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CVD Risk among Men Participating in the National Health and Nutrition Examination Survey (NHANES) from 2001–10: Differences by Sexual Minority Status

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Abstract

Background—Recent research indicates sexual minority women are at increased risk for cardiovascular disease (CVD) compared to Heterosexual women; however, few studies of CVD risk exist for sexual minority men (SMM). This study aimed to determine whether disparities in CVD risk exist for SMM and if CVD risk is consistent across subgroups of SMM.

Methods—This study utilized publicly available data from the National Health and Nutrition Examination Survey (NHANES), pooled from 2001 to 2010. CVD risk was calculated using the Framingham General CVD Risk Score and operationalized as the ratio of a participant's vascular and chronological age. Differences in this ratio were examined between Heterosexual and SMM as a whole, and within subgroups of SMM.

Results—SMM had vascular systems that were on average 4.0% (95% CI = −7.5%, −0.4%) younger than their Heterosexual counterparts; however, adjustment for education and history of hard drug use rendered this difference statistically insignificant. Analysis of SMM subgroups revealed increased CVD risk for Bisexual men and decreased CVD risk for both Gay and Homosexually-experienced Heterosexual men when compared to Heterosexual men. Differences in CVD risk persisted for only Bisexual and Homosexually-experienced Heterosexual men after adjustment for education and history of hard drug use.

Conclusion—Subgroups of SMM are at increased risk for CVD compared to Heterosexual men, and this increased risk cannot be completely attributed to differences in demographic characteristics or negative health behaviors.

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Keywords

Homosexuality; Cardiovascular Diseases; Minority Health; Substance-Related Disorders

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in the United States, accounting for approximately 1 in every 3 deaths.[1] The direct and indirect costs of CVD exceeded $297 billion in 2008, and it is expected the direct costs of CVD will triple by 2030.[1] While CVD affects both men and women, men accounted for over half of all US heart disease deaths in 2009 and comprised between 70% to 89% of the total sudden cardiac deaths.[1, 2]

A subgroup of men that may be at increased risk for CVD, relative to all men, are sexual minority men (SMM, i.e., men who identify as gay or bisexual, or who engage in same-sex sexual behavior). Recent research has shown SMM have disparately higher rates of smoking, alcohol and drug use, all of which may contribute to increased CVD risk.[3–8] Moreover, SMM are more likely to have limited access to health care and to culturally competent care, which have been linked to increased rates of CVD among other stigmatized groups.[9–20] Yet, despite this evidence suggesting that CVD disparities may exist for SMM, there is a dearth of empirical work examining CVD and CVD risk in this population.[5, 21, 22] Of the work that has been done, the majority has focused on the potential for increased CVD in HIV positive men.[5]

At present, only a few studies have examined differences in the prevalence of CVD diagnosis among SMM with population-based data.[11, 23, 24] For example, using data from the California Quality of Life Survey, Cochran and Mays found that Homosexually-experienced Heterosexual men were significantly more likely to report a diagnosis of heart disease compared to heterosexual men; however, there were no significant differences in self-reported heart disease for Gay or Bisexually identified men.[23] Similarly, using aggregated data from the Massachusetts Behavioral Risk Factor Surveillance Surveys (BRFSS) from 2001–2008, Conron and colleagues found no difference in the report of cardiovascular disease between Heterosexual and Gay or Bisexual men; however, Bisexual men and women were more likely to report multiple risks for cardiovascular disease.[11] These findings suggest that certain subgroups of SMM (i.e., Bisexual and Homosexually-experienced Heterosexual men) may be at increased risk for CVD; however, they are difficult to generalize as each study utilized data collected from only one state.

In our recent work, we found differences in CVD risk, as measured by the Framingham General CVD risk score, for sexual minority women (SMW) who participated in the National Health and Nutrition Examination Survey (NHANES).[25] In particular, these results indicated that SMW were at increased risk for CVD compared to heterosexual women, even after accounting for differences in smoking and alcohol use. At present, no such work exists for SMM. Consequently, this study aimed to determine whether similar disparities in CVD risk exist for SMM who participated in the NHANES, and if these differences are consistent across subgroups of SMM. Based on our previous work with SMW, we hypothesized that SMM would be at greater risk for CVD than Heterosexual men.

METHODS

The present study utilized publicly available data from the National Health and Nutrition Examination Survey (NHANES), pooled from 2001 to 2010. The NHANES is a nationally representative cross sectional survey of U.S. adults and children that assesses health and

nutritional status using in-home interviews and physical exams. In 2001, sexual orientation questions were added to the sexual behavior interview, and these data were included in the public use data set for participants aged 20–59 from 2001–06 and for participants aged 20–69 in 2007–10. Survey response rates for the ten years included in our sample ranged from 75% to 80% .[26] More detailed information regarding the NHANES design and sampling strategies are described elsewhere.[27] A total of 7571 men aged 20 to 69 completed the sexual behavior survey from 2001–2010. For the present study, 155 men (2.1%) were excluded because they either refused to answer the sexual orientation or same-sex behavior question or they provided a response of “Something Else”, “Not Sure” or “Don’t Know” to the sexual orientation question. Another 314 men (4.2%) were excluded due to preexisting cardiovascular disease (self-reported congestive heart failure, coronary heart disease, angina, heart attack or stroke), resulting in a final analytic sample of 7078 men.

Measures

Sexual minority status—The NHANES contains self-administered measures of both sexual orientation and sexual behavior. Sexual orientation was assessed using the question: “Do you think of yourself as … Heterosexual or straight (attracted to women); homosexual or gay (attracted to men); bisexual (attracted to men and women); something else; or you're not sure? ”. Sexual behavior was assessed by asking participants to provide the total number of their past-year and lifetime same-sex and opposite-sex sexual partners. For the present study, sexual minority men (SMM) were defined as men who either self-identified as Gay or Bisexual, or who reported having had at least one lifetime same-sex sexual partner (Homosexually-experienced Heterosexuals).

Cardiovascular Risk—CVD risk was assessed using the Framingham General CVD risk score. The Framingham score is a sex-specific, multivariable, risk factor algorithm that utilizes several established CVD risk factors to predict both the absolute 10-year likelihood of developing a first CVD event as well as an estimate of vascular age.[28] “Vascular age” is defined as the chronological age of a person with the same predicted CVD risk, given he or she has risk factor levels in the normal range. As such, vascular and chronological age will be equal when a person has a normal risk factor profile, and the ratio of his or her vascular and chronological age will be equal to one. For example, the vascular age of a 35 year old male smoker with untreated systolic blood pressure between 140 and 149 mmHg is 42, and the ratio of his vascular to chronological age is 1.2. This ratio indicates his vascular system is 20% older than would be expected given his chronological age. As age is a primary driver of CVD risk, the use of vascular age is a more appropriate measure of CVD risk in younger to middle-aged populations, as it is rare for persons in this age group to exhibit increased absolute risk whether or not they have multiple CVD risk factors.[29]

The risk factors included in the Framingham algorithm were age, sex, high-density lipoprotein (HDL) and total cholesterol level, systolic blood pressure, antihypertensive medication use, diabetes and current smoking status. A male was considered to have a normal risk factor profile if he did not currently smoke, was non-diabetic, had a total cholesterol level less than 160 mg/dL, had a HDL cholesterol level of 45 mg/dL or greater, and had an untreated systolic blood pressure of 129 mmHg or less. Men were classified as current smokers if they answered either “Some days” or “Every day” to the question “Do you now smoke cigarettes”, and men were considered diabetic if they answered “Yes” to the question “Have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?”.

Additional covariates—In addition to the variables that comprise the Framingham risk score, participants’ family history of early CVD, body mass index (BMI), education, annual

household income, race/ethnicity, history of hard drug use, and current alcohol use were assessed. Participants were considered to have a family history of premature CVD if they indicated having a first-degree relative who had a heart attack or angina before age 50. Participants' current BMI (defined as weight in kg divided by height in m^2) was recoded into 3 categories (normal/underweight, overweight, obese) based on NIH guidelines.[30] Participants were considered to have a history of hard drug use if they indicated ever using illicit drugs (e.g., cocaine, crack, heroin, methamphetamine) other than marijuana. Participants were classified into three categories of current alcohol users (risky drinkers, social drinkers, infrequent drinkers) based on the National Institute on Alcohol Abuse and Alcoholism (NIAAA) criteria for risky drinking, with infrequent drinkers being those participants who indicated having fewer than 12 drinks in their lifetime.[31] Lifelong abstention was not directly assessed in the survey.

