A Comparative Analysis of Lifetime Medical Conditions and Infectious Diseases by Sexual Identity, Attraction, and Concordance among Men:

Results from a National U.S. Survey

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ABSTRACT

BACKGROUND. There have been relatively few studies of potential disparities in the prevalence/risk for health conditions or infectious diseases other than HIV/AIDs and other sexually transmitted infections (STIs) among sexual minority men (e.g., men who self-identify as gay or bisexual or who have sex with other men). The recent addition of sexual orientation and attraction questions to the National Survey on Drug Use and Health (NSDUH) now allows for health-related research using a national survey that identifies participant sexual orientation and attraction.

OBJECTIVES. This study sought to compare the prevalences/odds of having ten medical conditions/infectious diseases among men assessing for differences associated with sexual identity, sexual attraction, and the degree of concordance between identity and attraction.

METHOD. Data from 18,718 adult (18 and over) male participants in the 2015 NSDUH survey were analyzed using bivariate and multivariable logistic regression models to assess for differences by sexual orientation, attraction, or concordance in the prevalence/adjusted odds of seven medical conditions (asthma, heart condition, hypertension, diabetes, chronic bronchitis or chronic obstructive pulmonary disease, kidney disease, cancer of any kind) and three infectious diseases (hepatitis B or C; STIs, and HIV/AIDS). Multivariable models adjusted for demographics, substance abuse/dependence, and mental illness.

RESULTS. Except for HIV/AIDS, there were no significant associations between sexual identity and any medical condition/infectious disease in the multivariable models nor were there any significant associations with sexual attraction or concordance.

CONCLUSION. The findings diverge from prior studies that used non-national samples and which found modest health differences for gay and bisexual men for some conditions other than HIV or STIs. The divergent findings highlight the importance of having nationally representative data for health research related to sexual minorities.

KEYWORDS. health conditions, infectious diseases, sexual minority, gay men, bisexual men, gay men's health

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1.INTRODUCTION

Health research on sexual minority men (i.e., gay, bisexual, or other men who have sex with men) has focused on two areas: sexually transmitted infections (STIs) such as HIV/AIDS, gonorrhea, syphilis, chlamydia, and hepatitis B and C and behavioral health conditions such as mental illness, smoking, and substance use, often with an emphasis on how these relate to sexual behaviors and risk for HIV infection.(1-9) To a lesser extent, health conditions such as anal cancer resulting from infection with the human papillomavirus have also been studied but again are related to sexual activity.(10, 11) There have been far fewer studies of the relative prevalence of medical conditions such as heart disease, asthma, or hypertension.(12) This gap in the research literature represents a critical barrier to gaining a more complete understanding of the medical profiles of sexual minority men and how best to provide comprehensive health care for this population.(13-15)

In part, the focus on HIV/STIs and behavioral health conditions reflects a legitimate concern over their significant health consequences and long-standing high prevalence rates among sexual minority men as well as the associated and high prevalence rates of substance use and mental illness.(16) Until very recently, another important determinant of the lack of research on a broader range of health conditions among sexual minorities has been the absence of questions on sexual orientation – composed of sexual identity, attraction, and behavior – from national health surveys.(13, 15, 17) As a consequence, much of what little is known about the broader health concerns of sexual minorities, for women as well as men, is based on studies using circumscribed, non-nationally representative samples that have also been subject to methodological limitations such as a narrow range of assessed medical conditions and low response rates.(2, 18, 19)

Over the past few years, however, sexual orientation questions have been added to a number of national U.S. surveys on health and health-related behaviors (see Wolff et al. for a more detailed enumeration of surveys and the questions included). (17) Examples of national surveys that now incorporate sexual orientation questions include the National Health Interview Survey (NHIS) beginning in 2013 and the National Survey on Drug Use and Health (NSDUH) beginning in 2015. In 2014, the Behavioral Risk Factor Surveillance System (BRFSS) also added an optional module on sexual identity that can be administered at the discretion of participating states. The addition of items assessing one or more aspects of sexual orientation to the BRFSS, NHIS and NSDUH allows for research on the relative prevalence of an expanded range of medical conditions using large and/or nationally representative samples. Consequently, studies of health and health-related behaviors among sexual minorities based on the information collected for these surveys have recently emerged in the research literature. (20-23)

For instance, a study using combined data from the 2013 and 2014 NHIS examined the extent of multimorbidity for 10 chronic medical conditions (i.e., cancer, hypertension, coronary heart disease, stroke, COPD, asthma, diabetes, arthritis, hepatitis,

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and weak or failing kidneys) for lesbian, gay, and bisexual participants 18 years or older. (23) To assess multimorbidity, the health conditions were collapsed into a three-category outcome variable representing none, 1, or 2+ conditions. There were no significant differences in multimorbidity for either gay or bisexual men and men who identified as heterosexual in multivariable logistic regression models that adjusted for demographic and socioeconomic covariates.

Using 2014-2015 BRFSS data, a related study examined differences by sexual identity for five classes of health conditions: cardiovascular disease, cancer, arthritis, asthma, and COPD. (22) Logistic regressions adjusting for sociodemographics found gay men to have a slightly lower rate of cancer but an elevated rate of COPD whereas bisexual men had an elevated rate of asthma compared with heterosexual men. Overall, the findings suggest differences in the prevalence of a few chronic medical conditions by sexual identity but that those differences are not large. These findings, however, are also limited by the fact that the BRFSS sample is not nationally representative.

To our knowledge, no study has as yet used the most recently available data from the NSDUH to compare the odds/probabilities of having a given medical condition by sexual identity. The NSDUH survey is nationally representative of the non-institutionalized U. S. population and includes questions on eight medical conditions as well as three infectious diseases. The NSDUH, as opposed to the NHIS and BRFSS, is also incorporates a question on sexual attraction; the degree to which a person is attracted to members of the same or opposite sex regardless of sexual identity and behavior. This allows for fuller analyses of how medical condition and infectious disease prevalences vary by two of the three constructs that compose sexual orientation.(17) Accordingly, the goals of the current study were to use the most recently available data from the NSDUH to: 1) compare the odds/probabilities of having a specific set of medical conditions/infectious diseases for sexual majority and sexual minority individuals; and 2) for any differences that do exist, determine if they are associated specifically with sexual identity and/or sexual attraction.

The inclusion of questions on identity and attraction in the NSDUH also allowed for a third goal. