Published in final edited form as:
AIDS Educ Prev. 2014 August ; 26(4): 317–327. doi:10.1521/aeap.2014.26.4.317.

"KNOW YOUR STATUS": RESULTS FROM A NOVEL, STUDENT-RUN HIV TESTING INITIATIVE ON COLLEGE CAMPUSES

Caitlin Milligan,
University of Washington School of Medicine

C. Nicholas Cuneo,
Harvard Medical School Department of Global Health and Social Medicine and The Johns Hopkins University School of Medicine

Sarah E. Rutstein, and
University of North Carolina School of Public Health Department of Health Policy and Management and UNC School of Medicine

Charles Hicks
University of California, San Diego Department of Medicine

Abstract

Know Your Status (KYS), a novel, student-run program offered free HIV-testing at a private university (PU) and community college (CC). Following completion of surveys of risk behaviors/reasons for seeking testing, students were provided with rapid, oral HIV-testing. We investigated testing history, risk behaviors, and HIV prevalence among students tested during the first three years of KYS. In total, 1408 tests were conducted, 5 were positive: 4/408 CC, 1/1000 PU (1% vs. 0.1%, $p = 0.01$). Three positives were new diagnoses, all black men-who-have-sex-with-men (MSM). Over 50% of students were tested for the first time and 59% reported risk behaviors. CC students were less likely to have used condoms at last sex (a surrogate for risk behavior) compared to PU (OR 0.73, CI [0.54, 0.98]). Race, sexual identity, and sex were not associated with condom use. These results demonstrate that KYS successfully recruited large numbers of previously untested, at-risk students, highlighting the feasibility and importance of testing college populations.

In 2001, the Centers for Disease Control and Prevention (CDC) issued revised guidelines for HIV counseling and testing, emphasizing the importance of testing in non-traditional (i.e., nonclinical) settings (CDC, 2001). This recommendation was aimed at promoting testing among populations at increased risk and coincided with the approval of rapid HIV tests, which facilitated the expansion of testing in these non-traditional environments (Granade, Parekh, Phillips, & McDougal, 2004).

Address correspondence to Charles Hicks, MD, Professor of Clinical Medicine, University of California, San Diego, 200 West Arbor Dr.; Mail stop 8681, San Diego, CA 92104. cbhicks@ucsd.edu.

One nontraditional setting of particular interest is college campuses. College students are at increased risk of acquiring HIV and other sexually transmitted infections (STIs), in part due to behavioral factors common in college such as alcohol and substance abuse (Adefuye, Abiona, Balogun, & Lukobo-Durrell, 2009; Baliunas, Rehm, Irving, & Shuper, 2010; Benotsch, Koester, Luckman, Martin, & Cejka, 2011; Brown & Vanable, 2007; Caldeira, Singer, O'Grady, Vincent, & Arria, 2012; Cooper, 2002; Gullette & Lyons, 2005; Hightow et al., 2005; Kiene, Barta, Tennen, & Armeli, 2009; Lewis, Malow, & Ireland, 1997; Scott-Sheldon, Carey, & Carey, 2010; Trieu, Bratton, & Hopp Marshak, 2011). In fact, between 2007 and 2010 the rates of HIV infection increased in persons aged 15–24, while remaining stable or declining across all other age groups (CDC, 2012a). Furthermore, while approximately one in five HIV-infected Americans are not aware of their status, the number of undiagnosed HIV infections in persons age 13–24 is greater than 50% (CDC, 2012b). These data, coupled with the recent U.S. Preventive Services Task Force recommendation of screening all persons aged 13–65 for HIV infection, highlight the importance of HIV-testing in college-aged populations (Moyer, 2013).

Despite increasing knowledge about the virus, perceptions of personal risk of acquiring HIV remain low among college students, even among those with significant risk behaviors (Adefuye et al., 2009; Bruce & Walker, 2001; Sutton et al., 2011; Teague, 2009). This discrepancy may contribute to an underutilization of HIV testing services among college students. Surveys of at-risk students reveal low rates of testing and little interest in future testing for HIV, leading to recommendations to target college students for testing programs (Adefuye et al., 2009; Caldeira et al., 2012; Maguen, Armistead, & Kalichman, 2000; Morris et al., 2006; Prince & Bernard, 1998).

The Know Your Status (KYS) program was started in 2005 at a private university in North Carolina as a student-led initiative to increase access to HIV testing, counseling, and prevention services among local area college students. The program, run at both the private university (PU) and a local community college (CC), engaged students by offering free, confidential rapid testing in the colleges' student centers. This paper reports results from greater than three years of testing.

