Published in final edited form as:

J Am Coll Health. 2014 October ; 62(7): 450–460. doi:10.1080/07448481.2014.917654.

Correlates of HIV/STI Testing and Disclosure Among HIV-Negative Collegiate Men Who Have Sex With Men

J. Michael Wilkerson¹, Erika L. Fuchs², Sonya S. Brady², Rhonda Jones-Webb², and B. R. Simon Rosser²

¹The University of Texas Health Science Center at Houston (UTHealth) School of Public Health, Houston Texas

²University of Minnesota School of Public Health, Minneapolis, Minnesota

Abstract

Objective—Determine the extent to which personal, behavioral, and environmental factors are associated with HIV/STI testing and disclosure.

Participants—930 HIV-negative collegiate men who have sex with men (MSM) who completed an online survey about alcohol use and sexual behavior.

Methods—Correlates of testing and disclosure significant in bivariate analyses ($p < 0.05$) were grouped into personal, behavioral, or environmental factors and entered into multivariable logistic regression models.

Results—About half of participants tested for HIV (51.9%) and for STIs (45.8%) at least annually. Over half (57.8%) of participants always/almost always discussed HIV status with new sex partners; 61.1% with new unprotected sex partners. Personal and behavioral factors (age and outness) explained differences in testing, and the behavioral factor (routine testing) explained differences in disclosure.

Conclusions—Collegiate MSM should be supported in coming out, encouraged to engage in routine testing, and counseled on discussing HIV/STI status with potential sex partners.

Keywords

gay men; health education; HIV prevention; sexual behavior; social cognitive theory

INTRODUCTION

The National HIV/AIDS Strategy¹ and the CDC's High-Impact HIV Prevention Plan² promote routine testing among sexually active men who have sex with men (MSM). It is hoped that MSM who know their HIV status will more accurately disclose their status to sex

For comments and further information, address correspondence to J. Michael Wilkerson, PhD, MPH, The University of Texas Health Science Center at Houston (UTHealth) School of Public Health, 7000 Fannin, Suite 2620, Houston, TX, USA (Johnny.M.Wilkerson@uth.tmc.edu).

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

partners, and if diagnosed with HIV, begin antiretroviral therapy, thus reducing their risk of transmitting the virus to others and reducing the community's viral load. Approximately three-quarters of U.S. MSM appear to have ever been tested for HIV,^{3,4} half of MSM appear to test at least annually.^{5,6} With the recent trend toward a higher incidence of HIV cases among young MSM,⁷ it is necessary to increase the number of young MSM—including the men on U.S. college campuses—who engage in routine testing and share test results with potential sex partners. To improve the efforts of college health professionals who encourage MSM to engage in routine testing and partner communication, we need a better understanding of factors contributing to routine testing and disclosure.

Social cognitive theory^{8,9} suggests people engage in desired health behaviors when environmental and personal factors support the enactment of the behavior. Previous studies of HIV/STI testing and disclosure among U.S. MSM support social cognitive theory. Routine testing and disclosure is more likely to occur when there is less social stigma related to sexual orientation^{5,10–12} or living with HIV,¹³ greater involvement with the gay community,¹⁴ more satisfaction with social support,¹⁵ and having a healthcare provider willing to have open, nonjudgmental discussions about same-gender sexual behavior.^{16–18} Whether similar variables are correlated with HIV/STI testing and disclosure among collegiate MSM is unclear. To date, there have been no published studies of factors associated with HIV/STI testing and disclosure among collegiate MSM. Thus, in this manuscript we identify factors associated with routine HIV/STI testing and disclosure among HIV-negative collegiate MSM between the ages of 18–24. Grounded in social cognitive theory, we explore how personal, environmental, and behavioral factors contribute to routine HIV/STI testing and disclosure.

METHODS

Study Design

In 2008, we began a four-wave prospective study of MSM in 16 U.S. metropolitan statistical areas (MSAs). In the fourth wave, participants were asked to identify if they were students. Those who indicated they were students were asked questions about academic classification, enrollment status, and institution type. Thus, data for this analysis came from the fourth wave of data collection.

Participants were recruited between May 20, 2011 and December 26, 2011 with geo-targeted banner advertisements to adult male members of Facebook (<http://www.facebook.com>) who self-identified as attracted to men and to men who frequented websites affiliated with the Gay Ad Network.¹⁹ Banner advertisements and emails directed interested persons to a webpage hosted on a dedicated university server with appropriate encryption to ensure data security. Eligibility criteria included being a man having prior sexual experience with a man, being 18 years or older, and reporting a residential zip code in a MSA under study.

For this analysis, we restricted the sample to the 930 MSM who indicated that they were HIV-negative and a student. Participants were compensated \$30 for their time. A Certificate of Confidentiality was obtained from the National Institutes of Health. We conducted the

study under the oversight of The University of Texas Health Science Center at Houston (UTHealth) Committee for the Protection of Human Subjects. A “refuse to answer” response option allowed participants to opt out of answering any item.

Measures

Our outcome measures included testing for HIV and other STIs in the past year and discussing HIV status with protected and unprotected male sex partners prior to anal intercourse. Explanatory measures included items we conceptualized as measuring personal, environmental, or behavioral determinants of testing and disclosure of HIV status. The items we used are described below.

Outcome Measures

HIV/STI testing: Two items were used to measure testing behavior. One item asked how often participants test for HIV and another item asked how often they test for STIs. Response options included once a month, once every 3 months, twice per year, once a year, once every couple of years, less than once every couple of years, and never/I have never been tested for HIV(or STIs). For this analysis, we collapsed responses into two groups, those who test at least yearly and those who do not test yearly. The CDC and the U.S. Preventative Services Task Force recommend that persons at high risk of HIV, including MSM, test at least annually.^{20,21}

Disclosure of HIV status with male sex partners: One item asked participants to think about the times they had protected anal sex (anal sex with condoms) in the past three months, and to select a response that best reflected how often they told their sex partner(s) their HIV status. Response options included never (0% of the time), rarely (1–24% of the time), sometimes (25–49% of the time), frequently (50–74% of the time), and almost always or always (75–100% of the time). A “not applicable” option was included for participants who had not had protected anal sex in the previous three months. A parallel item asked participants about disclosure of HIV status to male sex partners with whom they had unprotected anal sex (anal sex without condoms).

Personal Measures

Student status: One item asked participants to indicate academic classification (freshman, sophomore, junior, senior, or graduate student), and one item asked participants to indicate enrollment status (full-time or part-time).

Internalized homonegativity: We measured internalized homonegativity using Smolenski, Diamond, Ross, and Rosser’s²² Revised Reactions to Homosexuality Scale. Responses to the seven 7-point Likert-type questions ranged from strongly disagree to strongly agree and included three constructs: personal comfort with being gay (two items), public identification as gay (three items), and social comfort with gay men (two items). A higher score indicated greater internalized homonegativity (i.e., less comfort and public identification as gay). The Cronbach’s alpha for the entire scale was 0.74.

Outness: Participants were asked to respond to one 5-point Likert-type item that asked them to indicate how open (out) they were to others as gay, bisexual, or a man attracted to other men. Responses ranged from not at all open (out) to open (out) to all or almost all people I know. A higher score indicated greater outness.

Demographic characteristics: Participants were asked their age and race/ethnicity. Based on the response pattern, we collapsed the race/ethnicity responses into Black, Hispanic, White, and other. Participants were also asked to indicate their sexual identity; responses were collapsed into gay, bisexual, and other.

Environmental Measures

Institution type: One item asked participants to indicate whether they were attending a community college, technical college, business school, liberal arts college, state university, or private university. Because of a limited number of responses from participants attending community college, technical college, or business school, we collapsed these participants into one category. Conceptually, we were comfortable collapsing these institution types into one category because they primarily award associate degrees.

Community's population density: One item asked participants to indicate whether they lived in a rural or urban community.

Community's acceptance of homosexuality: Participants rated community acceptance of homosexuality using a 5-point Likert scale ranging from 1=very hostile to 5=very accepting. Ratings were averaged across seven items to create a composite score; items included perceived acceptance by friends, family members, co-workers, and individuals within one's neighborhood, city, state, and the United States. Thus, "community" was assessed from a broad, social-ecological perspective. A higher score indicated higher perceived community acceptance of homosexuality. The Cronbach's alpha for the composite score was 0.69.

Behavioral Measure

Number of male sex partners: A sexual behavior battery investigated sexual risk behavior. Participants were asked to report the number of male sex partners in the last 3 months and, of those, the number with whom they had protected and unprotected anal intercourse.

Data Analysis

To identify personal, environmental, and behavioral correlates of HIV/STI testing and disclosure, we first examined bivariate associations between each of our outcomes and explanatory variables using Student's t, Pearson's chi-square, and Fisher's exact tests. Variables that were statistically significant ($p < 0.05$) were included in multivariable logistic regression models. We used post-estimation tests to determine if there were differences between the linear relationships of the personal, environmental, or behavioral groups and HIV/STI testing and disclosure. STATA-IC version 12.1²³ was used for all analyses.

RESULTS

Participant characteristics are summarized in Table 1. The mean age of participants was 20.7 years. The majority of participants was White (72.2%), undergraduates (87.4%), and enrolled full-time in college (85.6%). Most participants indicated they were gay (86.9%). On average, participants had low internalized homonegativity ($M=2.4$ on a 7-point scale) and were relatively out ($M=4.2$ on a 5-point scale). The majority of participants attended a four-year institution (76.6%) and lived in an urban environment (70.9%). Perceived acceptance of homosexuality was moderate ($M=3.7$ on a 5-point scale). Approximately half of participants tested for HIV (51.9%) and STIs (45.8%) at least once per year. More than half of participants indicated they almost always or always disclosed their HIV status with protected (57.8%) and/or unprotected (61.1%) sex partners. Participants had more protected sex partners within the last three months ($M=1.1$) than unprotected sex partners ($M=0.7$).

We used results of bivariate analyses to determine which participant characteristics to include as explanatory variables in multivariable logistic regression models. In Table 2, we summarize results of bivariate analyses examining differences between participants who tested at least yearly for HIV/STIs and participants who did not test at least yearly. In Table 3, we summarize results of bivariate analyses examining differences between participants who disclosed their HIV status to sex partners and participants who did not disclose. Based on statistically significant p-values, we selected age, internalized homonegativity, and outness to comprise the personal factor, community's population density and community's acceptance of homosexuality to comprise the environmental factor, and the number of protected and unprotected male anal sex partners in the last three months to comprise the behavioral factor. Number of unprotected male anal sex partners in the last 3 months did not statistically differ between participants who did or did not test yearly or did or did not discuss HIV status with sex partners. Nonetheless, from a conceptual standpoint we believed it important to retain this variable in the multivariable regression models; unprotected anal sex is a known risk factor for HIV transmission. Because we hypothesized that frequency of HIV/STI testing would be correlated with disclosure, in the multivariable regression models predicting disclosure we additionally included testing in the behavioral factor.

By grouping determinants according to overarching constructs of social cognitive theory, we were able to examine the extent to which the collegiate MSM in our sample differed in HIV/STI testing and disclosure by selected personal, environmental, and behavioral characteristics. Differences between participants who did or did not test yearly for HIV/STIs could be understood by examining the groups of personal variables ($X^2_{HIV\ Testing} < 0.001$; $X^2_{STI\ Testing} = 0.001$) and behavioral variables ($X^2_{HIV\ Testing} < 0.001$; $X^2_{STI\ Testing} < 0.001$; see Table 4). Among the personal variables, greater age and outness increased the odds of testing yearly for HIV/STIs. Among the behavioral variables, the number of protected male sex partners increased the odds of yearly testing. Environmental determinants did not explain testing in multivariable regression models. Differences between participants who discuss their HIV status with sex partners could be understood by examining behavioral variables ($X^2_{Protected} < 0.001$; $X^2_{Unprotected} < 0.001$; see Table 5). Specifically, the odds of disclosing HIV status were greater for participants who were tested yearly for STIs than for participants who were not tested yearly for STIs. This was true for disclosure to both

protected and unprotected sex partners. Personal and environmental determinants did not explain disclosure in multivariable regression models.

COMMENT

Similar to findings from studies that did not limit their sample to collegiate MSM,^{5,6} approximately half of our sample reported testing for HIV/STIs at least once per year. Slightly more than half reported that they almost always or always disclosed their HIV status to protected and/or unprotected sex partners. Thus, it appears nearly half of sexually active collegiate MSM are not testing regularly or disclosing their HIV status. There is a need for college health professionals to identify new methods to increase the proportion of collegiate MSM who regularly test and disclose their status to sex partners.

Personal and behavioral factors (age and outness) best explained differences in testing, and the behavioral factor (routine testing) best explained differences in disclosure of HIV status to new sex partners. With increasing age, MSM typically have less internalized homonegativity and are more out.^{24,25} The degree to which MSM experience internalized homonegativity and are out has been shown to influence their willingness to access HIV testing services.²⁶

While we found a community's perceived acceptance of homosexuality to be associated with a greater likelihood of HIV status disclosure to unprotected sex partners in bivariate analyses, we found no association between perceived acceptance and testing or disclosure in multivariable regression analyses. The broader conceptualization of community in our measure of perceived acceptance, combined with our multivariable regression approach, might explain the lack of significance. Another explanation for the lack of significance might be that our sample included MSM from supportive campus environments.

Social cognitive theory posits that the personal and behavioral factors best explain the enactment of health behaviors when the environment also supports the enactment of the health behaviors. The majority of participants in our sample, regardless of testing frequency, lived in an urban environment and reported a relatively high acceptance of homosexuality in their community, so it is perhaps less surprising that the environmental factor was not significant in multivariable analyses. An accepting environment is nevertheless important because of its probable influence on internalized homonegativity and outness.^{5,10–12,26} Thus, university policies and data collection forms that are inclusive of LGBT identities, LGBT-friendly student organizations, ally programs, and faculty and staff cultural competency training programs remain important because they can influence a campus community's acceptance of homosexual students.

In multivariable analyses, a greater number of protected sex partners increased the odds of testing within the last year, but not disclosure. It could be that MSM who had sex with multiple protected partners were particularly concerned about preventing infections and monitoring their HIV/STI status, but did not link this concern to a need to communicate test results to sex partners. Of note, yearly testing for STIs *was* associated with greater likelihood of discussing HIV with both protected and unprotected partners. It is possible that testing procedures included conversations with health care providers that prompted greater

communication with sex partners about HIV status. Future research should explore the direction of associations between motivations to test and disclosure of status to partners.

Limitations

There are limitations to this study. First, because this analysis used cross-sectional data, we were limited in our ability make temporal inferences. With longitudinal data, we would, for example, be better equipped to comment on the role of environment on internalized homonegativity and outness. Second, in this study, we relied on self-reported data and we did not assess for social desirability, requiring us to assume participants reported their sexual encounters accurately. Limiting this analysis to participants who met someone online for sex in the last 90-days minimized recall error, increasing the accuracy of the self-reported data. Third, in this analysis we did not examine the role of sexual position (e.g., insertive or receptive partner) on testing and disclosure behavior. Preferred sexual position could influence the frequency of these behavior because some MSM might assume they are at less risk of infection when only having insertive anal sex{Holt, 2011 #8161}.²⁷ Fourth, because data were collected from a non-random online sample of MSM, the generalizability to other online samples, offline samples of MSM, or all MSM should not be assumed.

Implications

Our findings have implications for campus administrators, health practitioners, and college health researchers. Administrators should strive to create an LGBT-friendly campus environment that reduces internalized homonegativity and allows MSM who are open about their same-gender attraction to feel safe. For persons in administration, this could mean advocating for policies and forms inclusive of LGBT identities, the formation of LGBT and ally-friendly campus organizations, and the implementation of cultural competency trainings. For health practitioners, it appears critical to create a clinical environment that allows MSM to be open with their healthcare providers about their sexual behavior. Health practitioners should promote routine HIV and STI testing to collegiate MSM using the most sensitive testing methods available and test sites (e.g., urethral, rectal, and pharyngeal) based on exposures. When discussing lab results, health practitioners should encourage communication with potential sex partners about HIV/STI status and safer sex prior to initiating sexual activity. As previously mentioned, college health researchers should examine temporal associations between motivations to test routinely, intentions to discuss recent lab results with potential sex partners, and reported disclosure. The influence of campus environment on internalized homonegativity and outness should also be examined.

Conclusions

Conceptualizing determinants of HIV/STI testing and disclosure within overarching constructs of social cognitive theory provides a macro view of factors contributing to testing and disclosure by collegiate MSM. Personal and behavioral variables are most strongly associated with routine testing, and behavioral variables—routine HIV/STI testing in particular—are most strongly associated with disclosure of HIV status to potential sex partners. The influence of environment should not be ignored because a campus and community environment's acceptance of homosexuality could influence the extent to which MSM experience internalized homonegativity and are out to others about their same-gender

attraction. College health practitioners should encourage MSM on their campus to engage in routine HIV/STI testing and when delivering lab results, counsel patients on how to discuss HIV/STI status with potential sex partners.

Acknowledgments

FUNDING

The *Structural Interventions to Lower Alcohol Related STI/HIV risk (SILAS)* study was funded by the National Institute on Alcohol Abuse and Alcoholism, funding number R01AA016270-01A1. All research was carried out with the approval of the University of Minnesota Institutional Review Board.