Statistical Analyses

Data were analyzed using SAS 9.3 software (SAS Institute Inc, Cary, NC), incorporating both the design information and weights as specified in the NHANES Analytic and Reporting Guidelines to account for the complex survey design.[32, 33] Demographic characteristics and individual CVD risk factors were compared by sexual minority status using the chi-square test for proportions and one-way analysis of variance (ANOVA) for continuous variables. Linear regression was used to examine whether the ratio of vascular to chronological age varied by sexual minority status and multivariate linear regression was used to adjust for differences on demographic characteristics and other covariates that were not incorporated into the Framingham calculation. Variables were considered candidates for adjustment if they exhibited a statistically significant difference by sexual minority status at the alpha=0.20 level, and a 10% change in the beta estimate for sexual minority status was used as the final criterion for determining which variables to retain as covariates in the final model.[34] We conducted a sensitivity analysis to determine if restricting the definition of SMM to only those who identified as "Gay" or "Bisexual" affected the study's results, and we ran an analysis using a 4-category variable for sexual minority status (i.e., Heterosexual, Gay, Bisexual, Homosexually-experienced Heterosexuals) to determine if CVD risk differed among sub-groups of SMM.

RESULTS

Table 1 provides a summary of demographic characteristics and individual CVD risk factors by sexual minority status. Of the 7078 men in the sample, 5.2% were classified as SMM and 94.8% were classified as Heterosexual. Compared to Heterosexual men, SMM were more likely to be chronologically older (p=.007) and to have higher education levels (p<.001). However, a greater percentage of SMM fell into the lowest income bracket compared to Heterosexuals (21.3% vs. 16.5%, p=.02). In addition, SMM were more likely to have a history of hard drug use (39.4% vs. 25.8%) than their Heterosexual counterparts, but were less likely to be current risky drinkers (25.9% vs. 39.1%) and had, on average, lower systolic blood pressure (119.1 vs. 122.0). There were no statistically significant differences by sexual minority status in regards to race/ethnicity, smoking status, diabetes status, use of antihypertensive medication, family history of CVD, BMI categorization, total cholesterol, or HDL cholesterol.

The mean ratio of vascular to chronological age for the entire sample was 1.201, indicating that, on average, participants' vascular age was 20.1% greater than their chronological age. To aid in interpretation, all subsequent ratios will be expressed as percentages. Table 2 provides a summary of the differences in CVD risk by sexual minority status. Regression analysis revealed a statistically significant difference in the ratio of vascular to chronological age by sexual minority status. SMM were on average 16.3% (95% CI = 11.8%, 20.8%) older

in vascular terms than their chronological age, which was 4.0% (95% CI = −7.5%, −0.4%) less than their Heterosexual counterparts. Five variables emerged from the bivariate analysis as potential candidates for adjustment: education, income, family history of premature CVD, history of hard drug use, and alcohol use. In addition, year of data collection was also considered as a potential adjustment variable. Only education and history of hard drug use met the 10% change in beta estimate for sexual minority status criteria (56.1% for education and 20.1% for history of hard drug use), and as such, they were retained as adjustment variables in all subsequent models. After adjustment for education and history of hard drug use, the effect of sexual minority status on CVD risk decreased from −4.0% to −2.4% (95% CI = −5.9%, 0.1%), and was no longer statistically significant (p=0.16). When a sensitivity analysis was performed narrowing the definition of sexual minority status to only those who identified as “Gay” or “Bisexual”, neither the unadjusted nor adjusted difference in the ratio of vascular to chronological age between sexual minority and Heterosexual men was statistically significant (Table 2).

A summary of demographic characteristics and individual CVD risk factors using the 4-category variable for sexual minority status is presented in table 3. Among the SMM, 35.1% identified as Gay, 27.9% identified as Bisexual, and 37.0% were Homosexually-experienced Heterosexuals. As in the original analysis, significant ($p<0.01$) differences were found in regards to education, income, systolic blood pressure and history of hard drug use. The revised categorization revealed that income and education levels were the highest among Gay men and the lowest among Bisexual men, and that Gay men were more likely to have a history of hard drug use than Heterosexual men, but were less likely to have a history of hard drug use than Bisexual or Homosexually-experienced Heterosexual men. Systolic blood pressure was lower for both Gay and Homosexually-experienced Heterosexual men compared to Heterosexuals, but there was no significant difference for Bisexual men. In contrast to the original analysis, significant differences in diabetes status, antihypertensive medication use and total cholesterol emerged when using the revised categorization; however, differences in alcohol use were not statistically significant.

