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BEHAVIORAL RISK DISPARITIES IN A RANDOM SAMPLE OF SELF-IDENTIFYING GAY AND NON-GAY MALE UNIVERSITY STUDENTS

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Abstract

This internet-based study was designed to compare health risk behaviors of gay and non-gay university students from stratified random cross-sectional samples of undergraduate students. Mean age of the 4,167 male participants was 20.5 (±2.7) years. Of these, 206 (4.9%) self-identified as gay and 3,961 (95.1%) self-identified as heterosexual. After adjusting for selected characteristics and clustering within university, gay men had higher odds of reporting: multiple sexual partners; cigarette smoking; methamphetamine use; gamma-hydroxybutyrate (GHB) use; other illicit drug use within the past 30 days and during lifetime; and intimate partner violence (IPV). Understanding the health risk behaviors of gay and heterosexual men is crucial to identifying associated factors and intervening upon them using appropriate and tailored strategies to reduce behavioral risk disparities and improve health outcomes.

Keywords

gay men; sex; drug use; student; alcohol; intimate partner violence; methamphetamine; tobacco; condom; GHB

When compared to their heterosexual peers, gay men are disproportionately affected by a number of health outcomes, such as infectious diseases, including HIV (Centers for Disease Control and Prevention [CDC], 2005) and types of viral hepatitis (Atkins & Nolan, 2005; CDC, 2004); and by noncommunicable diseases, including anal carcinoma (Daling et al., 1982; Dean et al., 2000; Gee, 2006; Klencke & Palefsky, 2003), lung cancer resulting from increased rates of smoking (Greenwood et al., 2005; Gruskin & Gordon, 2006; Ryan, Wortley, Easton, Pederson, & Greenwood, 2001; Stall, Greenwood, Acree, Paul, & Coates, 1999; Tang et al., 2004), and AIDS-related malignancies (CDC, 2005; Palefsky, Holly,

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Ralston, & Jay, 1998). They also are at increased risk for alcohol misuse and its consequences (Council on Scientific Affairs, American Medical Association [AMA], 1996; Gruskin & Gordon, 2006; Hughes, 2005; Katsufrakis, 2004) and intimate partner violence (IPV; Ferri, 2004; Freedberg, 2006; Owen & Burke, 2004).

Despite what is known, data on health risk behaviors and their associated health outcomes by sexual orientation remain extremely limited and inexact. Most behavioral and epidemiologic studies, including population-based studies, do not include measures of sexual orientation or do not distinguish those who self-identify as gay versus those who engage in same-sex behavior but identify as bisexual or heterosexual (Gay and Lesbian Medical Association [GLMA], 2001; Greenwood et al., 2005; Rhodes & Yee, 2006; Sell & Becker, 2001). Without reliable data on sexual orientation, assessing the health of gay men is difficult, and thus, little is known about the health of gay men compared to their heterosexual peers (GLMA, 2001; Gee, 2006; Herek, Chopp, & Strohl, 2007; Rhodes & Yee, 2006; Sell & Becker, 2001). Because many of the behaviors that contribute to health outcomes are initiated in adolescence and early adulthood, we sought to compare the health risk behaviors of self-identifying gay male university students to their heterosexual peers.

METHODS

In the fall of 2004, 2005, and 2006, we invited stratified random cross-sectional samples of undergraduate university students attending 10 universities (8 public and 2 private) in North Carolina to complete an online Internet-based assessment of risk behaviors. The assessments were part of the Study to Prevent Alcohol-Related Consequences (SPARC) among College Students. Campuses were selected based on interest and readiness to participate in SPARC. Campus sizes ranged from 5,000 to 30,000 students (graduate and undergraduate students combined), with all universities having a graduate program. One university was affiliated with a religious denomination.

Campus administrators were approached by the study team during the project protocol development and asked whether they wanted their students to participate. These administrators worked with the study team to ensure that the project adhered to university requirements as well as expectations for student recruitment and participation. Human subjects review and study oversight were provided by the Institutional Review Board (IRB) at the authors' institution. The review boards of other universities participating in this study either approved this study or officially deferred to the authors' institutional IRB. The registrar at each campus provided the e-mail addresses for each enrolled student.

Marketing this assessment included several steps which have been described in more detail elsewhere (Rhodes et al., 2006). We first placed posters in common areas on each campus (e.g., residence halls and dorms, student unions, and cafeterias) encouraging students to check their e-mail accounts for an invitation to participate in the study. The poster also indicated that students would receive $10.00 via PayPal, a method to send and receive money online, for completing the assessment. Then, we randomly selected students from each campus by academic classification ("freshman," "sophomore," "junior," and "senior") and sent postcards asking them to check their e-mail accounts for an invitation to complete the online Internet-based assessment. These same randomly selected students were sent messages by e-mail describing the study and encouraging them to complete the online Internet-based assessment. The e-mail messages contained a link to a secure Uniform Resource Locator (URL) where the student completed the assessment. We sent non-respondents up to four reminder e-mails.

Assessment Instrument

Item development for the assessment followed Nunnally's (1970) principles for the measurement of constructs where the domain of observables was used, followed by the rationale instrument construction approach described by Comrey (1988) and Jackson (1970, 1971). An initial item pool was created with items from a variety of established instruments including the Youth Risk Behavior Survey (Kolbe, Kann, & Collins, 1993), the Harvard College Alcohol Survey (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994), the Core questionnaire (Presley, Meilman, & Lyerla, 1994), and the Birmingham Measurement Study (Rhodes & Hergenrather, 2008).

This study involved sociologists, a developmental psychologist, an "out" gay behavioral scientist, a communications scientist, an emergency department physician, and community and campus interventionists, with various areas of expertise and used a collaborative and iterative process to finalize the assessment. This process included reviewing and evaluating the original item pool, selecting items for inclusion, and revising the assessment for applicability and comprehension to ensure content validity and clarity of expression. Prior to implementation, the assessment was pre-tested and revised twice with college students from a nonstudy university for attention, comprehension, relevance, and acceptability.

Assessment items, based on self-report, used predefined response options with binary, categorical, or Likert-scale response options to facilitate readability and administration. The entire assessment included 267 items and took between 17 and 24 minutes to complete, depending on the participant. Skip patterns were programmed directing each participant to the appropriate questions based on their unique responses.

Items measured included demographic characteristics, such as age, gender and sex, sexual orientation, ethnicity and race, and martial status. Each participant was asked his or her current academic classification ("freshman," "sophomore," "junior," and "senior") and whether part- or full-time student status.

Sexual orientation was assessed using the item: "How would you describe your sexuality?" Response options included: "bisexual;" "gay or homosexual;" "heterosexual or straight;" "transgender;" and "other."

Each participant was asked his or her current living arrangement (e.g., single-sex residence hall/dorm, coed residence hall/dorm, on-campus fraternity/sorority housing, and off-campus housing); religious service attendance; and grade point average, among other descriptive variables.

Health behaviors measured included sexual behavior, such as number of partners in the past 30 days, gender and sex of sexual partners, substance use during sexual activity, condom use frequency ("never," "rarely," "sometimes," and "always"); and drinking behaviors, including user or non-user and times drunk in a typical week. For men, heavy episodic drinking was defined as consuming five drinks within two hours, which is a commonly used, although debated, definition of binge drinking (DeJong, 2003). Each participant also was asked to describe his current use of alcohol ("abstainer," abstainer/former drinker," "light drinker," "moderate drinker," "heavy drinker," "problem drinker"). We also used a drunkeness question: "In a typical week, on how many days do you get drunk?" This item has been found effective to identify college students who are at high risk of injury as a result of their own drinking and the drinking of others (O'Brien et al., 2006).

Other substance use was assessed. Cigarette use, smokeless tobacco use, marijuana use, and other drug use (including: cocaine, gamma-hydroxybutyrate [GHB], Rohypnol,

methamphetamines, Quaaludes, and hallucinogens (e.g., lysergic acid diethylamide [LSD]), ecstasy, and ketamine) were assessed, including lifetime history of use and during the past 30 days.

History of IPV including victimization and perpetration was assessed using the following items: (a) “Has a date or boyfriend or girlfriend ever started a physical fight with you?” and (b) “Have you ever started a physical fight with a date or boyfriend or girlfriend?” Response options for each items included: “Yes” and “No.” For participants who reported a history of IPV, the sex/gender of the partner was assessed.

Prior to administration, the assessment was pretested and revised twice for attention, comprehension, personal relevance, credibility, and acceptability with university students from a nonstudy university.

Statistical Analyses

The objective of the statistical analyses was to estimate the differences in health risk behaviors between gay and heterosexual men and explore and adjust for demographic and academic characteristics. Descriptive analyses were performed to examine overall prevalence, group prevalence, and distribution shape. Demographic and behavioral data were then analyzed in bivariate analyses using clustered logistic regression to compare gay to heterosexual men. Unadjusted odds ratios (OR) were calculated for behaviors from the bivariate analysis and their 95% confidence intervals (CI) estimated.

Behaviors found to be significantly different by sexual orientation in the bivariate analyses were analyzed in a multivariable logistic regression model using a generalized linear mixed modeling approach (GLMM) that adjusted for the within-university clustering of health behaviors with demographic and academic characteristics as covariates (Rabe-Hesketh, Skrondal, & Pickles, 2002). Campus was considered a random effect with students nested within campus. The purpose for the GLMM approach was to adjust for campus differences in student characteristics and health behaviors and account for the fact that students from the same campus may be more alike than students from different campuses. Adjusted odds ratios (AOR) were calculated for behaviors and confidence intervals estimated in multivariable modeling. All analyses were performed in Stata v9.2 using the GLLAMM package (Rabe-Hesketh et al., 2002). The alpha level was set at $p \leq 0.05$.

RESULTS

A total of 11,217 participants completed the assessment over the course of the 3 years: fall 2004 (n= 2,645); fall 2005 (n= 4,297); and fall 2006 (n= 4,275) with a response rate of 33%. Each of the 10 campuses was represented with 659 to 1,354 participants across all three years depending on the campus population size. Of the 11,217 participants, 4,167 participants self-identified as male and as “gay or homosexual” or “heterosexual or straight.” The other 7,050 identified as female, were men who did not self-identify as gay, or were missing. Mean age of these participants was 20.5 years (±2.7); 206 (4.9%; 95% Wilson confidence interval for proportions (Brown, Cai, & DasGupta, 2001) were 4.3%, 5.6%) self-identified as gay/homosexual and 3,961 (95.1%) self-identified as heterosexual/straight. No significant differences were found on the demographic characteristics between those students in the sample who identified as gay and those who identified as heterosexual (see Table 1).

When compared to their heterosexual peers, gay men were more likely to report having: had multiple sexual partners ($p < 0.001$), smoked cigarettes in the past 30 days ($p = 0.009$), used methamphetamines ($p < 0.001$), used GHB; $p < 0.001$), or used other illicit drugs ($p < 0.015$)

in the past 30 days. Gay men also were more likely to report a lifetime history of illicit drug use ($p < 0.001$); ever being a victim in intimate partner violence (gay men with a male date and heterosexual men with a female date; $p < 0.001$); and ever being a perpetrator in intimate partner violence (gay men with a male date and heterosexual men with a female date; $p < 0.001$). Unadjusted ORs and 95% CIs are presented in Table 2. No differences were found between the groups for all other risk behaviors including condom, current and past alcohol, marijuana, and cocaine use.

After adjusting for the characteristics listed in Table 1 (including race, academic classification, residence type, student status, and religious service attendance) and university clustering, eight significant differences between gay and heterosexual men remained, with gay men reporting higher risk in each of the behaviors than heterosexual men (shown in Table 3). When compared to their heterosexual peers, gay men had increased odds of reporting:

a. multiple sexual partners (AOR=1.46, 95% CI=1.06–2.0);

b. cigarette smoking (AOR=3.27, 95% CI=2.27–4.7);

c. methamphetamine use (AOR=3.83, 95% CI=2.07–7.06);

d. GHB use (AOR=7.89, 95% CI=2.66–23.4);

e. other illicit drug use past 30 days (AOR=1.9, 95% CI=1.1–3.28);

f. a lifetime history of illicit drug use (AOR=1.7, 95% CI=1.22–2.38);

g. IPV as a victim (gay men with a male date and heterosexual men with a female date; AOR=2.1, 95% CI=1.31–3.36); and

h. IPV as a perpetrator (gay men with a male date and heterosexual men with a female date; AOR=7.54, 95% CI=4.09–13.9).

DISCUSSION

Several findings deserve discussion. First, nearly 5% of participants self-identified as gay. This finding is important as data estimating the percentage of the population that is gay is limited. This analysis examined self identity; however, it should be noted that defining what constitutes gay can be difficult. Profound differences can exist among how individuals define and describe themselves, how they feel, and what they do behaviorally. National and international studies within various samples of men have found rates of men who self-identify as gay to range from 1.6%–5.9% (Bagley & Tremblay, 1998; Laumann, Gagnon, Michael, & Michaels, 1994; Smith, Rissel, Richters, Grulich, & de Visser, 2003), while same-sex sexual behavior among men has been found to range from 2.7% to 9.8% (Analyse des Comportements Sexuels en France ACSF Investigators, 1992; Binson et al., 1995; Council on Scientific Affairs, AMA, 1996; Johnson, Wadsworth, Wellings, Bradshaw, & Field, 1992; Laumann et al., 1994; Melbye & Biggar, 1992; Michaels, 1996). Thus, this study adds to our understanding of the percentage of men who self-identify as gay; it may be the only such study using a methodologically sound random sample of university students, often a point in the life course when a gay sexual orientation is developing. However, not all those who will self-identify as gay in later life will have done so at this age. Furthermore, underreporting likely occurred given the societal stigmatization of same-sex behavior (Council on Scientific Affairs, AMA, 1996; Rhodes & Yee, 2006).

After adjusting for race, academic classification, residence type, student status, religious service attendance, and university clustering, gay men had one and a half times the odds of reporting multiple sexual partners when compared to their heterosexual peers. In post-hoc

analysis, the average number of partners in the past 30 days was 1.1 (±1.2) for gay men and 0.6 (±0.8) for heterosexual men. This finding is especially important because same-sex sexual behavior among men continues to be the primary mode of HIV transmission in the United States. Although there had been a decline in the prevalence and incidence of HIV infection among gay men in the United States during the last 10–15 years, data suggest that self-identifying and non-self-identifying gay men still account for a significant proportion of all new infections (Karon, Fleming, Steketee, & De Cock, 2001) and a majority of all new AIDS diagnoses (CDC, 2005). Recent reports suggest that the rates of new infections among gay men, after this period of decline, may be on the rise, especially among younger gay men (CDC, 2001; Kellogg, McFarland, & Katz, 1999; Sullivan & Wolitski, 2008). Epidemiologic data in North Carolina indicates that among some subgroups of gay university students, HIV incidence and prevalence may be as high as 14% and 32%, respectively (Anonymous, 2004; Miller et al., 2002). Recent studies also have observed increasing incidence rates of STDs among gay men in the US (CDC, 1999, 2001; Fox et al., 2001; Williams et al., 1999). In our study, the higher number of partners among gay men is challenging to interpret because gay men reported more multiple sexual partners but not significantly different condom use consistency. However, higher HIV prevalence among gay men, the increased number of partners, and the higher risk of transmission that results from anal intercourse (as compared to vaginal; Cohen & Miller, 1998) may imply that gay men are more likely to expose themselves to HIV than their heterosexual peers.

Furthermore, although early in the HIV epidemic prevention education included reducing the risk of exposure to HIV through limiting the number of sexual partners, prevention education now focuses on having one long-term mutually monogamous relationship with a partner who has been tested and is known to be uninfected. This type of message may not resonate with gay men who do not have the same socially sanctioned expectation to find a partner and “get married” (Klausner, Pollack, Wong, & Katz, 2006). Rather, as has been suggested elsewhere, messages may need to explicitly recommend reduced numbers of sexual partners, in addition to increased use of condoms, to impact the epidemiology of HIV infection (Wilson, 2004). Such messages may be more salient for gay men and thus perhaps more likely to affect their risk.