METHODS

PARTICIPANTS AND PROCEDURE

From October 2006 to December 2009, the KYS program offered free, rapid HIV testing on a weekly basis at two different North Carolina colleges: a four-year private university (PU) and a two-year technical community college (CC). In addition to regular weekly testing, special testing events were held in collaboration with student groups and classes during health fairs, World AIDS Day, and other educational events. Students from the PU ran the program, serving as program administrators and HIV testing counselors while students from the CC assisted in program development and on-campus advertising/event setup. Oversight was provided by administrators at the CC and physicians and student health employees at the PU-affiliated academic medical center.

Testing sites were established in high-traffic pedestrian zones at each institution's student center, with confidential testing and counseling done in adjacent private rooms. Students were recruited for testing via advertisements in student centers. Prior to testing, students were asked to complete a voluntary anonymous survey that included questions about demographics, reasons for getting tested, risk behaviors, past testing history, and perceptions of risk. Relevant responses were discussed during the counseling process. All individuals gave written consent to participate in the study, which was approved by the Institutional Review Board of the Duke University Health System.

Testing was done with the OraQuick Advance Rapid HIV-1/2 Antibody Test (OraSure Technologies, Inc., Bethlehem, PA). Results were available within 20 minutes of the oral swab being collected. Individuals with positive HIV tests received additional counseling and were referred to either the PU-affiliated hospital or the county health department for confirmatory blood testing. All tested students received a free T-shirt that featured the KYS logo and the words "I know my status… Do you know yours?" Distribution of these shirts was aimed at raising awareness and reducing stigma associated with HIV testing. Free condoms were also available for any individual passing through the student center during testing hours.

Data collected included age, sex, race, prior HIV testing history, and risk behaviors/perceptions. Risk behaviors were defined as past engagement in unprotected sex, having ≥ 2 sexual partners in the previous year, sharing needles, and/or men identifying as homosexual or bisexual (men who have sex with men; MSM).

STATISTICAL ANALYSES

Two-tailed, two-proportion z-tests were used to analyze continuous variables and Pearson's χ^2 tests were used for categorical variables. Logistic regression was used to explore self-reported condom use among students with ≥ 1 sexual partner in the past 12 months, controlling for relevant demographic/risk factors. We assessed appropriate covariate inclusion using bivariate analyses. Overall model evaluation relied on Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) tests. Appropriateness of consolidation of categorical variables was assessed using Likelihood Ratio (LR) tests.

RESULTS

Overall, 1,408 students were tested (1,000 PU, 408 CC) at the two sites (Table 1). For the majority (56%) of individuals, this was their first HIV test. The tested populations at both institutions were demographically diverse. Tested students at the PU were younger (mean age in years: 21 vs. 26, $p < 0.001$), more often male (48% vs. 38%, $p < 0.001$), and less often black (18% vs. 73%, $p < 0.001$). These differences in demographics across the testing sites reflect differences in the overall student bodies at each institution. The total proportion of tested students identifying as heterosexual vs. homosexual/bisexual did not vary significantly between the two institutions (12% PU vs. 10% CC, $p = 0.12$). The PU, however, had significantly more men identifying as homosexual or bisexual (21% vs. 8% of tested males, $p < 0.001$) while the CC had more women identifying as homosexual or bisexual (4% vs. 12% of tested females, $p < 0.001$).

REASONS FOR SEEKING TESTING, RISK BEHAVIORS, AND TESTING HISTORY

Before testing, students were asked to identify their reason(s) for seeking HIV testing. The majority of students at each testing site stated that they sought testing because they "just wanted to know their HIV status" (Table 1). More CC students reported seeking testing because of "past engagement in unprotected sex" than PU students (33% vs. 24%, $p = 0.001$). Eight students at the PU and one student at the CC reported needle sharing ($p = 0.24$). Students at the CC were more likely to seek testing to "support a friend or loved one touched by HIV" (5% vs. 3%, $p = 0.04$) while those at the PU were more likely to seek testing to "support the KYS program based on principle" (37% vs. 28%, $p = 0.001$).

At the PU, 55% of tested students reported one or more risk behaviors (past engagement in unprotected sex, having ≥ 2 sexual partners in the previous year, sharing needles, and/or men identifying as homosexual or bisexual), compared to 66% of those at the CC ($p < 0.001$) (Table 1). Students at the CC were less likely to report using a condom during their last sexual encounter (48% vs. 55%, $p = 0.009$) and more likely to have had ≥ 2 sexual partners in the past year (58% vs. 50%, $p = 0.01$). The proportion of students with 6 or more sexual partners in the previous year was similar at both sites (7.5% PU vs. 7.7% CC, $p = 0.90$). A greater proportion of students at the CC perceived their risk of HIV infection as somewhat or very high compared to those at the PU (17% vs. 9%, $p < 0.001$). Students at the CC were also more likely to report having been previously tested for HIV (59% vs. 38%, $p < 0.001$).

TESTING RESULTS

There were five positive tests, three of which were new HIV diagnoses: one at the PU and two at the CC (Table 2). Two additional positive tests at the CC were in persons who had previously tested positive. The overall rate of positive tests was tenfold higher at the CC (4/408 = 1%) than the PU (1/1000 = 0.1%) ($p = 0.01$) (Table 1). The five cases ranged in age from 18 to 42 and all self-identified as black (one also stated Asian). All three new diagnoses were in black MSM, and the overall seropositive rate in homosexual or bisexual men tested was significantly higher than in persons who did not identify as such. (3/109–2.8% vs. 2/1299–0.15%) ($p < 0.001$). All persons testing positive were referred to either the PU-affiliated hospital or the county health department for confirmatory blood testing. The one positive test at the PU was confirmed, but the two new positives at the CC could not be followed up due to the confidential nature of testing.

CHARACTERISTICS ASSOCIATED WITH LIKELIHOOD OF CONDOM USE AT LAST SEX

Although HIV risk behaviors, as defined above, were reported by a majority (59%) of persons seeking testing at both institutions, these behaviors and demographics varied by institution. The relationship between these factors and the higher rate of positive tests at the CC was explored. Logistic regression modeling was used to characterize factors associated with condom use at last sex, a proxy for risk behavior. The final model was based on surveys with complete information from respondents who were sexually active in the preceding 12 months ($n = 769$). Because completion of the behavior questionnaire was anonymous and voluntary, missing data were common. The two most common reasons for exclusion from the model were: (1) omission of race due to an early version of the

questionnaire that left out this category (n = 339) and (2) respondents who were not sexually active in the preceding 12 months (n = 170).

In bivariate analyses, the following factors were significantly ($p < 0.05$) associated with decreased likelihood of condom use at last sexual encounter: CC students (OR 0.72, CI [0.56,0.92]), increasing age (in years) (OR 0.97, CI [0.94, 0.98]), being homosexual or bisexual (OR 0.62, CI [0.39, 0.98]), having only one sexual partner in the past year (OR 0.77, CI [0.61, 0.98]), and having high perceived risk (OR 0.54, CI [0.37, 0.78]) (Table 3). Neither race nor sex was associated with likelihood of condom use at last sexual encounter.

To better understand the higher rate of positive tests at the CC, multivariate analysis was employed to evaluate the association of school (PU or CC) and condom use, controlling for demographics and risk behaviors among students who reported at least one sexual partner in the year prior to testing. Race was omitted from the model due to multicolinearity (there was a strong correlation between race and school). Similar to the bivariate analysis, CC students were less likely to have used condoms at last sexual encounter compared to PU students (OR 0.73, CI [0.54, 0.98]) (Table 3). Increasing age, having only one sexual partner in the past year, and having a high-perceived risk remained significantly associated with reduced condom use while sex was not associated with likelihood of condom use at last sex. Sexual identity was not associated with condom use in the multivariate model (OR 0.71 CI [0.49, 1.03]).

DISCUSSION

KYS is a novel, student-run HIV testing program successfully implemented at two diverse educational institutions. Differing from services typically provided by student health centers, the testing provided by KYS was offered in convenient highly-accessed student areas, did not require an appointment, was free of cost, and was noninvasive. The high visibility of the program (afforded by testing in high-traffic areas, a T-shirt social marketing campaign, and advocacy by student leaders) may have reduced stigma and subsequently increased testing rates (Barth, Cook, Downs, Switzer, & Fischhoff, 2002). In fact, the program was well received and tested a population representative of the student demographics at each institution. The implementation of KYS at the PU increased the number of tests done by more than five-fold in the first year (Rutstein, Mugavero, Sullivan, Bickers-Bock, & Hicks, 2006) and KYS has become the sole provider of free HIV testing on campus. KYS is still operational at both campuses to date. Using trained student volunteers to perform testing and counseling, the program is self-sustaining and high value.

Although a formal cost-effectiveness analysis was not conducted, there are many reasons to believe the KYS program was of high value. As student volunteers operated the program and provided testing and counseling, the major programmatic costs were test kits, condoms, and t-shirts. The OraQuick® tests, while the most expensive budgeted item, are relatively inexpensive compared to other testing options and do not require laboratory infrastructure (Greenwald, Burstein, Pincus, & Branson, 2006; Pinkerton et al., 2009). Additionally, the counseling and condoms provided during the testing process may help reduce risk behaviors of students and thus prevent the costs associated with acquisition of HIV or other STIs.

Although this study did not formally address behavior change after testing, a number of studies have suggested that increased counseling and access to such services promotes behavior change and lowers STI risk (Johnson et al., 2008; Kamb et al., 1998; Robin et al., 2004). Finally, the new identification of HIV infections allows linkage of those individuals into care and early treatment, thus reducing their risk of transmission and costly disease complications (Long, Brandeau, & Owens, 2010; Sanders et al., 2005; Walensky, Freedberg, Weinstein, & Paltiel, 2007).

The characteristics of those tested demonstrate the capability of novel testing programs, such as KYS, to attract previously untested, at-risk individuals. A variety of risk factors were reported including unprotected intercourse, multiple sexual partners, and needle sharing. Underestimation of HIV risk was common with more than half of tested persons reporting risk behaviors despite the fact that most persons at both institutions recognized themselves as having low or nonexistent risk of acquiring HIV infection.

HIV has increasingly become an infection of minority populations, with black MSM accounting for the majority of infections in the U.S. (CDC, 2011; Prejean et al., 2011). All three of the new HIV diagnoses in the KYS program were black MSM. Despite increased infection rates in black MSM, race was not associated with likelihood of condom use at most recent sexual encounter (a proxy for risk behavior) in our bivariate model; nor was bisexuality/homosexuality in the multivariate model. These findings reinforce other recent studies that have shown a higher HIV prevalence among black MSM despite lower or similar overall risk behaviors to other groups (Magnus et al., 2010; Millett, Flores, Peterson, & Bakeman, 2007; Millett, Peterson, Wolitski, & Stall, 2006). Other factors not measured in our study, including concurrent sexual partnerships, increased rates of sexual acts with partners of unknown HIV status, and older partners have all been associated with increased infection rates in black MSM and may account for the infections in this study (Berry, Raymond, & McFarland, 2007; Bohl, Raymond, Arnold, & McFarland, 2009; Eaton, Kalichman, & Cherry, 2010).

The rate of HIV positive tests was significantly higher at the CC, 4/408 (1%) as compared to the PU, 1/1000 (0.1%) ($p = 0.01$). Factors that may play a role in this difference include the older age and higher proportion of black students tested at the CC. In the U.S., blacks are disproportionately affected by HIV, accounting for 46% of new infections in 2010 despite representing only 14% of the total population (CDC, 2012a; Rastogi, Johnson, Hoeffel, & Drewery, 2011). Tested students at the CC were also significantly less likely to have used a condom at last sexual encounter compared to those at the PU. A somewhat paradoxical finding was the observation that students at the CC appeared more knowledgeable about the epidemic than those at the PU, but despite this, they were less likely to use condoms. For example, when compared to students at the PU, those at the CC were more likely to perceive their risk of HIV infection as somewhat or very high, were more likely to be getting tested to “support a friend or loved one who has been touched by HIV,” and were more likely to have been previously tested for HIV infection. This disconnect between perceived risk and condom use deserves further investigation.

The discrepancy between perceived and identified risk, as well as the higher rate of HIV diagnoses among students tested at the CC may have important implications for the allocation of resources for HIV prevention and testing in college students. PU students, unlike their CC counterparts, were required to have health insurance for enrollment and thus may have had greater access to services such as prevention counseling, free condoms, and HIV testing—all of which may encourage greater condom use. Additionally, students at the PU had access to alternative on-campus HIV testing options at the student health facility. Therefore, riskier students at the PU may have sought testing through the student health center, whereas such alternatives to KYS were not available on campus to students at the CC. Additionally, the presence of a student health facility has been associated with increased STI education in U.S. colleges (Koumans et al., 2005). While we cannot quantify utilization of other risk-reduction services or alternative testing options, other studies have suggested that improved counseling and increased access to services increases condom use and reduces the number of sexually transmitted infections (Kamb et al., 1998; Robin et al., 2004). Future programs should be aimed at increasing access to services for all college students to bridge the disconnect between perceived and identified risk.