References

1. The White House Office of National AIDS Policy. National HIV/AIDS strategy: Federal implementation plan. Washington D.C.: 2010.
2. Center for Disease Control and Prevention. High-impact HIV prevention: CDC's approach to reducing HIV infections in the United States. Atlanta, GA: Center for Disease Control and Prevention; 2011.
3. Sifakis F, Hylton J, Flynn C, et al. Prevalence of HIV infection and prior HIV testing among young men who have sex with men. The Baltimore young men's survey. *AIDS Behav.* 2010; 14(4):904–912. [PubMed: 17968648]
4. Wilkerson JM, Smolenski DJ, Horvath KJ, Danilenko GP, Rosser BRS. Online and offline sexual health-seeking patterns by HIV-negative men who have sex with men. *AIDS Behav.* 2010; 14(6): 1362–1370. [PubMed: 20799060]
5. Parent MC, Torrey C, Michaels MS. "HIV testing is so gay": The role of masculine gender role conformity in HIV testing among men who have sex with men. *J Couns Psychol.* 2012; 59(3):465–470. [PubMed: 22774868]
6. Manning S, Thorpe L, Ramaswamy C, et al. Estimation of HIV prevalence, risk factors, and testing frequency among sexually active men who have sex with men, aged 18–64 years—New York City, 2002. *J Urban Health.* 2007; 84(2):212–225. [PubMed: 17295058]
7. Centers for Disease Control and Prevention. HIV surveillance report. 2010; 2012:21. http://www.cdc.gov/hiv/surveillance/resources/reports/2010report/pdf/2010_HIV_Surveillance_Report_vol_22.pdf. Accessed February 18, 2013.
8. Bandura, A. Social foundations of thought and action. Englewood Cliffs, NJ: Prentice Hall; 1986.
9. Bandura A. Social cognitive theory: An agentic perspective. *Asian J Soc Psychol.* 1999; 2(1):21–41.
10. Wong FY, Nehl EJ, Han JJ, et al. HIV testing and management: Findings from a national sample of Asian/Pacific islander men who have sex with men. *Public Health Rep.* 2012; 127(2):186–194. [PubMed: 22379218]
11. Millett GA, Ding H, Marks G, et al. Mistaken assumptions and missed opportunities: correlates of undiagnosed HIV infection among black and Latino men who have sex with men. *J Acquir Immune Defic Syndr.* 2011; 58(1):64–71. [PubMed: 21654500]
12. Dodge B, Jeffries WL, Sandfort TG. Beyond the down low: Sexual risk, protection, and disclosure among at-risk Black men who have sex with both men and women (MSMW). *Arch Sex Behav.* Oct; 2008 37(5):683–696. [PubMed: 18512140]
13. Adam BD, Murray J, Ross S, Oliver J, Lincoln SG, Rynard V. Hivstigma.com, an innovative web-supported stigma reduction intervention for gay and bisexual men. *Health Educ Res.* 2011; 26(5): 795–807. [PubMed: 21242322]
14. Garcia LI, Lechuga J, Zea MC. Testing comprehensive models of disclosure of sexual orientation in HIV-positive Latino men who have sex with men (MSM). *AIDS Care.* 2012; 24(9):1087–1091. [PubMed: 22690708]
15. Beltran ED, Ostrow DG, Joseph JG. Predictors of sexual behavior change among men requesting their HIV-1 antibody status: The Chicago MACS/CCS cohort of homosexual/bisexual men, 1985–1986. *AIDS Educ Prev.* 1993; 5(3):185–195. [PubMed: 8217471]

16. Prestage GP, Hudson J, Jin F, et al. Testing for HIV and sexually transmissible infections within a mainly online sample of gay men who engage in group sex. *Sex Transm Infect.* 2009; 85(1):70–74. [PubMed: 19164606]
17. Wall KM, Khosropour CM, Sullivan PS. Offering of HIV screening to men who have sex with men by their health care providers and associated factors. *J Int Assoc Physicians AIDS Care.* 2010; 9(5):284–288.
18. Bernstein KT, Liu KL, Begier EM, Koblin B, Karpati A, Murrill C. Same-sex attraction disclosure to health care providers among New York City men who have sex with men: Implications for HIV testing approaches. *Arch Intern Med.* 2008; 168(13):1458–1464. [PubMed: 18625927]
19. Quantcast Corporation. Gay Ad Network. n.d.; www.quantcast.com. Accessed September 23, 2010
20. Center for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR.* 2006; 55(RR-14):1–17.
21. Moyer V. Screening for HIV: U.S. Preventative Services Task Force recommendation statement. *Ann Intern Med.* 2013
22. Smolenski DJ, Diamond PM, Ross MW, Rosser BRS. Revision, criterion validity, and multigroup assessment of the reactions to homosexuality scale. *J Pers Assess.* 2010; 92(6):568–576. [PubMed: 20954058]
23. STATA-IC[computer program]. Version 12.1. College Station, TX: StataCorp LP; 2012.
24. Ross MW, Rosser BR, Neumaier ER. The relationship of internalized homonegativity to unsafe sexual behavior in HIV-seropositive men who have sex with men. *AIDS Educ Prev.* Dec; 2008 20(6):547–557. [PubMed: 19072529]
25. Ross MW, Rosser BRS. Measurement and correlates of internalized homophobia: A factor analytic study. *J Clin Psychol.* 1996; 52(1):15–21. [PubMed: 8682906]
26. Ross MW, Berg RC, Schmidt AJ, et al. Internalised homonegativity predicts HIV-associated risk behavior in European men who have sex with men in a 38-country cross-sectional study: Some public health implications of homophobia. *BMJ Open.* 2013
27. Holt, M.; Ellard, J. HIV risk reduction strategies among gay men: A literature review. Newtown, New South Wales: Australian Federation of AIDS Organizations; 2011.

