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Results from Two Online Surveys Comparing Sexual Risk Behaviors in Hispanic, Black, and White Men Who Have Sex with Men

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Abstract

Many men who have sex with men (MSM) are among those who increasingly use the internet to find sexual partners. Few studies have compared behavior by race/ethnicity in internet-based samples of MSM. We examined the association of race/ethnicity with HIV risk-related behavior among 10,979 Hispanic, black, and white MSM recruited online. Significant variations by race/ethnicity were found in: age, income level, sexual orientation, number of lifetime male and female sexual partners, and rates of unprotected anal intercourse (UAI). Black and Hispanic men were more likely to report anal intercourse during the last sexual encounter, but white men were more likely to report UAI. In multivariate analysis, UAI was associated with HIV infection and sex with a main partner. Significant risk behavior variations by race/ethnicity were found. Research is

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needed to better target online interventions to MSM who engage in UAI or have other risk factors for transmitting or acquiring HIV.

Keywords

HIV; Men who have sex with men; Sexual behavior; Race; Ethnicity; Internet

Introduction

The HIV/AIDS epidemic in the U.S. continues to expand among men who have sex with men (MSM), and the Centers for Disease Control and Prevention (CDC) estimates that 53% of new HIV infections occurring in the U.S. in 2006 were among MSM [1]. Black and Hispanic MSM are disproportionately affected by the epidemic compared to white MSM and are a priority for HIV prevention efforts.

These racial and ethnic disparities in HIV prevalence do not appear to be explained by differences in traditional behavioral risk factors, such as the number of sex partners, concomitant substance abuse, or unprotected anal intercourse (UAI) [2–7]. Factors that may contribute to the disproportionate burden are: higher rates of same-race/ethnicity and concurrent partnerships, increased rates of UAI in partners of unknown HIV status, and older partners in black than white MSM [8–13]. In addition, black and Hispanic men may be less likely to know they are HIV infected. An HIV serosurvey of MSM from five cities found that nearly half the infected men were unaware of their infection, and rates of unrecognized HIV infection were five times as high in black and 1.5 times as high in Hispanic as in white MSM [14]. Since those who do not know they are HIV infected are more likely than those who do know to transmit the virus [15], higher rates of undiagnosed HIV infection among black and Hispanic MSM, coupled with a greater likelihood of having sex partners whose race/ethnicity matches their own, has the potential to concentrate the epidemic in these racial/ethnic groups [16].

Despite the disproportionate burden of HIV infection in MSM, particularly black and Hispanic MSM, only seven of 69 interventions in a CDC compendium of evidence-based HIV behavioral interventions specifically target MSM. Only one of the seven interventions was specifically developed for black men, and none were specifically for Hispanic men [17]. Recent data show a narrowing of the racial/ethnic digital divide, though class differences persist [18]. According to a recent Pew Research survey, 80% of non-Hispanic whites, 71% of blacks, and 82% of Hispanics use the Internet [19]. This investigation uses data from two online event-based surveys to describe racial and ethnic variations in sexual behavior, demographic characteristics, and predictors of UAI in MSM. These data can be used to inform future online HIV prevention interventions targeted to black and Hispanic MSM.

Methods

Data were combined from two existing online MSM surveys: study 1 collected data between October 2003 and March 2004 [20] and study 2 between November 2004 and March 2005 [21]. Participants were recruited through banner ads posted on fourteen different gay-oriented websites facilitating social and sexual networking. The websites were selected to include a range of content, from sexually explicit to news and information; two of the websites from which we recruited catered to black and Hispanic men. All the websites were geared toward english-speaking audiences, and the survey was available in English and French for study 1 and English only for study 2. Of 15,359 male respondents, analysis was limited to 10,979 Hispanic, non-Hispanic black, and non-Hispanic white men from the US

or Canada who reported ever having sex with a man in their lifetime. For this analysis, participants were excluded if they did not complete the survey, were transgender or female, reported no sex with men, did not fall into one of the three racial or ethnic categories described or were of mixed race, or were from a country other than the US or Canada. The research studies were approved by the Institutional Review Boards (IRBs) of participating institutions. The IRBs granted a waiver of the requirement to obtain written documentation of consent. Prior to initiating either survey, participants were required to read the consent forms online and click their agreement.

