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## Identification of HIV-Infected 12- to 24-Year-Old Men and Women in 15 US Cities Through Venue-Based Testing

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## Abstract

**Objective**—To test whether “venue-based testing” could identify human immunodeficiency virus (HIV) infection in US youth, 12 to 24 years of age, who were otherwise not aware of their infection. Racial and ethnic minority women and men who have sex with men (WSM and MSM) compose the majority of new HIV cases among adolescents and young adults.

**Design**—Cross-sectional study.

**Setting**—Selected venues in communities surrounding the 15 Adolescent Trials Network for HIV/AIDS Interventions (ATN) clinical sites over a 3-month period.

**Participants**—At each venue, ATN sites recruited 20 to 30 English- or Spanish-speaking at-risk youth (12 to 24 years of age), resulting in a total of 1217 study participants, including 611 MSM and 606 WSM.

**Intervention**—Venue-based HIV testing with 2 components: an anonymous audio computer-assisted self-administered interview and an anonymous HIV antibody assay.

**Main Outcome Measure**—The prevalence of HIV infection in MSM and WSM.

**Results**—The prevalence of HIV infection in MSM and WSM was 15.3% and 0.3%, respectively. Sixty percent of the MSM and 100% of the WSM claimed to not know of their infection.

**Conclusion**—Venue-based testing may be an important strategy to identify HIV-infected younger MSM; however, other strategies are needed for WSM.

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The highest prevalence of new human immunodeficiency virus (HIV) cases among adolescents and young adults has been found among racial and ethnic minority women and men who have sex with men (WSM and MSM).<sup>1,2</sup> There is a need to establish methods for identifying infected youth.

One method of identifying HIV-infected youth involves offering testing at locations where young people congregate. This approach, called “venue-based testing,” has been used with much success to identify older infected MSM.<sup>3,4</sup> However, there is little information about the success of this approach for identifying HIV-infected younger MSM and no information regarding the identification of HIV-infected adolescent and young adult minority WSM.

The objective of this investigation was to ascertain whether venue-based testing could identify HIV-infected adolescent and young adult MSM and WSM, particularly those without prior knowledge of their infection status. The HIV testing occurred during the initial phases of the Connect to Protect project<sup>5</sup> in the communities surrounding the 15 Adolescent Trials Network for HIV/AIDS Interventions (ATN) clinical sites.

## Methods

Among the 15 ATN clinical sites, 11 focused on identifying HIV-positive results among either MSM or WSM; 4 focused on both. Several methods were used to identify the venues where

the target youth could be recruited, including interviews with HIV-infected youth in care and community partner organizations.<sup>6</sup> The ATN clinical sites targeting both MSM and WSM identified separate venues for each population. The detailed methods of the Connect to Protect project are discussed in detail elsewhere.<sup>5</sup>

After identifying the initial list of venues, ATN clinical site staff conducted brief venue interviews with the target youth at 3 to 5 venues to assess whether it was feasible to identify eligible participants to meet the target sample size per venue. The target sample size per venue (ie, 20-30) was defined from the power calculation to detect a 3% prevalence. For the brief venue interviews, site staff went to each venue and recorded sex and race/ethnicity of age-appearing-eligible participants. Based on the brief venue interviews, the list of feasible recruitment venues was narrowed to the 2 to 3 highest-volume venues for each ATN clinical site. The final set of recruitment venues included commercial and service-oriented areas for WSM and clubs and bars for MSM.

The HIV testing was conducted at selected venues for each ATN clinical site within a 3-month period after venue interviews. The venue-based HIV testing had 2 components: an anonymous audio computer-assisted self-administered interview and an anonymous HIV antibody assay (OraSure swab; OraSure Technologies, Bethlehem, Pennsylvania). The HIV testing was implemented at selected venues between January 2005 and August 2006. The ATN clinical site staff recruited 20 to 30 MSM or WSM at each venue who spoke either English or Spanish. A total of 1217 at-risk youth were recruited, which included 611 MSM and 606 WSM. Individuals who were 12 to 24 years of age and had engaged in voluntary vaginal, anal, and/or oral sex within the past 12 months were eligible. The ATN clinical site staff obtained verbal informed consent from eligible participants and conducted the HIV testing. Because of the nature of the anonymous testing, test results were not returned to participants directly. The ATN clinical site staff informed participants of locations where they could receive confidential HIV test results. All participating ATN clinical sites' institutional review boards approved the protocol.

