the same venue; reference categories for logistic modeling are bolded in first column.

[1]Model results were adjusted for differences according to whether or not the subject was currently attending school.

[2]Model results were adjusted for differences according to gender, race and sexual orientation.

[3]Model results were adjusted for differences in subject's age.

Table 2

Association of subject-related HIV risk behaviors with HIV testing status among venue based study participants.

Subject-related HIV risk behavior	HIV tested, known status (N=934)	Tested, unknown HIV status (N=113)	No prior HIV testing (N=410)	HIV Tested vs. No prior HIV testing OR (95% CI) [p-value]*	Tested, known HIV status vs. Tested, unknown status OR (95% CI) [p-value]*
Greater than 3 sex partners in the past 3 months: n (%)					
Yes	216 (76.6)	18 (6.4)	48 (17.0)	2.16 (1.55,3.02)	1.56 (0.85,2.87)
No	716 (61.3)	93 (8.0)	359 (30.7)	[<0.0001]	[0.15]
Ever had sexually transmitted disease: n (%)					
Yes	293 (80.5)	43 (11.8)	28 (7.7)	6.42 (4.03, 10.23)	0.72 (0.55, 0.95)
No	640 (58.9)	68 (6.3)	379 (34.9)	[<0.0001]	[0.0202]
Frequency of condom use when having sex with partner: n (%)					
Few times/half of time	321 (68.4)	43 (9.2)	105 (22.4)	1.39 (1.04, 1.85)	0.79 (0.50, 1.24)
Most of time/every time	580 (64.6)	61 (6.8)	257 (28.6)	[0.0238]	[0.30]
Used alcohol, marijuana or hard drugs last time had sex with partner: n (%)					
Yes	504 (67.7)	74 (9.9)	167 (22.4)	1.56 (1.22, 2.00)	0.70 (0.46, 1.08)
No	628 (62.4)	65 (6.5)	313 (31.1)	[0.0004]	[0.11]
Ever had sex with same gender (for males) or ever had sex with male who also has sex with other males (males and females): n (%)					
Yes	483 (76.5)	43 (6.8)	105 (16.6)	2.44 (1.68, 3.53)	1.74 (1.07, 2.81)
No	349 (58.3)	54 (9.0)	196 (32.7)	[<0.0001]	[0.0245]
Had sex with someone who injects drugs: n (%)					
Yes	108 (66.3)	25 (15.3)	30 (18.4)	1.84 (1.32, 2.56)	0.45 (0.31, 0.66)
No	822 (64.0)	86 (6.7)	376 (29.3)	[0.0003]	[<0.0001]
Had sex with someone who is HIV infected: n (%)					
Yes	86 (84.3)	10 (9.8)	6 (5.9)	6.80 (2.52, 18.30)	1.02 (0.56, 1.88)
No	831 (62.7)	99 (7.5)	395 (29.8)	[0.0001]	[0.94]

Sex Transm Dis. Author manuscript; available in PMC 2012 August 1.

* P-values were derived from logistic regression modeling implemented using SAS Proc GENMOD that is capable of addressing possible correlations among subjects interviewed at the same venue, as well as HIV risk behaviors each individual engaged in with their different sexual partners; reference categories for logistic modeling are bolded in first column.

Table 3

Association of sex partner-related HIV risk behaviors with HIV testing status among venue-based study participants.

Sex partner-related HIV risk behavior	HIV tested, known status (N=934)	Tested, unknown HIV status (N=113)	No prior HIV testing (N=410)	HIV Tested vs. No prior HIV testing OR (95% CI) [p-value]*	Tested, known HIV status vs. Tested, unknown status OR (95% CI) [p-value]*
Number of sex partners participants identified in survey	*1141*	*142*	*484*	*484 vs. 1283*	*142 vs. 1141*
Partner made participant have sex (oral, anal or vaginal) without a condom: n (%)					
Happened one or more times	200 (52.5)	44 (11.5)	137 (36.0)	0.59 (0.45, 0.78)	0.45 (0.29, 0.70)
Never happened	926 (68.2)	92 (6.8)	340 (25.0)	[0.0001]	[0.0004]
Partner used force - like hitting, holding down, or using a weapon - to make participant have sex: n (%)	58 (61.1)	14 (14.7)	23 (24.2)	1.19 (0.68, 2.07)	0.48 (0.24, 0.97)
Happened one or more times	1074 (64.9)	124 (7.5)	456 (27.6)	[0.54]	[0.0410]
Never happened					
At last sex, partner was using drugs like cocaine, heroin, or speed: n (%)					
Yes	117 (75.0)	25 (16.0)	14 (9.0)	4.14 (2.00, 8.57)	0.53 (0.30, 0.94)
No	1018 (63.8)	115 (7.2)	463 (29.0)	[0.0001]	[0.0287]
Sex partner's HIV status: n (%)					
HIV positive	29 (63.0)	8 (17.4)	9 (19.6)	0.75 (0.30, 1.86)	0.24 (0.08, 0.73)
HIV status unknown	284 (41.9)	80 (11.8)	314 (46.3)	0.21 (0.16, 0.27)	0.23 (0.15, 0.35)
HIV negative	828 (79.4)	54 (5.2)	161 (15.4)	[<0.0001]	[<0.0001]
Partner had other sex partner while study subject and partner were in a sexual relationship: n (%)					
Yes	403 (69.2)	59 (10.1)	120 (20.6)	1.70 (1.32, 2.19)	0.75 (0.50, 1.10)
No	715 (62.5)	78 (6.8)	351 (30.7)	[<0.0001]	[0.14]

*P-values were derived from logistic regression modeling implemented using SAS Proc GENMOD that is capable of addressing possible correlations among subjects interviewed at the same venue, as well as HIV risk behaviors each individual engaged in with their different sexual partners; reference categories for logistic modeling are bolded in first column.

Table 4

Association of health care utilization with HIV testing status among venue-based study participants.

Health care utilization measure	HIV tested, known status (N=934)	Tested, unknown HIV status (N=113)	No prior HIV testing (N=410)	HIV Tested vs. No prior HIV testing OR (95% CI) [p-value]*	Tested, known HIV status vs. Tested, unknown status OR (95% CI) [p-value]*
In the past year, participant went to health care facility to check for STIs: n (%)					
Yes	725 (80.2)	74 (8.2)	105 (11.6)	9.34 (7.66, 11.40)	1.79 (1.40, 2.29)
No	208 (38.0)	38 (6.9)	302 (55.1)	[<0.0001]	[<0.0001]
In past year, participant received any health care: n (%)					
Yes	701 (65.3)	85 (7.9)	288 (26.8)	1.29 (1.04, 1.60)	0.97 (0.63, 1.51)
No	229 (60.7)	27 (7.2)	121 (32.1)	[0.0197]	[0.90]

*P-values were derived from logistic regression modeling implemented using SAS Proc GENMOD that is capable of addressing possible correlations among subjects interviewed at the same venue; reference categories for logistic modeling are bolded in first column.