The online questionnaires used in the two studies were nearly identical and collected information on age, gender, race/ethnicity, income, education, partner status (main partner vs. new or non-main partner), number of lifetime male and female sexual partners, sexual identity, HIV status, HIV testing behavior, and country and state of residence. Detailed information on the last sexual encounter was collected, including: partner gender, number of sexual partners, type of sexual partner (main, non-main, or multiple, defined as any sexual encounter involving more than one partner, i.e. three-way or group sex), use of alcohol or drugs prior to sex, whether the encounter included unprotected anal, oral, or vaginal sex, and whether the participant disclosed his HIV status to the partner prior to the last sexual encounter. For variables specific to the last sexual encounter, the analysis was limited to those participants reporting sex within the 3 months prior to completion of the survey. Links to websites providing HIV and sexually transmitted infection education, prevention and treatment information, mental health hotlines, and drug and alcohol use treatment information were present on the last screen of the surveys. On average, between 10 and 20 min were needed to complete the questionnaires. No incentives were provided for survey participation or completion.

Data analysis was conducted using SPSS 16.0 for Windows (2007, Chicago, IL). Bivariate analysis was conducted to explore differences between Hispanic, non-Hispanic black, and non-Hispanic white survey respondents. A two-sided Pearson's chi-square test was used for comparisons of categorical variables. Only differences significant at a *P*-value less than or equal to 0.001 and corresponding 99.9% confidence intervals were considered statistically significant because of the large sample size. Multivariate logistic regression was used to assess independent predictors of UAI. Variables shown to be significant in the bivariate analysis, associated with UAI in other studies, or likely to act as confounders were included in the final, comprehensive model. Separate multivariate analyses for each race/ethnic group examined associations between potential predictors and UAI.

Results

A total of 25,375 individuals clicked on the surveys' banner advertisements and consented to participate. Of the 15,359 adult male participants for whom complete, non-duplicated data were available, participants were excluded from this analysis for the following reasons: 2,357 reported never having sex with a man or did not answer that question, 1,109 were not from the US or Canada, and 914 did not classify themselves within the three racial/ethnic categories included in this analysis. This analysis was limited to 10,979 Hispanic, non-Hispanic black, or non-Hispanic white men from the US or Canada who reported ever having sex with a man. Of those included, 9,549 (87%) were non-Hispanic white, 530 (5%) were non-Hispanic black, and 900 (8%) were Hispanic. The demographic, behavioral, and reported HIV status characteristics of the participants are summarized in Table 1.

Overall Comparison of MSM by Race/Ethnicity

White men within the sample were significantly older than black or Hispanic men, and black men reported the lowest annual income, compared with Hispanics and whites. Participants

were categorized by number of lifetime male partners: 1–50, 51–500, and over 500 partners. Fewer black men reported more than 500 lifetime male sex partners than white or Hispanic men, but black men were significantly more likely than white (OR = 1.64, 99.9% CI 1.18–2.28) or Hispanic men (OR = 1.76, 99.9% CI 1.19–2.61) to report ever having sex with a woman. White and Hispanic men were significantly more likely than black men to self-identify as gay or homosexual.

HIV Testing by Race/Ethnicity

No significant racial/ethnic differences were seen in self-reported rates of HIV infection. Among the 79% of MSM who reported the results of an HIV test, 13.4% of white, 15.2% of black, and 14.2% of Hispanic MSM reported being HIV infected. Black men were least likely to have been tested for HIV and least likely to have answered the question. Thus, reported HIV status was unavailable for 28% of the black MSM respondents, the highest of any of the racial/ethnic groups represented in the sample. Regardless of race, men identifying as heterosexual or bisexual were less likely to report ever having had an HIV test than gay-identified men. Overall, 2,338 MSM (21%) reported having received definitive results from an HIV test within the past 90 days; of those, 11% responded that the results showed HIV infection.

Characteristics of the Last Sexual Encounter by Race and Ethnicity

Overall, 92% of survey respondents ($n = 10,082$) meeting inclusion criteria reported having sex in the 3 months prior to completing the questionnaire (Table 2). Black men were significantly more likely than white men (OR = 3.58, 99.9% CI 2.13–6.03) and Hispanic men (OR = 2.68, 99.9% CI 1.27–5.63) to report sex with a woman in the most recent single partner encounter; black men also had a higher proportion of non-main sexual partnerships than the other two racial/ethnic categories, and Hispanic men reported the highest proportion of multiple partner (three-way or group sex) encounters. White men were far more likely to report sex with a partner of the same race in the last sexual encounter than black (OR = 4.4, 99.9% CI 3.13–6.21) or Hispanic men (OR = 9.0, 99.9% CI 6.76–12.0).