We defined MSM as participants who reported birth sex as male and who reported ever having had sex with a man. We defined WSM as participants who reported birth sex as female and self-identified as heterosexual or bisexual. Univariate statistics (number, percentage) were used to describe the distributions of select characteristics of study participants. Logistic regression models were used to assess the associations between HIV status and binary characteristics among MSM. Linear regression models were used to assess the associations between HIV status and the continuous characteristics, as implemented using generalized estimating equations to control for possible correlation in the data among subjects enrolled in each venue. Analyses were carried out using SAS version 8 (SAS Institute Inc, Cary, North Carolina).

## Results

Table 1 presents descriptive statistics for select characteristics for MSM and WSM. Venue-based testing identified 93 HIV-infected MSM (15.3% prevalence, 60.2% of whom claimed to be unaware of their infection) and 2 HIV-infected WSM (0.3% prevalence, 100% of whom claimed to be unaware of their infection). Table 2 compares select characteristics by HIV status confirmed during venue-based testing and is restricted to MSM. The prevalence of HIV infection was higher in MSM who were 18 years and older compared with those 12 to 17 years of age ( $P < .05$ ). It was also higher in African American MSM compared with their counter groups ( $P < .001$ ). More than 90% of MSM who were found to be HIV infected ( $n = 93$ ) in venue-based testing reported that they had known of their previous HIV test results. Half of MSM who were found to be HIV infected in venue-based testing reported a previous negative test result while almost all MSM who were found to be HIV uninfected reported a previous

negative test result ( $P < .001$ ). Average numbers of lifetime sex partners were higher in HIV-infected MSM ( $P < .05$ ), although average numbers of sex partners in the past 90 days were not different by HIV infection status. There was no difference between HIV-infected and uninfected MSM in other risk characteristics, including drug and alcohol uses.

## Comment

This study showed that venue-based testing can be used to identify HIV-infected minority adolescent and young adult MSM and WSM. These findings are consistent with past research. A survey conducted between 1994 and 1998 revealed that 5.6% and 8.6% of young MSM 15 to 19 years of age and 20 to 22 years of age, respectively, were found to be HIV infected.<sup>4</sup> A similar type of venue-based testing study conducted in 5 cities between 2004 and 2005 targeting MSM found that 14% of 18- to 24-year-olds were infected with HIV.<sup>3</sup>

We were only able to identify 2 HIV-infected women, both previously unaware of their HIV infection status. The prevalence of 0.3% among these women found in the venue-based testing is not as high as the estimated HIV/AIDS prevalence of 15- to 24-year-old women (0.68%) using the age group-specific rates derived from the National Vital Statistics System and multiple HIV/AIDS surveillance studies between 2004 and 2006 in the United States.<sup>7</sup> The prevalence found in our study and a nationally representative sample of 18- to 25-year-old women (0.087%)<sup>8</sup> suggests continued challenges in identifying positive test results among at-risk women in surveys regardless of their methods.

There remains a need to develop more successful approaches for identifying HIV-infected young minority WSM. The revised Centers for Disease Control and Prevention recommendation for universal testing of all patients in care may prove effective. Other potentially effective approaches, such as the use of social networks, need to be evaluated in younger women.

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**Table 1**  
**Description of Characteristics of MSM and WSM**

Demographic Characteristic	No. (%)		
	Overall (N=1217)	MSM (n=611)	WSM (n=606)
Race			
African American	748 (61.7)	282 (46.5)	466 (76.9)
Other	465 (38.3)	325 (53.5)	140 (23.1)
Age, y			
12-17	316 (26.0)	84 (13.7)	232 (38.3)
18-23	901 (74.0)	527 (86.3)	374 (61.7)
Sexual orientation			
Gay/lesbian/bisexual	636 (53.9)	548 (95.3)	88 (14.5)
Heterosexual	545 (46.1)	27 (4.7)	518 (85.5)
Sexual activity and history			
No. of sex partners, lifetime			
Natural log mean (SD)	2.06 (0.87)	2.61 (1.31)	1.52 (1.10)
Natural log median (SD)	1.79	2.40	1.61
Geometric mean (SD)	7.8	13.6	4.6
No. of sex partners, past 90 d			
Natural log mean (SD)	0.67 (0.87)	0.95 (0.97)	0.39 (0.64)
Natural log median (SD)	0.69	0.69	0.0
Geometric mean (SD)	2.0	2.6	1.5
HIV test in the past			
Ever	923 (76.0)	511 (83.8)	412 (68.2)
Never	291 (24.0)	99 (16.2)	192 (31.8)
Previous test results			
HIV positive	48 (5.8)	42 (9.0)	6 (1.7)
HIV negative	778 (94.2)	427 (91.0)	351 (98.3)
Missing/don't know	97	42	55
Venue-based HIV test			
Tested for HIV during study	1212 (99.6)	607 (99.3)	605 (99.8)
Not tested for HIV during study	5 (0.4)	4 (0.7)	1 (0.2)
Test results			
Positive	95 (7.8)	93 (15.3)	2 (0.3)
Negative	1114 (91.9)	511 (84.2)	603 (99.7)
Indeterminate	3 (0.2)	3 (0.5)	0
Among HIV positive			
Previously unaware	58 (61.1)	56 (60.2)	2 (100.0)
Previously aware	37 (38.9)	37 (39.8)	0
Other risk characteristics			
Drug use			
Ever	733 (61.0)	400 (66.6)	333 (55.5)