Table 1

Participant characteristics (N=930)

<i>Personal</i>	
	<u>n (%)</u>
Race/Ethnicity	
Black	29 (3.2)
Hispanic	133 (14.7)
White	653 (72.2)
Other	90 (9.9)
Academic classification	
Freshman	115 (16.2)
Sophomore	142 (20.0)
Junior	167 (23.6)
Senior	196 (27.6)
Graduate student	89 (12.6)
Enrollment status	
Full-time	793 (85.6)
Part-time	133 (16.4)
Sexual identity	
Gay	807 (86.9)
Bisexual	91 (9.8)
Other	<u>31 (3.3)</u>
	<u>mean (SD)</u>
Age	20.7 (1.8)
Internalized homonegativity	2.4 (1.0)
Outness	4.2 (1.1)
<i>Environmental</i>	
	<u>n (%)</u>
Institution type	
Community college/technical or business school	213 (23.4)
Liberal arts college	89 (9.8)
State university	433 (47.5)
Private university	176 (19.3)
Community's population density	
Rural	271 (29.1)
Urban	<u>659 (70.9)</u>
	<u>mean (SD)</u>
Community's acceptance of homosexuality	3.7 (0.6)
<i>Behavioral</i>	
	<u>n (%)</u>

<i>Personal</i>	
Frequency of HIV testing	
Once a month	23 (2.5)
Once every 3 months	127 (13.7)
Twice per year	158 (17.1)
Once a year	172 (18.6)
Once every couple of years	73 (7.9)
Less than once every couple of years	52 (5.6)
Never, I have never been tested for HIV	321 (34.7)
Frequency of STI testing	
Once a month	22 (2.4)
Once every 3 months	98 (10.6)
Twice per year	136 (14.7)
Once a year	168 (18.1)
Once every couple of years	74 (8.0)
Less than once every couple of years	53 (5.7)
Never, I have never been tested for STIs	375 (40.5)
Frequency of HIV status disclosure to protected sex partners	
Never (0%)	55 (19.2)
Rarely (1–24%)	22 (7.7)
Sometimes (25–49%)	23 (8.0)
Frequently (50–74%)	21 (7.3)
Always or almost always (75–100%)	166 (57.8)
Frequency of HIV status disclosure to unprotected sex partners	
Never (0%)	65 (21.4)
Rarely (1–24%)	14 (4.6)
Sometimes (25–49%)	16 (5.2)
Frequently (50–74%)	24 (7.8)
Always or almost always (75–100%)	<u>187 (61.1)</u>
	<u>mean (SD)</u>
No. protected male anal sex partners last 3 months	1.1 (2.1)
No. unprotected male anal sex partners last 3 months	0.7 (2.4)

Note: Differences in values are the result of missing data. Frequency of HIV status disclosure to protected and unprotected sex partners were calculated based on those who engaged in the behaviors within the last 3 months.

Table 2
Differences in person, environment, and behavior variables between participants who were tested for HIV/STI

	Tested yearly for HIV (n=480)			Tested yearly for STI (n=424)		
	Yes n (%)	No n (%)	p	Yes n (%)	No n (%)	p
<i>Personal</i>						
Race/Ethnicity			0.839			0.704
Black	16 (3.4)	13 (3.0)		14 (3.4)	15 (3.1)	
Hispanic	67 (14.4)	66 (15.1)		61 (14.8)	72 (14.6)	
White	334 (71.5)	319 (72.8)		292 (70.7)	361 (73.4)	
Other	50 (10.7)	40 (9.1)		46 (11.1)	44 (8.9)	
Academic classification			0.017			0.176
Freshman	51 (13.9)	64 (18.8)		51 (16.0)	64 (16.4)	
Sophomore	67 (18.2)	75 (22.0)		56 (17.6)	86 (22.1)	
Junior	92 (25.0)	75 (22.0)		74 (23.2)	93 (23.9)	
Senior	99 (26.9)	97 (28.5)		88 (27.6)	108 (27.7)	
Graduate student	59 (16.0)	30 (8.8)		50 (16.7)	39 (10.0)	
Enrollment status			0.234			0.115
Full-time	403 (84.3)	390 (87.1)		353 (83.7)	440 (87.3)	
Part-time	75 (15.7)	58 (13.0)		69 (16.4)	64 (12.7)	
Sexual identity			0.166			0.526
Gay	426 (88.8)	381 (84.9)		371 (87.5)	436 (86.3)	
Bisexual	42 (8.8)	49 (10.9)		42 (9.9)	49 (9.7)	
Other	12 (2.5)	19 (4.2)		11 (2.6)	20 (4.0)	
Age	mean (SD)	No mean (SD)	p	Yes mean (SD)	No mean (SD)	p
Age	21.0 (0.1)	20.4 (0.1)	0.000	20.9 (0.1)	20.5 (0.1)	0.000
Internalized homonegativity	2.2 (0.0)	2.5 (0.0)	0.002	2.2 (0.0)	2.5 (0.0)	0.001
Outness	4.4 (0.0)	4.1 (0.1)	0.000	4.4 (0.0)	4.1 (0.1)	0.000