Due to the predominately service provision environment of KYS, there are important limitations in our data. Because questionnaire data is self-reported, its accuracy is uncertain. However, it is unlikely that the quality of the data differs between institutions, implying that the comparisons are valid. The voluntary nature of the questionnaire also made missing data an issue since nearly 44% of students who were tested did not provide information on all the variables of interest. The distribution of individuals with missing data did not appear to preferentially impact any one group. Some individuals may have been included in the study more than once due to repeat testing and the anonymous nature of the survey. If students who seek re-testing are those with the greatest risk behaviors, this could bias the results to suggest a riskier student body overall. Assuming high-risk students are as likely to be retested on both campuses, this issue would not impact the between-institution comparisons. Additionally, as testing was voluntary and data were only collected from those who pursued testing, there was not a nontested group with which to compare risk behaviors or understand reasons why people did not seek testing.

Overall, the results from Know Your Status demonstrate that a student-run, rapid HIV testing program can sustainably provide voluntary HIV testing in diverse college settings. Given dedicated student leaders and volunteers, along with the support of affiliated student health centers, academic medical centers, and local health departments, this program has the potential to be replicated in other colleges. KYS was successful in recruiting large numbers of untested and at-risk individuals. The HIV-positive cases concentrated in black MSM are demographically reflective of local and national epidemiologic trends, underscoring the importance of focusing nontraditional screening efforts towards populations at higher risk, especially those that may have limited access to testing services. With limited resources, targeting of testing programs may maximize the number of new diagnoses and ultimately help curb the spread of HIV.

Acknowledgments

Test kits were provided by the North Carolina Communicable Disease Branch and funding for this project was from the following sources: Duke University Student Health and an mtvU Think Venture grant. This publication resulted (in part) from research supported by the Duke University Center for AIDS Research (CFAR), an NIH funded program (5P30 AI064518). S.E.R. was supported in part by NIH T32-GM008719.

We would like to thank Lindsey Bickers-Bock and Tom Jaynes for help with KYS at their respective institutions. This work could not have been done without the support of Duke Student Health, social workers at the Duke Infectious Disease clinic, and the student volunteers.

References

Adefuye AS, Abiona TC, Balogun JA, Lukobo-Durrell M. HIV sexual risk behaviors and perception of risk among college students: Implications for planning interventions. BMC Public Health. 2009; 9:281.10.1186/1471-2458-9-281 [PubMed: 19653901]

Baliunas D, Rehm J, Irving H, Shuper P. Alcohol consumption and risk of incident human immunodeficiency virus infection: A meta-analysis. International Journal of Public Health. 2010; 55(3):159–166.10.1007/s00038-009-0095-x [PubMed: 19949966]

Barth KR, Cook RL, Downs JS, Switzer GE, Fischhoff B. Social stigma and negative consequences: Factors that influence college students' decisions to seek testing for sexually transmitted infections. Journal of American College Health. 2002; 50(4):153–159.10.1080/07448480209596021 [PubMed: 11910948]

Benotsch EG, Koester S, Luckman D, Martin AM, Cejka A. Non-medical use of prescription drugs and sexual risk behavior in young adults. Addictive Behaviors. 2011; 36(1–2):152–155.10.1016/j.add-beh.2010.08.027 [PubMed: 20863626]

Berry M, Raymond HF, McFarland W. Same race and older partner selection may explain higher HIV prevalence among black men who have sex with men. AIDS. 2007; 21(17):2349–2350. [PubMed: 18090287]

Bohl DD, Raymond HF, Arnold M, Mc-Farland W. Concurrent sexual partnerships and racial disparities in HIV infection among men who have sex with men. Sexually Transmitted Infections. 2009; 85(5):367–369.10.1136/sti.2009.036723 [PubMed: 19773457]

Brown JL, Vanable PA. Alcohol use, partner type, and risky sexual behavior among college students: Findings from an event-level study. Addictive Behaviors. 2007; 32(12):2940–2952.10.1016/j.add-beh.2007.06.011 [PubMed: 17611038]

Bruce KE, Walker LJ. College students' attitudes about AIDS: 1986 to 2000. AIDS Education and Prevention. 2001; 13(5):428–437. [PubMed: 11718442]

Caldeira KM, Singer BJ, O'Grady KE, Vincent KB, Arria AM. HIV testing in recent college students: Prevalence and correlates. AIDS Education and Prevention. 2012; 24(4):363–376.10.1521/aeap.2012.24.4.363 [PubMed: 22827905]

Centers for Disease Control and Prevention. Revised guidelines for HIV counseling, testing, and referral. MMWR. Recommendations and Reports. 2001; 50:1–58.