When compared with white men, black men reported the least drug use prior to the last sexual encounter (OR 0.74, 99.9% CI 0.49–1.12), and Hispanic men reported the most (OR 1.18, 99.9% CI 0.90–1.56), but this did not meet the cutoff for statistical significance of 0.001. There were no statistically significant differences by race or ethnicity in alcohol use prior to the last sexual encounter. The rates of HIV disclosure were assessed only for those reporting one partner in the last encounter because of the potential for differential disclosure amongst multiple sex partners. Disclosure did not vary significantly by race/ethnic group or by HIV status but did occur more frequently with main partners than non-main partners.

Analysis for the prevalence of anal intercourse and UAI was limited to single partner encounters (Table 3). Rates of anal intercourse in the last sexual encounter were significantly higher in black (OR = 1.5, 99.9% CI 1.03–2.16) and Hispanic men (OR = 1.5, 99.9% CI 1.11–1.94) compared with white men. However, the inverse was seen for UAI, with black (OR = 0.6, 99.9% CI 0.36–0.91) and Hispanic men (OR = 0.7, 99.9% CI 0.52–1.04) less likely to report UAI than white men. UAI was not associated with partner type in the last sexual encounter, though black men reported more UAI with non-main partners than main partners. Frequency of HIV disclosure for those reporting UAI in the last sexual encounter did not differ by racial/ethnic group.

Predictors of Unprotected Anal Intercourse in the Last Sexual Encounter by Race/Ethnicity

Bivariate analyses were conducted for all MSM who reported any type of sex with a man in the past 3 months to determine potential predictors of UAI (Table 4). Race/ethnicity, age

over 40 years, having at least one lifetime female sex partner, reporting HIV-infection, and using drugs prior to the last sexual encounter were all significantly associated with UAI in the last sexual encounter. Being black, bisexually identified, and reporting sex with a non-main partner were associated with lower odds of UAI. Multivariate logistic regression was used to assess the relationship between UAI and variables shown to be significant in the bivariate analysis, associated with UAI in other studies, or likely to act as confounders (Table 4). Statistically significant predictors of UAI in the multivariate model were being HIV infected and having sex with a non-main partner. Similar trends were seen after stratifying for racial/ethnic group, but these analyses were limited by loss of sample size with the stratification, as only 157 black men and 317 Hispanic men were included in the final model (data not shown).

Discussion

In this analysis of combined data from two online surveys of MSM, we found significant differences between white, black, and Hispanic participants in demographic characteristics and sexual risk behaviors. These data support the argument that racial/ethnic behavioral differences must be taken into account when designing initiatives to reduce HIV risk, even if some data suggest that prevention message preferences, in terms of content, identification of credible sources, and level of sexual explicitness, are similar by race/ethnicity [22].

Of particular concern is the finding that black MSM respondents were significantly less likely to report HIV testing or to answer the question about their HIV status. Although most studies have not found significant differences in rates of HIV testing for black MSM vs. white MSM [3], the difference in testing rates observed in this study has also been seen in at least one other recent investigation [23]. Although data on HIV testing rates are mixed, black MSM are more likely to have undiagnosed HIV infection compared to white MSM [14]. This prior finding and the present results suggest that more HIV-positive black men surveyed were unaware of their status or unwilling to provide this information. Data show that HIV-positive men of color who are unaware of their HIV infection are more likely to engage in UAI than men who know they are HIV-infected [24]. Mathematical models, not limited to MSM of color, demonstrate that those unaware of their HIV infection may be responsible for a higher proportion of new HIV infections than those aware of their serostatus [15]. A recent investigation found that HIV-negative black MSM were more likely than white MSM to report UAI with partners of unknown HIV status [11]. Lower rates of HIV testing and diagnosis of HIV infection among black MSM in this sample may be secondary to lack of access to testing and health care [25, 26]. The ability of the online recruitment strategy used in this investigation to reach significant numbers of untested MSM of color highlights its potential utility in future prevention and testing initiatives and underscores the need to find better ways to engage these men online.

A previously published analysis from one of the internet studies presented in this paper found that men who screened positive for recent depressive symptoms and did not report treatment from a mental health provider were significantly more likely to have less education, be black or Hispanic, and were less likely to have a primary care provider, compared to men who screened positive and reported mental health treatment [27]. These findings indicate socioeconomic differences in access to care among MSM online. Men of color and men with low socioeconomic status who use the Internet may not otherwise have access to these types of services. Further, the Internet is an underutilized tool for providing HIV education and prevention materials and referrals to services, such as HIV testing and treatment [28–30].

Contrary to some prior studies of MSM, Hispanic men participating in these online studies were more similar to white men than black men in terms of sexual orientation, with more Hispanic men self-identifying as gay, and fewer reporting sex with women [31, 32]. A recent community-based survey lends support to these findings, reporting that Hispanic and white MSM scored higher on a scale that measured comfort with and attitudes towards homosexuality than black men scored [33], but other data show that Hispanics who experience “homonegativity” engage in riskier sexual behaviors than those who do not [34]. Hispanic men were also more similar to white men in HIV risk behavior, including multiple partners in the last sexual encounter and use of drugs before sex, both of which correlate with HIV transmission risk [3, 35, 36].

In this study, black and Hispanic MSM were more likely than white MSM to report anal intercourse in the last sexual encounter, though frequency of UAI was lower in these race/ethnic groups than in whites. This finding is consistent with some of the data from existing literature [2–4]. However, racial/ethnic concordance between partners in the last sexual encounter was much more common among white MSM, than black or Hispanic, which differs from some literature suggesting that black MSM were more likely to have black partners than white men were likely to have white partners [9]. It is possible that the online sampling undertaken in this investigation reached a different population than prior studies due to recruitment sites or other factors. In addition, a single sexual encounter may not be representative of participants’ usual sexual behavior.

The observation that risk for UAI was lower for MSM having sex with non-main partners argues that men may engage in lower risk behavior with people they do not know as well, and higher risk behavior with trusted partners. This has been seen in other groups of MSM [4, 37–39]. Of note, the self-reported prevalence found in this investigation (13.5% of those who reported HIV testing) was similar to self report results in another study which recruited MSM both on- and off-line: 16.3% for the sample recruited on-line and 11.6% for the sample recruited offline [40]. These self-reported prevalence estimates are higher than that found in a recent serosurvey of MSM participating in the National Health and Nutrition Examination Survey (9.1%)[41], and lower than that from a recent HIV surveillance report of MSM from 21 cities (19%) [42].

Online research has the advantage of collecting data from large and diverse samples of respondents in a confidential or anonymous manner, and may allow participants to disclose stigmatized practices more easily than in-person interviews [43]. This investigation includes data from over 10,000 MSM, most of whom were white. The proportion of black and Hispanic respondents was low relative to white participants; however, 530 black and 900 Hispanic MSM were included in the analysis, making the absolute sample size robust. Some limitations of this analysis stem from the online nature of the survey itself, which limits the investigator’s ability to ensure complete and accurate responses.

Limitations of the surveys used for this analysis include our inability to examine either the frequency of serodiscordant UAI or the prevalence of concurrent sexual partnerships by race/ethnicity. Although the high rates of UAI reported by HIV-infected study participants lead to questions regarding the HIV infection status of their partners, the statistical power to detect differences between racial/ethnic groups was limited by small subgroup sample size in the analysis of predictors of UAI stratified by sex partner HIV status. In addition, information about partner concurrency was not collected in either study. Since these were cross-sectional studies, we were unable to determine changes in patterns of sexual behavior over time, specifically regarding partner race and relationship status, disclosure and specific sexual acts. Since the completion of these two Internet studies, community-based studies have found higher rates of concurrent partnerships in networks of black MSM compared

with non-black MSM, suggesting that this behavior pattern deserves further exploration in online and offline surveys [10]. Finally, the fact that the surveys were not offered in Spanish may limit the generalizability of the findings to English-speaking Hispanic men.

This analysis provides insights into necessary components of target interventions for risk reduction in MSM seeking sex online. Reaching MSM of color online who have not been HIV tested is a potential new strategy for intervention in this hard-to-reach population. MSM who have had more than 100 lifetime sex partners, who have had sex with women, and who are HIV-positive should also be a priority for reducing HIV transmission risk. MSM who do not self-identify as gay, a phenomenon that was more prevalent amongst black MSM surveyed, may require different outreach techniques and prevention messages. Finally, interventions that address the need for protection even when having sex with a main partner are critical.

Our findings highlight the need to target HIV prevention efforts to MSM who visit social and sexual networking sites online. Data from the studies analyzed here can be used to design online HIV prevention interventions, which will make best use of this novel and important venue for delivering the next generation of behavioral interventions. The advantages of conducting online interventions include engaging untested, not recently tested, and HIV-positive MSM of color where they meet sex partners [30], reducing the stigma associated with HIV by enabling men to participate anonymously, and being cost-effective because of the ability to reach and potentially change HIV risk behaviors among a large population at relatively low cost [43, 44]. This investigation included a large number of untested MSM of color, and underscores the unique power of an online recruitment strategy to reach this lower income, at risk population, which may not be regularly accessing HIV testing or care.