Table 4 presents differences in overall CVD risk using the 4-category variable for sexual minority status. Both Gay and Homosexually-experienced Heterosexual men had lower ratios of vascular to chronological age than their heterosexual counterparts (−9.1%; 95% CI = −13.9%, −4.3% and −6.6%; 95% CI = −11.5%, −1.7%, respectively). In contrast, the ratio of vascular to chronological age was significantly higher for Bisexual men compared to Heterosexuals (8.1%, 95% CI = 1.3%, 15.0%), indicating Bisexual men were at increased risk of developing CVD. Adjustment for education and history of hard drug use slightly attenuated the estimate of increased risk for Bisexuals, but did not appreciably change the difference estimate for Homosexually-experienced Heterosexuals. For Gay men, adjustment decreased the difference estimate by over half and rendered it statistically insignificant (p=.07).

DISCUSSION

Our current findings did not mirror those of our previous work with women in the NHANES where we found that SMW, as a whole, exhibited increased CVD risk compared to Heterosexual women. Rather, we found that SMM, as a whole, exhibited no significant difference in CVD risk compared to Heterosexual men after accounting for differences in education and history of hard drug use. One explanation for this finding may be that the proportion of Bisexuals was greater among SMW compared to SMM, which could have accounted for increased CVD risk among SMW as a whole. Another explanation may be that sexual minority status affects CVD risk differently for women and men.

Our results indicate that certain subgroups of SMM are at increased risk for CVD compared to Heterosexual men, and this increased risk cannot be completely attributed to differences in demographic characteristics or negative health behaviors. Specifically, we found that Bisexual men were at significantly increased risk for CVD and Homosexually-experienced Heterosexual men were at significantly decreased risk for CVD compared to Heterosexual men. Gay men did not exhibit significantly increased CVD risk compared to Heterosexual men after accounting for differences in education and history of hard drug use. These findings indicate that it is critically important to look at differences within sexual minority categories, as combining Gay, Bisexual and Homosexually-experienced Heterosexual men into one broad category may mask important differences.

Our findings were consistent with those of Conron and colleagues that Bisexuals were at increased risk for CVD compared to Heterosexuals, but were inconsistent with Cochran and Mays's finding that Homosexually-experienced Heterosexual men were significantly more likely to report a diagnosis of heart disease than Heterosexual men. Among our sample, Homosexually-experienced Heterosexuals had significantly lower CVD risk than Heterosexual men, which persisted even after adjustment for possible confounding factors. Potential explanations for this inconsistency include both the use of different sampling frames, (i.e., state vs. nation) and the use of different outcome measures (i.e., self-reported CVD vs. CVD risk).

Consistent with previous research, we found that SMM were more likely to have a history of hard drug use than Heterosexual men; however, we did not find significantly increased rates of current risky drinking or smoking for SMM. One explanation for the lack of any difference in these variables is that the prevalence of both current risky drinking and smoking among Heterosexual men in our sample is higher than would be expected based on other national estimates (39.1% vs. 23.2% for binge drinking; 29.1% vs. 22.3% for smoking). [35, 36] When compared to these national estimates, the prevalence of both current risky drinking and smoking is higher among all groups of SMM in our sample, which is consistent with previous research.

Strengths of this study include the use of a national population-based sample, the use of both identity and behavior measures to operationalize sexual minority status, and the use of a validated multi-risk algorithm to measure CVD risk. Limitations include a lack of sexual behavior data for older participants, a relatively small sample of SMM, and the exclusion of men who identified their sexual orientation as "Something Else", "Not Sure" or "Don't Know" because we could not definitively infer the meaning of their sexual orientation. As such, our sample may not be representative of all SMM. Moreover, the use of self-reported measures of substance use, sexual identity and sexual behavior could have introduced misclassification bias due to under-reporting of these behaviors. Finally, although we assessed and controlled for confounding factors using a well-established and validated approach, the potential for uncontrolled and residual confounding exists.

The increased CVD risk we found for Bisexual men and the increased prevalence of substance use among all SMM reinforce the need for culturally competent interventions to reduce substance use and CVD risk in this population. Future work is also needed to elucidate the mechanisms by which sexual minority status confers increased CVD risk and, in particular, how these mechanisms may differ among sexual minorities and by gender. Critical in such research is the need utilize assessments of sexual minority status that accurately capture variation within sexual minority categories and allow sexual minorities to be disaggregated into subgroups. In addition, longitudinal studies are needed to determine whether disparities in CVD risk for sexual minorities ultimately result in increased CVD for this population.

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What is already known on this subject?

Sexual minorities may be at increased risk for cardiovascular disease, in part due to increased prevalence of tobacco, alcohol and drug use among this population. Previous research using the Framingham General CVD risk score found that sexual minority women were at increased CVD risk compared to heterosexual women. No such work currently exists for sexual minority men.

What this study adds?

We found that CVD risk varies among subgroups of sexual minority men, with Bisexual men having increased CVD risk and Homosexually-experienced Heterosexual men having decreased CVD risk compared to heterosexual men. Our findings illustrate the importance of examining differences within subgroups of sexual minorities as well as between sexual minorities and Heterosexuals.

Table 1

Demographic Characteristics and Cardiovascular Risk Factors of Male NHANES Participants from 2001–2010 by Sexual Minority Status

	Heterosexual Men (N=6713)	Sexual Minority Men* (N=365)	
	% or Mean (SE)	% or Mean (SE)	p-value†
Demographic Characteristic			
Age Category			0.007
Less than 29	27.2%	18.6%	
30–39	24.5%	31.5%	
40–49	27.2%	27.2%	
50 or greater	21.1%	22.7%	
Race			0.554
Non-Hispanic White	69.5%	70.7%	
Non-Hispanic Black	10.7%	9.5%	
Mexican American	9.9%	8.3%	
Other Hispanic	4.8%	6.1%	
Other (Including Multi-Racial)	5.2%	5.4%	
Education			<0.001
Less than High School	16.1%	8.6%	
High School	26.8%	15.1%	
Some College	30.8%	36.3%	
College Graduate or Above	26.3%	40.0%	
Annual Household Income			0.02
Less than $25,000	16.5%	21.3%	
$25,000 – $34,999	10.0%	6.2%	
$35,000 – $49,999	10.0%	7.3%	
$45,000 to $54,999	10.5%	13.1%	
$55,000 or greater	53.3%	51.8%	
CVD Risk Factors			
Smoking Status			0.616
Nonsmoker	49.3%	46.0%	
Former Smoker	21.6%	21.5%	
Smoker	29.1%	32.5%	
Diabetes			0.138
Yes	4.0%	5.9%	
Antihypertensive Medication			0.648
Yes	12.8%	11.7%	
Family History of CVD			0.098
Yes	7.3%	9.5%	
BMI Category			0.497
Normal or Underweight	58.0%	61.2%	

	Heterosexual Men (N=6713)	Sexual Minority Men* (N=365)	
	% or Mean (SE)	% or Mean (SE)	p-value†
Overweight	24.2%	21.1%	
Obese	17.8%	17.7%	
Total Cholesterol (mg/dL)	199.4 (0.73)	202.4 (3.70)	0.316
HDL Cholesterol (mg/dL)	47.1 (0.25)	47.3 (1.15)	0.851
Systolic Blood Pressure (mmHg)	122.0 (0.25)	119.1 (1.08)	0.001
History of Drug Use (Excluding Marijuana)			<0.001
Yes	25.8%	39.4%	
Current Alcohol Use			0.044
Risky Drinker	39.1%	35.9%	
Social Drinker	55.8%	61.9%	
Infrequent Drinker	5.1%	2.3%	

*Includes men who identify as "Gay" or "Bisexual" or Heterosexually identified men with at least one lifetime same-sex sexual partner

†P-values are from the chi-square test for categorical variables and ANOVA for continuous variables

Table 2

Ratios of Vascular to Chronological Age by Sexual Minority Definition

	Heterosexual Men	Sexual Minority Men	Difference	95% CI of Difference
Identity/Behavior Definition[†]				
Unadjusted	1.203	1.163	−0.040	(−0.075, −0.004)
Adjusted[*]	1.091	1.067	−0.024	(−0.059, 0.010)
Identity Only Definition[‡]				
Unadjusted	1.202	1.177	−0.025	(−0.075, 0.025)
Adjusted[*]	1.090	1.090	0.001	(−0.044, 0.045)

[*] Adjusted for education and history of hard drug use

[†] Includes men who identify as "Gay" or "Bisexual" or Heterosexually identified men with at least one lifetime same-sex sexual partner

[‡] Includes only men who identify as "Gay" or "Bisexual"

Table 3

Demographic Characteristics and Cardiovascular Risk Factors of Male NHANES Participants from 2001–2010 by Sexual Minority Status

		Heterosexual (N=6713)	Gay (N =128)	Bisexual (N=102)	Homosexually-experienced Heterosexual (N=135)
		% or Mean (SE)			p-value †
Demographic Characteristic					
Age Category					0.12
Less than 29	27.2%	18.1%	23.1%	15.9%	
30–39	24.5%	34.7%	29.5%	29.3%	
40–49	27.2%	28.6%	22.8%	28.7%	
50 or greater	21.1%	18.5%	24.6%	26.1%	
Race					0.273
Non-Hispanic White	69.5%	73.3%	66.8%	70.4%	
Non-Hispanic Black	10.7%	7.4%	13.0%	9.7%	
Mexican American	9.9%	6.8%	9.9%	8.9%	
Other Hispanic	4.8%	3.9%	8.0%	7.3%	
Other (Including Multi-Racial)	5.2%	8.7%	2.3%	3.9%	
Education					<0.001
Less than High School	16.1%	2.5%	17.7%	9.3%	
High School	26.8%	7.7%	23.9%	17.5%	
Some College	30.8%	29.0%	36.4%	44.7%	
College Graduate or Above	26.3%	60.9%	22.0%	28.5%	
Annual Household Income					0.005
Less than $25,000	16.5%	14.4%	30.6%	23.7%	
$25,000–$34,999	10.0%	7.3%	6.9%	4.6%	
$35,000–$49,999	9.7%	3.4%	13.0%	7.6%	
$45,000 to $54,999	10.5%	16.3%	10.7%	11.0%	
$55,000 or greater	53.3%	58.6%	38.8%	53.0%	
CVD Risk Factors					
Smoking Status					0.353
Nonsmoker	49.3%	50.6%	45.2%	41.2%	

		Heterosexual (N=6713)	Gay (N =128)	Bisexual (N=102)	Homosexually-experienced Heterosexual (N=135)
		% or Mean (SE)			p-value †
Former Smoker	21.6%	19.4%	14.2%	29.0%	
Smoker	29.1%	30.0%	40.6%	29.8%	
Diabetes					<0.001
Yes	4.0%	0.4%	15.4%	5.5%	
Antihy pertensive Medication					0.011
Yes	12.8%	7.8%	23.0%	8.5%	
Family History of CVD					
Yes	7.3%	9.4%	7.2%	11.3%	0.402
BMI Category					0.6
Normal or Underweight	58.0%	63.6%	54.8%	63.0%	
Overweight	24.2%	21.1%	19.8%	21.9%	
Obese	17.8%	15.3%	25.4%	15.1%	
Total Cholesterol (mg/dL)	199.4 (0.73)	200.3 (5.72)	197.3 (4.45)	208.2 (4.11) *	
HDL Cholesterol (mg/dL)	47.1 (0.24)	47.3 (1.51)	46.4 (2.32)	47.8 (1.75)	
Systolic Blood Pressure (mmHg)	122.0 (0.25)	119.0 (1.13) **	122.8 (2.43)	116.5 (1.49) **	
History of Drug Use (Excluding Marijuana)					<.0.001
Yes	25.8%	31.3%	42.5%	46.5%	
Alcohol Use					0.085
Risky Drinker	39.1%	31.4%	40.6%	37.7%	
Social Drinker	55.8%	65.5%	55.7%	62.0%	
Infrequent Drinker	5.1%	3.1%	3.7%	0.3%	

† P-values are from the chi-square test for categorical variables and ANOVA for continuous variables

* p<0.05

** p<0.001

Table 4

Ratios of Vascular to Chronological Age by Sexual Minority Category Definition

	Ratio	Difference from Heterosexual	95% CI of Difference
Unadjusted			
Heterosexual	1.203	Reference	Reference
Gay	1.112	−0.091	(−0.139, −0.043)
Bisexual	1.285	0.081	(0.013, 0.150)
Homosexually-experienced Heterosexuals	1.137	−0.066	(−0.115, −0.017)
Adjusted *			
Heterosexual	1.092	Reference	Reference
Gay	1.049	−0.043	(−0.088, 0.003)
Bisexual	1.159	0.068	(0.001, 0.134)
Homosexually-experienced Heterosexuals	1.024	−0.068	(−0.116, −0.019)

* Adjusted for education and history of hard drug use