Centers for Disease Control and Prevention. HIV surveillance report, 2011. 2011. Retrieved from http://www.cdc.gov/hiv/topics/surveillance/resources/reports/

Centers for Disease Control and Prevention. HIV surveillance report, 2010. 2012a. Retrieved from http://www.cdc.gov/hiv/topics/surveillance/resources/reports/

Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 U.S. dependent areas—2010. HIV Surveillance Supplemental Report. 2012b; 17(3 part A) Retrieved from http://www.cdc.gov/hiv/pdf/statistics_2010_HIV_Surveillance_Report_vol_17_no_3.pdf.

Cooper ML. Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. Journal of Studies on Alcohol. Supplement. 2002; 14:101–117. [PubMed: 12022716]

Eaton LA, Kalichman SC, Cherry C. Sexual partner selection and HIV risk reduction among Black and White men who have sex with men. American Journal of Public Health. 2010; 100(3):503–509.10.2105/AJPH.2008.155903 [PubMed: 20075328]

Granade TC, Parekh BS, Phillips SK, McDougal JS. Performance of the OraQuick and Hema-Strip rapid HIV antibody detection assays by non-laboratorians. Journal of Clinical Virology. 2004; 30(3):229–232. [PubMed: 15135740]

Greenwald JL, Burstein GR, Pincus J, Branson B. A rapid review of rapid HIV antibody tests. Current Infectious Disease Reports. 2006; 8(2):125–131. [PubMed: 16524549]

Gullette DL, Lyons MA. Sexual sensation seeking, compulsivity, and HIV risk behaviors in college students. Journal of Community Health Nursing. 2005; 22(1):47–60.10.1207/s15327655jchn2201_5 [PubMed: 15695196]

Hightow LB, MacDonald PDM, Pilcher CD, Kaplan AH, Foust E, Nguyen TQ, Leone PA. The unexpected movement of the HIV epidemic in the Southeastern United States: transmission among college students. Journal of Acquired Immune Difficiency Syndromes. 2005; 38(5):531–537.

Johnson WD, Diaz RM, Flanders WD, Goodman M, Hill AN, Holtgrave D, et al. Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. Cochrane Database of Systematic Reviews. 2008; 2008(3)10.1002/14651858.CD001230.pub2

Kamb ML, Fishbein M, Douglas JMJ, Rhodes F, Rogers J, Bolan G, et al. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial. Project RESPECT Study Group. Journal of the American Medical Association. 1998; 280(13):1161–1167. [PubMed: 9777816]

Kiene SM, Barta WD, Tennen H, Armeli S. Alcohol, helping young adults to have unprotected sex with casual partners: findings from a daily diary study of alcohol use and sexual behavior. Journal of Adolescent Health. 2009; 44(1):73–80.10.1016/j.jadohealth.2008.05.008 [PubMed: 19101461]

Koumans EH, Sternberg MR, Motamed C, Kohl K, Schillinger JA, Markowitz LE. Sexually transmitted disease services at U.S. colleges and universities. Journal of American College Health. 2005; 53(5):211–217. [PubMed: 15813231]

Lewis JE, Malow RM, Ireland SJ. HIV/AIDS risk in heterosexual college students. A review of a decade of literature. Journal of American College Health. 1997; 45(4):147–158.10.1080/07448481.1997.9936875 [PubMed: 9019001]

Long EF, Brandeau ML, Owens DK. The cost-effectiveness and population outcomes of expanded HIV screening and antiretroviral treatment in the United States. Annals of Internal Medicine. 2010; 153(12):778–789.10.7326/0003-4819-153-12-201012210-00004 [PubMed: 21173412]

Magnus M, Kuo I, Phillips G 2nd, Shelley K, Rawls A, Montanez L, et al. Elevated HIV prevalence despite lower rates of sexual risk behaviors among black men in the District of Columbia who have sex with men. AIDS Patient Care and STDs. 2010; 24(10):615–622.10.1089/apc.2010.0111 [PubMed: 20863246]

Maguen S, Armistead LP, Kalichman S. Predictors of HIV antibody testing among Gay, Lesbian, and bisexual youth. Journal of Adolescent Health. 2000; 26(4):252–257. [PubMed: 10734272]

Millett GA, Flores SA, Peterson JL, Bakeman R. Explaining disparities in HIV infection among black and white men who have sex with men: A meta-analysis of HIV risk behaviors. AIDS. 2007; 21(15):2083–2091. [PubMed: 17885299]