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Table 1

Survey respondents' characteristics by race/ethnicity, limited to non-Hispanic white, non-Hispanic black, or Hispanic MSM from the USA or Canada (Internet samples, 2003–2004, and 2004–2005)

| Characteristic ^a | White men (n = 9,549) | Black men (n = 530) | Hispanic men (n = 900) | Chi square |
|---------------------------------|-----------------------|---------------------|------------------------|------------|
| Age | | | | |
| 18–29 yrs | 2,290 (24%) | 196 (38%) | 311 (35%) | 201.2*** |
| 30–39 yrs | 2,695 (29%) | 167 (32%) | 343 (39%) | |
| 40 yrs | 4,464 (47%) | 157 (30%) | 234 (26%) | |
| Individual annual income | | | | |
| < \$20,000 | 1,176 (13%) | 97 (20%) | 153 (19%) | 113.0*** |
| \$20–39,999 | 2,238 (26%) | 182 (37%) | 243 (30%) | |
| \$40–49,999 | 1,200 (14%) | 60 (12%) | 126 (15%) | |
| \$50–99,999 | 2,757 (31%) | 113 (23%) | 215 (26%) | |
| >\$100,000 | 1,427 (16%) | 35 (7%) | 84 (10%) | |
| Lifetime male sexual partners | | | | |
| 1–50 | 4,305 (45%) | 335 (63%) | 420 (47%) | 75.0*** |
| 51–500 | 3,749 (39%) | 161 (30%) | 352 (39%) | |
| >500 | 1,495 (16%) | 34 (6%) | 128 (14%) | |
| Lifetime female sexual partners | | | | |
| None | 3,671 (39%) | 146 (28%) | 358 (41%) | 101.9*** |
| 1–10 | 4,925 (52%) | 275 (53%) | 420 (48%) | |
| 11–100 | 756 (8%) | 81 (16%) | 91 (10%) | |
| >100 | 70 (0.7%) | 19 (4%) | 11 (1%) | |
| Sexual orientation | | | | |
| Gay/homosexual | 8,179 (86%) | 313 (61%) | 727 (82%) | 461.8*** |
| Bisexual | 1,173 (12%) | 140 (27%) | 129 (14%) | |
| Straight/heterosexual | 110 (1%) | 64 (12%) | 35 (4%) | |
| Reported HIV status | | | | |
| Positive | 1,011 (11%) | 58 (11%) | 100 (11%) | 25.2*** |
| Negative | 6,552 (69%) | 323 (61%) | 606 (67%) | |
| Never tested | 1,260 (13%) | 86 (16%) | 106 (12%) | |
| Did not answer | 726 (8%) | 63 (12%) | 88 (10%) | |

P < 0.001

^aTotals vary because of missing data

Table 2

Characteristics of the last sexual encounter (LSE), limited to 10,082 MSM meeting inclusion criteria who reported having sex in the 3 months prior to the survey (Internet samples, 2003–2004, and 2004–2005)

| Characteristic ^a | White men (<i>n</i> = 8,769) | Black men (<i>n</i> = 476) | Hispanic men (<i>n</i> = 837) | Chi square |
|---|-------------------------------|-----------------------------|--------------------------------|------------|
| Partner gender ^b | | | | |
| Male | 7,231 (96%) | 358 (87%) | 651 (95%) | 73.2*** |
| Female | 299 (4%) | 53 (13%) | 36 (5%) | |
| Partner type | | | | |
| Main | 3,047 (35%) | 137 (29%) | 259 (31%) | 21.9*** |
| Non-main | 4,458 (51%) | 276 (59%) | 423 (51%) | |
| Multiple | 1,189 (14%) | 58 (12%) | 147 (18%) | |
| Partner race/ethnicity same as respondent | 6,093 (82%) | 205 (51%) | 226 (34%) | 965.4*** |
| Alcohol prior to sex | 1,952 (23%) | 114 (25%) | 197 (24%) | 1.71 |
| Drugs prior to sex | 1,943 (22%) | 82 (18%) | 210 (25%) | 10.6** |
| Disclosed HIV status ^b | | | | |
| Total | 4,063 (63%) | 197 (56%) | 362 (62%) | 8.50* |
| of known HIV+ (<i>n</i> = 751) | 432 (67%) | 21 (50%) | 41 (60%) | 6.30* |
| HIV Disclosure by partner type ^b | | | | |
| With main | 1,602 (78%) | 67 (74%) | 145 (78%) | 2.35 |
| With non-main partner | 2,443 (57%) | 130 (49%) | 216 (53%) | 6.32* |