Demographic Characteristic	No. (%)		
	Overall (N=1217)	MSM (n=611)	WSM (n=606)
Never	468 (39.0)	201 (33.4)	267 (44.5)
Past 90 d			
Not used	132 (18.0)	58 (14.5)	74 (22.2)
Marijuana only	345 (47.1)	171 (42.8)	174 (52.3)
Used hard drug	256 (34.9)	171 (42.8)	85 (25.5)
Used intravenous drugs			
Ever	33 (4.5)	29 (7.3)	4 (1.2)
Never	698 (95.5)	370 (92.7)	328 (98.8)
Used alcohol			
Ever	916 (76.1)	494 (82.5)	422 (69.9)
Never	287 (23.9)	105 (17.5)	182 (30.1)
Used alcohol in the past 90 d	777 (85.7)	438 (89.6)	339 (81.1)
No alcohol use in the past 90 d	130 (14.3)	51 (10.4)	79 (18.9)

Abbreviations: HIV, human immunodeficiency virus; MSM, men who have sex with men; WSM, women who have sex with men.

**Table 2**  
**Comparison of Characteristics of 604 HIV-Infected and Uninfected MSM Confirmed in**  
**Venue-based HIV Testing<sup>a</sup>**

Demographic Characteristic	No. (%)		P Value
	HIV Infected (n=93)	HIV Uninfected (n=511)	
Race			<.001
African American	63 (67.7)	216 (42.6)	
Other	30 (32.3)	291 (57.4)	
Age, y			.01
12-17	3 (3.2)	79 (15.5)	
18-23	90 (96.8)	432 (84.5)	
Sexual orientation			.34
Gay/lesbian/bisexual	85 (97.7)	457 (95.0)	
Heterosexual	2 (2.3)	24 (5.0)	
Sexual activity and history			
No. of sex partners, lifetime			.002
Natural log mean (SD)	3.11 (1.47)	2.53 (1.26)	
Natural log median, (SD)	2.86	2.30	
Geometric mean, (SD)	22.4	12.6	
No. of sex partners, past 90 d			.24
Natural log mean (SD)	1.09 (1.03)	0.93 (0.96)	
Natural log median, (SD)	0.90	0.69	
Geometric mean, (SD)	3.0	2.5	
HIV test in the past			
Ever	84 (90.3)	422 (82.7)	
Never	9 (9.7)	88 (17.3)	
Previous test results			<.001
HIV positive	37 (49.3)	4 (1.0)	
HIV negative	38 (50.7)	387 (99.0)	
Missing/don't know <sup>b</sup>	9	31	
Other risk characteristics			
Drug use			.09
Ever	70 (75.3)	327 (65.1)	
Never	23 (24.7)	175 (34.9)	
Past 90 d			.99
Not used	13 (18.6)	44 (13.5)	
Marijuana only	25 (35.7)	145 (44.3)	
Used hard drug	32 (45.7)	138 (42.2)	
Used intravenous drugs			.62
Ever	6 (8.6)	23 (7.1)	
Never	64 (91.4)	303 (92.9)	
Used alcohol			.68



Demographic Characteristic	No. (%)		P Value
	HIV Infected (n=93)	HIV Uninfected (n=511)	
Ever	74 (81.3)	416 (83.0)	
Never	17 (18.7)	85 (17.0)	
Used alcohol in the past 90 d	67 (90.5)	368 (89.5)	.79
No alcohol use in the past 90 d	7 (9.5)	43 (10.5)	

Abbreviations: HIV, human immunodeficiency virus; MSM, men who have sex with men.

<sup>a</sup>Seven subjects (4 without HIV testing conducted in the study and 3 with indeterminate study testing results) were excluded from this analysis.

<sup>b</sup>Subjects missing results from previous HIV testing (question left blank, participant did not go back for test results, participant did not know results of previous HIV test, participant refused to answer) were excluded from model used to generate *P* value.