Millett GA, Peterson JL, Wolitski RJ, Stall R. Greater risk for HIV infection of black men who have sex with men: A critical literature review. American Journal of Public Health. 2006; 96(6):1007–1019.10.2105/AJPH.2005.066720 [PubMed: 16670223]

Morris M, Handcock MS, Miller WC, Ford CA, Schmitz JL, Hobbs MM, et al. Prevalence of HIV infection among young adults in the United States: Results from the Add Health Study. American Journal of Public Health. 2006; 96(6):1091–1097.10.2105/AJPH.2004.054759 [PubMed: 16670236]

Moyer VA. Screening for HIV: U.S. Preventive Services Task Force Recommendation Statement. Annals of Internal Medicine. 2013; 159(1):51–60.10.7326/0003-4819-159-1-201307020-00645 [PubMed: 23698354]

Pinkerton SD, Bogart LM, Howerton D, Snyder S, Becker K, Asch SM. Cost of OraQuick oral fluid rapid HIV testing at 35 community clinics and community-based organizations in the USA. AIDS Care. 2009; 21(9):1157–1162.10.1080/09540120902729940 [PubMed: 20024775]

Prejean J, Song R, Hernandez A, Ziebell R, Green T, Walker F, et al. Estimated HIV incidence in the United States, 2006–2009. PloS One. 2011; 6:e17502. [PubMed: 21826193]

Prince A, Bernard AL. Sexual behaviors and safer sex practices of college students on a commuter campus. Journal of American College Health. 1998; 47:11–21.10.1080/07448489809595614 [PubMed: 9693475]

Rastogi, S.; Johnson, TD.; Hoeffel, EM.; Drewery, MP. The Black population: 2010. Washington, DC: U.S. Census Bureau; 2011 Sep. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-06.pdf

Robin L, Dittus P, Whitaker D, Crosby R, Ethier K, Mezoff J, et al. Behavioral interventions to reduce incidence of HIV, STD, and pregnancy among adolescents: A decade in review. Journal of Adolescent Health. 2004; 34(1):3–26. [PubMed: 14706401]

Rutstein, S.; Mugavero, M.; Sullivan, C.; Bickers-Bock, L.; Hicks, CB. Enhancing voluntary HIV testing among university students—The Know Your Status (KYS) Program. Paper presented at AIDS 2006–XVI International AIDS Conference; Toronto. 2006 Aug.

Sanders GD, Bayoumi AM, Sundaram V, Bilir SP, Neukermans CP, Rydzak CE, et al. Cost-effectiveness of screening for HIV in the era of highly active antiretroviral therapy. New England Journal of Medicine. 2005; 352(6):570–585.10.1056/NEJMsa042657 [PubMed: 15703422]

Scott-Sheldon LAJ, Carey MP, Carey KB. Alcohol and risky sexual behavior among heavy drinking college students. AIDS and Behavior. 2010; 14(4):845–853.10.1007/s10461-008-9426-9 [PubMed: 18648928]

Sutton MY, Hardnett FP, Wright P, Wahi S, Pathak S, Warren-Jeanpiere L, Jones S. HIV/AIDS knowledge scores and perceptions of risk among African American students attending historically black colleges and universities. Public Health Reports. 2011; 126(5):653–663. [PubMed: 21886325]

Teague SM. Perceptions of vulnerability to HIV/AIDS: A comparison of two college cohorts, 1990 and 2005. AIDS Education and Prevention. 2009; 21(6):526–537.10.1521/aeap.2009.21.6.526 [PubMed: 20030497]

Trieu SL, Bratton S, Hopp Marshak H. Sexual and reproductive health behaviors of California community college students. Journal of American College Health. 2011; 59(8):744–750.10.1080/07448481.2010.540764 [PubMed: 21950256]

Walensky RP, Freedberg KA, Weinstein MC, Paltiel AD. Cost-effectiveness of HIV testing and treatment in the United States. Clinical Infectious Diseases. 2007; 45(Suppl 4):S248–S254.10.1086/522546 [PubMed: 18190295]

TABLE 1

Demographics, Reasons for Seeking Testing, HIV Risk Behaviors, Testing History, Perceived Risk, and Test Results