It also has been hypothesized that perceived social stigma related to same-sex behavior and being gay (Cody & Welch, 1997; Council on Scientific Affairs, AMA, 1996; Katsufrakis, 2004; MacDonald, 1976; Meyer, 2003; O'Hanlan, Cabaj, Schatz, Lock, & Nemrow, 1997; Rhodes & Yee, 2006; Rowen & Malcolm, 2002), as well as socially constructed and stereotypical notions of masculinity, may contribute to risk behavior among males (Connell, 1992; Courtenay, 2000; Green, 2005; Griffiths, 2004; Hong, 2000; Moynihan, 1998). External and internal homophobia and heterosexism (i.e., stigma operationalized) may cause depression and unhealthy coping strategies that result in unhealthy coping such as having multiple partners (Diaz, Ayala, & Bein, 2004; Dudley, Rostosky, Korfhage, & Zimmerman, 2004; O'Hanlan et al., 1997). We did not assess depression; however, future studies may benefit from assessing depression in order to test the potential associations among self-identified orientation, psychological well being, and risk behaviors within large random samples of men who self-identify as gay compared to those who do not. Although studies have identified depression as high among men who have sex with men (MSM; Mills et al., 2004; Stall et al., 2001), insufficient empirical data exist to examine the differences among men based on sexual orientation.

Masculinity often implies that men must prove their manhood through their actions which can be most efficiently communicated to others through being aggressive, not expressing emotion, not seeking health care, and engaging in risk behavior (Connell, 1992; Courtenay, 2000; Griffiths, 2004; Halkitis & Parsons, 2003; Hong, 2000; Moynihan, 1998; Rhodes et

al., 2007). Rigid and stereotypical notions of masculinity may yield intensified outcomes for gay men who do not perceive themselves as meeting these standards by virtue of their orientation (Halkitis & Parsons, 2003). Gay men may feel as though they cannot meet gender role expectations because of their orientation and thus may pursue other means of asserting their manhood, such as having multiple partners and/or engaging in other sexual risk behaviors (Rhodes & Yee, 2006). Of course, there are many factors involved in behavior; however, further exploration of socially constructed meanings of masculinity and their impact on the health and well being of gay men may be warranted.

The stress and depression resulting from social stigma and/or the conflict between what it means to be a man and one's gay identity also may contribute to substance use. In comparison to their heterosexual peers, gay men in this study had higher rates of use. Gay men had triple the odds of having smoked cigarettes, nearly quadruple the odds of having used methamphetamines, over seven times the odds of having used GHB, and nearly double the odds of having used other illicit drugs (including heroine, LSD, and ecstasy) within the past 30 days. It has been recognized that insufficient research has been done to understand the rates of use and implications of use of drugs such as GHB among gay men (Halkitis & Palamar, 2006). Given the short- and long-term health outcomes associated with these substances, further research is needed to understand the rates, patterns, and motivations and contexts of substance use in order to develop strategies to prevent initiation and reduce ongoing use of these substances.

It is important to note that alcohol risk behaviors, such as heavy episodic drinking and getting drunk multiple times in a typical week were not significantly different when comparing gay men to their heterosexual peers. This lack of significance may be due to the current wide use of these substances on university campuses. Further work is needed to reduce high-risk alcohol use on university campuses overall (National Institutes of Health, 2002). Although differences among gay and heterosexual male university students were not identified, alcohol use among gay men may higher than their heterosexual peers post college (Gruskin & Gordon, 2006); however, this remains unclear. Recently identified alcohol use differences (Gruskin & Gordon, 2006) contradict previous alcohol use research that suggested that their was no difference between gay men and their heterosexual peers (Stall & Wiley, 1988).

IPV among adolescents and university students is common among both gay and heterosexual students; Eaton et al. (2006) found that gay men were at increased risk to be both the victim and the perpetrator of IPV when compared to their heterosexual peers. Again, some of this could be related to the stress of being gay (Freedberg, 2006); however, little research has explored IPV among gay men (Heintz & Melendez, 2006).