	Tested yearly for HIV (n=480)		Tested yearly for STI (n=424)	
	Personal			
	Environmental			
	Yes n (%)	No n (%)	Yes n (%)	No n (%)
			p	p
Institution type			0.564	0.388
Community college/technical or business school	109 (23.3)	104 (23.4)	102 (24.7)	111 (22.3)
Liberal arts college	41 (8.8)	48 (10.8)	39 (9.4)	50 (10.4)
State university	220 (47.1)	213 (48.0)	185 (44.8)	248 (49.8)
Private university	97 (20.8)	79 (17.8)	87 (21.0)	89 (17.9)
Community's population density			0.045	0.002
Rural	126 (26.3)	145 (32.2)	102 (24.1)	169 (33.4)
Urban	354 (73.8)	305 (67.8)	322 (75.9)	337 (66.6)
Community's acceptance of homosexuality	Yes mean (SD)	No mean (SD)	Yes mean (SD)	No mean (SD)
	3.7 (0.0)	3.7 (0.0)	3.8 (0.0)	3.7 (0.0)
			0.402	0.100
	Behavioral			
	Yes mean (SD)	No mean (SD)	Yes mean (SD)	No mean (SD)
			p	p
No, protected male anal sex partners last 3 months	1.5 (0.1)	0.7 (0.1)	1.6 (0.1)	0.7 (0.1)
No, unprotected male anal sex partners last 3 months	0.8 (0.1)	0.6 (0.1)	0.8 (0.1)	0.6 (0.1)
			0.000	0.000
			0.142	0.111

Note: Fisher's exact tests were used when expected cell sizes of categorical values were below 5, otherwise statistical significance was calculated using Pearson's chi-square tests. A total of 397 of the participants tested annually for HIV and STIs.

Table 3

Differences in person, environment, and behavior variables between participants who discussed HIV status with sex partners

	Discuss HIV status with protected sex partners in last 3 months (n=471)				Discuss HIV status with unprotected sex partners in last 3 months (n=394)			
	Personal		p		Yes		No	
	Yes n (%)	No n (%)	p		Yes n (%)	No n (%)	p	
Race/Ethnicity			0.891				0.828	
Black	15 (3.3)	4 (3.2)			9 (2.3)	3 (2.6)		
Hispanic	69 (15.1)	21 (16.7)			59 (15.4)	21 (18.1)		
White	329 (72.0)	87 (69.1)			280 (72.9)	80 (69.0)		
Other	44 (9.6)	14 (11.1)			36 (9.4)	12 (10.3)		
Academic classification			0.019				0.114	
Freshman	52 (14.7)	22 (22.7)			43 (15.1)	22 (23.9)		
Sophomore	58 (16.4)	24 (24.7)			48 (16.8)	21 (22.8)		
Junior	96 (27.1)	22 (22.7)			76 (26.7)	22 (23.9)		
Senior	98 (27.7)	24 (24.7)			35 (12.3)	20 (21.7)		
Graduate student	50 (14.1)	5 (5.2)			83 (29.1)	7 (7.6)		
Enrollment status			0.737				0.485	
Full-time	398 (85.0)	109 (83.9)			323 (82.4)	103 (85.1)		
Part-time	70 (15.0)	21 (16.2)			69 (17.6)	18 (14.9)		
Sexual identity			0.089				0.139	
Gay	398 (84.5)	117 (90.7)			342 (86.8)	110 (91.7)		
Bisexual	56 (11.9)	7 (5.4)			42 (10.7)	6 (5.0)		
Other	17 (3.6)	5 (3.9)			10 (2.5)	4 (3.3)		
Age	Yes mean (SD)	No mean (SD)	p		Yes mean (SD)	No mean (SD)	p	
Internalized homonegativity	20.8 (0.1)	20.3 (0.1)	0.005		20.8 (0.1)	20.2 (0.2)	0.000	
Outness	2.3 (0.0)	2.3 (0.1)	0.601		2.3 (0.1)	2.2 (0.1)	0.617	
	4.2 (0.1)	4.3 (0.1)	0.277		4.3 (0.1)	4.3 (0.1)	0.825	

	Discuss HIV status with protected sex partners in last 3 months (n=471)		Discuss HIV status with unprotected sex partners in last 3 months (n=394)			
	Personal					
	Environmental					
	Yes n (%)	No n (%)	p	Yes n (%)	No n (%)	p
Institution type			0.101			0.336
Community college/technical or business school	111 (24.2)	32 (25.0)		104 (27.1)	28 (23.9)	
Liberal arts college	39 (8.5)	18 (14.1)		25 (6.5)	12 (10.3)	
State university	209 (45.5)	60 (46.9)		178 (46.4)	59 (50.4)	
Private university	100 (21.8)	18 (14.1)		77 (20.1)	18 (15.4)	
Community's population density			0.244			0.045
Rural	138 (29.3)	45 (34.6)		112 (28.4)	46 (38.0)	
Urban	333 (70.7)	85 (65.4)		282 (71.6)	75 (62.0)	
	Yes mean (SD)	No mean (SD)	p	Yes mean (SD)	No mean (SD)	p
Community's acceptance of homosexuality	3.7 (0.0)	3.7 (0.1)	0.360	3.8 (0.0)	3.6 (0.1)	0.020
	Behavioral					
	Yes mean (SD)	No mean (SD)	p	Yes mean (SD)	No mean (SD)	p
No. protected male anal sex partners last 3 months	1.8 (0.1)	1.1 (0.2)	0.013	1.3 (0.1)	0.9 (0.2)	0.163
No. unprotected male anal sex partners last 3 months	0.8 (0.1)	0.6 (0.1)	0.273	1.3 (0.2)	0.8 (0.1)	0.120

Note: Fisher's exact tests were used when expected cell sizes of categorical values were below 5, otherwise statistical significance was calculated using Pearson's chi-square tests. A total of 297 participants who had anal intercourse in the last 3 months discussed their HIV status with some of their protected and unprotected sex partners.

Table 4

Adjusted odds of testing yearly for HIV/STI

	Tested yearly for HIV (n=480)	Tested yearly for STI (n=434)
<i>Personal</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
Age	1.2 [1.1, 1.3]	1.1 [1.0, 1.2]
Internalized homonegativity	1.0 [0.8, 1.2]	0.9 [0.7, 1.0]
Outness	1.3 [1.1, 1.5]	1.2 [1.0, 1.4]
<i>Environmental</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
Community's population density		
Rural	0.8 [0.6, 1.2]	0.7 [0.5, 1.0]
Urban	Ref.	Ref.
Community's acceptance of homosexuality	0.9 [0.7, 1.2]	1.1 [0.9, 1.5]
<i>Behavioral</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
No. protected male anal sex partners last 3 months	1.3 [1.2, 1.5]	1.3 [1.2, 1.4]
No. unprotected male anal sex partners last 3 months	1.0 [0.9, 1.1]	1.0 [0.9, 1.1]
<i>Post-estimation test of difference by variable groups between participants who test annually and participants who do not test annually</i>		
	χ^2	χ^2
Personal	<0.001	0.001
Environmental	0.551	0.084
Behavioral	<0.001	<0.001

Table 5

Adjusted odds of discussing HIV status with sex partners

	Discuss HIV status with protected sex partners in last 3 months (n=480)	Discuss HIV status with unprotected sex partners in last 3 months (n=480)
<i>Personal</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
Age	1.1 [0.9, 1.2]	1.1 [1.0, 1.3]
Internalized homonegativity	1.0 [0.8, 1.3]	1.1 [0.8, 1.5]
Outness	0.8 [0.6, 1.0]	0.9 [0.6, 1.2]
<i>Environmental</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
Community's population density		
Rural	0.8 [0.5, 1.4]	0.8 [0.5, 1.4]
Urban	Ref.	Ref.
Community's acceptance of homosexuality	1.2 [0.8, 1.8]	1.5 [1.0, 2.3]
<i>Behavioral</i>		
	<i>AOR [95% CI]</i>	<i>AOR [95% CI]</i>
No. protected male anal sex partners last 3 months	1.1 [0.9, 1.2]	1.0 [0.9, 1.1]
No. unprotected male anal sex partners last 3 months	1.0 [0.9, 1.2]	1.1 [0.9, 1.3]
Test yearly for HIV	1.7 [0.9, 3.2]	1.4 [0.7, 3.0]
Test yearly for STI	3.6 [1.8, 7.1]	3.1 [1.5, 6.8]
<i>Post-estimation test of difference by variable groups between participants who test annually and participants who do not test annually</i>		
	<i>X²</i>	<i>X²</i>
Personal	0.151	0.176
Environmental	0.521	0.122
Behavioral	<0.001	<0.001