	Private University		Community College		
	N[a]	(%)	*N*[a]	(%)	*p* value
Demographics					
Number tested	1000		408		
Age (years)—Mean (*SD*)	21.1	(3.6)	25.9	(9.2)	< 0.001
Male Sex	471/985	(47.8%)	153	(37.9%)	< 0.001
Race					
Black	138/779	(17.7%)	212/290	(73.1%)	< 0.001
White	404/779	(51.9%)	38/290	(13.1%)	< 0.001
Asian	122/779	(15.7%)	4/290	(1.4%)	< 0.001
Other	115/779	(14.8%)	36/290	(12.4%)	0.33
Sexual Orientation					
Heterosexual	859/990	(86.8%)	334/393	(85.0%)	0.39
Homosexual	67/990	(6.8%)	19/393	(4.8%)	0.18
Bisexual	54/990	(5.5%)	22/393	(5.6%)	0.92
Unsure/Other	10/990	(1.0%)	18/393	(4.6%)	< 0.001
Men identifying as homosexual or bisexual	98/465	(21.1%)	11/145	(7.6%)	< 0.001
Reported reasons for seeking testing					
Had unprotected sex	243	(24.3%)	133	(32.6%)	0.001
Shared needles	8	(0.8%)	1	(0.25%)	0.24
To support a friend or loved one who has been touched by HIV	31	(3.1%)	22	(5.39%)	0.04
To support the KYS program	374	(37.4%)	115	(28.2%)	0.001
Want a free t-shirt	288	(28.8%)	77	(18.9%)	< 0.001
Was just walking by	164	(16.4%)	130	(31.9%)	< 0.001
To know HIV status	573	(57.3%)	229	(56.1%)	0.69
Other	60	(6.0%)	12	(2.9%)	0.02
HIV risk behaviors, testing history, perceived risk					
Students exhibiting risk behaviors[b]	554	(55.4%)	269	(65.9%)	< 0.001
Currently sexually active	651/990	(65.8%)	297/396	(75.0%)	< 0.001

AIDS Educ Prev. Author manuscript; available in PMC 2015 February 24.

	Private University		Community College		
	***N*[a]**	**(%)**	***N*[a]**	**(%)**	***p* value**
Used a condom at last sexual encounter	445/808	(55.1%)	168/359	(47.9%)	0.009
≥ 2 sexual partners in the past year	474/950	(49.9%)	225/391	(57.5%)	0.01
≥ 6 sexual partners in the past year	71/950	(7.5%)	30/391	(7.7%)	0.90
“Non Existent” or “Very Low” perceived risk of infection	859/947	(90.7%)	300/361	(83.1%)	< 0.001
“Somewhat” or “Very high” perceived risk of infection	88/947	(9.3%)	61/361	(16.9%)	< 0.001
Previously tested	374/981	(38.1%)	233/392	(59.4%)	< 0.001
Testing Results					
Positive Tests	1	(0.1%)	4	(1.0%)	0.01

[a]Denominators are reported in cases in which the total was less than the entire tested population at an institution due to missing data.

[b]Risk behaviors are defined as students who reported unprotected sex or needle sharing, were MSM, or had ≥ 2 sexual partners in the past year.

TABLE 2

Demographics, Risk Factors, and Previous Testing History of Individuals With HIV-Positive Tests

Testing Site	Age	Sex	Race	Reported Risk Factors	Previous Test
PU	18	Male	Black	MSM	No
CC	29	Male	Black	MSM, sex with women	Yes, conventional blood test, negative
CC	26	Male	Black	Sex with women	Yes, conventional blood test, positive
CC	42	Female	Black	Sex with man, Sex with HIV+ person, Sex with IDU	Yes, conventional blood test, positive
CC	42	Male	Black/Asian	MSM	Yes, conventional blood and rapid oral, negative

AIDS Educ Prev. Author manuscript; available in PMC 2015 February 24.

TABLE 3

Bivariate and Logistic Regression Analyses of Characteristics Associated With Likelihood of Condom Use at Last Sex (Proxy for Risky Behavior)

Variable	Bivariate Analysis	Multivariate Analysis
	Odds Ratio [95% CI]	Odds Ratio [95% CI]
CC Student	0.72 [0.56, 0.92]*	0.73 [0.54, 0.98]*
Age (years)	0.97 [0.94, 0.98]*	0.97 [0.54, 0.99]*
Male Sex	1.16 [0.92, 1.46]	1.07 [0.82, 1.39]
Black Race	0.92 [0.71, 1.21]	—
Homosexual/Bisexual	0.62 [0.39, 0.98]*	0.71 [0.49, 1.03]
Only one sexual partner	0.77 [0.61, 0.98]*	0.72 [0.55, 0.94]*
High perceived risk[a]	0.54 [0.37, 0.78]*	0.62 [0.42, 0.91]*

[a] Perceived risk rated on a 1–4 scale with “high perceived risk” considered a 3 or 4.

* Statistically significant at $p < 0.05$.