Limitations

The current study is not without limitations. The sample size varied among campuses based on enrollment; however, the target response rate of 33% was the met. Although a higher response rate would have been more ideal, this target rate was selected based on what is known about the range in participation in online assessments (Dillman, 2000; Kypri, Gallagher, & Cashell-Smith, 2004; McCabe, 2004; McCabe, Boyd, Couper, Crawford, & D'Arcy, 2002; Mitra, Jain-Shukla, Robbins, Champion, & DuRant, In press; Pequegnat et al., 2006; Rhodes, Bowie, & Hergenrather, 2003); early on in the proliferation of the internet, response rates were much higher, perhaps due to its novelty.

Furthermore, the observed associations are based on cross-sectional data. Additional studies using a prospective-cohort design will be necessary to evaluate the significance and stability of these findings over time. Furthermore, although a self-administered format was utilized

that may minimize response bias, and included techniques found to increase validity of self-reported behavior (Fishbein & Pequegnat, 2000), including the use of the internet (Rhodes et al., 2003), these results remain based on self-reported data with their potential limitations (Pequegnat et al., 2000). Our assessment did not allow us to explore types of sexual behaviors as carefully as we would have liked, which would have helped clarify condom use by sexual behavior.

Also, this sample was not ethnically or racially diverse; however, post hoc analyses confirmed that this sample reflected the ethnic and racial composition of the 10 campuses.

Finally, how participants who completed the assessment compared to their peers on campus is unclear. Because the use of electronic technology for data collection is a relatively recent occurrence, understanding how different motivations to participate affect participation rates is not well understood. Although electronic data collection has been promoted (Pequegnat et al., 2006; Rhodes et al., 2003), careful attention to the process of data collection must be maintained. Further research is needed to understand electronic data collection and its limitations in both theory and practice.

Conclusions

To our knowledge, no other published study has compared self-identified gay and self-identified heterosexual men on such a broad variety of health behaviors or during a stage during the life course in which most of the behaviors that contribute to negative health outcomes are initiated. Because our most severe and costly health and social problems are caused, in large part, by behaviors that begin in adolescence and early adulthood, research that identifies how behaviors differ by sexual orientation is imperative in order to develop meaningful interventions to affect short-term and long-term health outcomes. Unfortunately, only recently have some population-based studies attempted to incorporate measures (both direct or, more often, proxy measures) of sexual orientation among study participants (Cochran & Mays, 2000; Gilman et al., 2001; Rhodes & Yee, 2006). This is an important step as prevention science addresses health ecologically, recognizing the individual within multiple influencing contexts.

This analysis examined health behavior disparities based on self-identification of sexual orientation. No doubt many differences exist between men who self-identify as gay and those men who do not self identify as gay but still engage in same-sex sexual behavior with other men (e.g., bisexual men and MSM); however, our sample size of men who reported same-sex behavior but did not self-identify as gay was too small to make meaningful comparisons. Subsequent research should explore and distinguish sexual orientation in terms of identity, desire, and behavior throughout the life course, and through more comprehensive surveillance and data collection, identify and understand disparities in health risk behavior and disease outcomes among gay, bisexual, and heterosexual men, and MSM of all ages. Innovative and scientifically sound interventions must be developed, implemented, and evaluated to reach a variety of men to prevent a variety of health risk behaviors and promote men’s health. Furthermore, although this analysis focused on gay men, parallel research among women who have sex with women must be undertaken to explore and improve the health and well being of sexual minorities.

Intervening to reduce health disparities between gay and heterosexual populations will not be easy but disparities must be addressed because they are not inevitable. They are changeable through multi-level interventions based on improved public health surveillance to measure disparities by behavior and disease and thorough exploration of the causes of

disparities and the identification of potential leverage points to reduce and eliminate disparities using community-sanctioned approaches.

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Table 1

Comparison of Gay and Heterosexual Male Students on Selected Characteristics.