* $P < 0.05$,

** $P < 0.01$,

*** $P < 0.001$

^aTotals vary because of missing data

^bOnly assessed for non-multiple partnership types, i.e. encounters between two individuals, excluding three-way or group sex

Table 3

Prevalence of oral intercourse, anal intercourse, unprotected anal intercourse (UAI) in last sexual encounter (LSE) with a man and characteristics of that encounter, limited to non-multiple partnerships (Internet samples, 2003–2004, and 2004–2005)

| Characteristic ^a | White men (n = 7,139) | Black men (n = 353) | Hispanic men (n = 640) | Chi square P-value |
|---|-----------------------|---------------------|------------------------|-----------------------|
| Oral intercourse | | | | |
| Yes | 6,715 (94%) | 313 (89%) | 592 (93%) | 15.4 *** |
| No | 424 (6%) | 38 (11%) | 48 (7%) | |
| Anal intercourse | | | | |
| Yes | 3,885 (54%) | 226 (64%) | 407 (64%) | 30.6 *** |
| No | 3,252 (46%) | 127 (36%) | 233 (36%) | |
| Unprotected anal intercourse ^b | | | | |
| Yes | 2,275 (59%) | 100 (46%) | 207 (52%) | 23.1 *** |
| No | 1,568 (41%) | 120 (54%) | 194 (48%) | |
| UAI by partner type: | | | | |
| Main | 1,184 (52%) | 40 (40%) | 112 (54%) | 6.07 * |
| Non-main | 1,091 (48%) | 60 (60%) | 95 (46%) | |
| HIV disclosure (if UAI) | | | | |
| Yes | 1,327 (70%) | 53 (63%) | 121 (71%) | 1.94 |
| No | 566 (30%) | 31 (37%) | 50 (29%) | |

* $P < 0.05$,

*** $P < 0.001$

^aTotals vary because of missing data

^bOf those reporting anal intercourse only

Table 4

Bivariate and multivariate analysis of predictors for unprotected anal intercourse during the last sexual encounter with a man among men reporting sex in the last 3 months. Multiple partnerships in the last sexual encounter were excluded (Internet samples, 2003–2004, and 2004–2005)

| Predictor | Bivariate | | Multivariate (<i>n</i> = 3,507) | |
|-------------------------------------|-------------|------------------|----------------------------------|------------------|
| | OR | 99.9% CI | AOR | 99.9% CI |
| Race/Ethnicity | | | | |
| Non-Hispanic white | Ref | | Ref | |
| Non-Hispanic black | 0.57 | 0.36–0.91 | 0.76 | 0.42–1.36 |
| Hispanic | 0.74 | 0.52–1.04 | 0.78 | 0.52–1.19 |
| Age | | | | |
| 18–29 years | Ref | | Ref | |
| 30–39 years | 1.18 | 0.92–1.53 | 1.02 | 0.74–1.41 |
| 40 years | 1.36 | 1.06–1.74 | 1.10 | 0.79–1.52 |
| Over 100 lifetime male sex partners | 1.19 | 0.97–1.46 | 1.30 | 0.99–1.70 |
| 1 Lifetime female sex partners | 1.22 | 1.00–1.50 | 1.18 | 0.91–1.53 |
| Sexual identity | | | | |
| Gay | Ref | | Ref | |
| Bisexual | 0.66 | 0.54–0.80 | 0.93 | 0.62–1.40 |
| Straight | 0.90 | 0.33–2.42 | 2.48 | 0.31–19.8 |
| HIV status | | | | |
| HIV-negative | Ref | | Ref | |
| HIV-positive | 2.05 | 1.47–2.87 | 2.35 | 1.59–3.47 |
| Never HIV tested | 0.81 | 0.59–1.18 | 0.91 | 0.61–1.36 |
| Non-main partner in LSE | 0.29 | 0.24–0.37 | 0.22 | 0.17–0.30 |
| Drug use prior to LSE | 1.35 | 1.06–1.72 | 1.32 | 0.84–1.42 |
| Disclosed to partner prior to LSE | 0.86 | 0.68–1.08 | 1.09 | 0.84–1.42 |

OR odds ratio, AOR adjusted odds ratio, CI confidence interval, ref reference group. Bold numbers are significant at $P < 0.001$