Characteristic	Gay Men[a] (n=206)	Heterosexual Men[a] (n=3,961)	p[b]
Age in years	20.7 ± 3.3	20.5 ± 2.5	0.51
Race			0.39
White	163 (79)	3,192 (81)	(4 df)
Black/African-American	15 (7)	220 (6)	
Asian/Pacific Islander	9 (4)	244 (6)	
Hispanic	5 (2)	128 (3)	
Other/Multiracial	14 (7)	165 (4)	
Academic Classification			0.67
Freshman	57 (28)	1,059 (27)	(3 df)
Sophomore	58 (28)	1,047 (26)	
Junior	43 (21)	904 (23)	
Senior	46 (22)	920 (23)	
Residence			0.38
On-campus	120 (58)	2,252 (57)	
Off-campus	85 (41)	1,700 (43)	
Student Status			0.16
Full-time	194 (94)	3,821 (96)	
Part-time	11 (5)	127 (3)	
Current GPA[c]	3.21 ± 0.55	3.12 ± 0.56	0.033
Religious service attendance			0.003
Monthly	45 (22)	1,275 (32)	
Less than monthly	159 (77)	2,676 (68)	

Notes:

[a] Mean ± SD or n (%), as appropriate;

[b] From bivariate clustered logistic regression model;

[c] N=3,165 because not all students had an established cumulative GPA (e.g., freshmen).

Table 2

Differences Between Gay and Heterosexual Male Students on Selected Behaviors, Unadjusted Bivariate Analysis.

Behavior	Gay Men n (%)	Heterosexual Men[a] n (%)	OR	95% CI	P
Inconsistent condom use	72 (35)	1,125 (28)	1.17	0.83–1.64	.37
Multiple partners in past 30 days	53 (26)	334 (8)	3.82	2.73–5.43	<.001
Any heavy episodic drinking, past 30 days	106 (51)	2,011 (51)	1.09	0.82–1.45	.54
Getting drunk 1+ times in a typical week	80 (39)	1,772 (45)	0.84	0.63–1.13	.25
Moderate/heavy/problem alcohol use	80 (39)	1,651 (42)	0.93	0.69–1.24	.61
Drank in high school	111 (54)	2,175 (55)	0.96	0.72–1.27	.77
Smoked cigarettes, past 30 days	81 (39)	1,203 (30)	1.48	1.10–1.98	.009
Smoked marijuana, past 30 days	60 (29)	972 (25)	1.28	0.93–1.75	.13
Used methamphetamines, past 30 days	16 (8)	74 (2)	4.26	2.42–7.50	<.001
Used any form of cocaine, past 30 days	12 (6)	153 (4)	1.55	0.85–2.84	.16
Used GHB, past 30 days	5 (2)	12 (<1)	8.33	2.89–24.0	<.001
Other illicit drug use, past 30 days[b]	18 (9)	203 (5)	1.90	1.13–3.17	.015
Lifetime history of illicit drug use[b]	72 (35)	899 (23)	1.80	1.33–2.44	<.001
Intimate partner violence: victim	27 (13)	228 (6)	2.36	1.53–3.63	<.001
Intimate partner violence: perpetrator	19 (9)	47 (1)	8.30	4.75–14.5	<.001

Notes:

[a]Referent group for the calculation of the OR;

[b]Heroin, LSD, ecstasy, ketamine, or Quaaludes; OR=Odds ratio; 95% CI=95% Confidence Interval.

Table 3

Increased Odds of Reporting Risk Behaviors among Gay Male Students Compared to Their Heterosexual Peers, Clustered Multivariable Logistic Regression Analysis.

Behavior	Adjusted Odds Ratio (AOR)[a]	95% CI	P
Multiple sexual partners in past 30 days	1.46	1.06–2.0	0.02
Smoked cigarettes, past 30 days	3.27	2.27–4.7	<0.001
Used methamphetamines, past 30 days	3.83	2.07–7.06	<0.001
Used GHB, past 30 days	7.89	2.66–23.4	<0.001
Other illicit drug use, past 30 days[b]	1.90	1.10–3.28	0.022
Lifetime history of illicit drug use	1.70	1.22–2.38	0.002
Intimate partner violence: victim	2.10	1.31–3.36	0.002
Intimate partner violence: perpetrator	7.54	4.09–13.9	<0.001

[a]Using Generalized Linear Mixed Modeling to adjust for the within-university clustering of behaviors and demographic and academic characteristics provided in Table 1;

[b]Heroin, LSD, ecstasy, ketamine, or Quaaludes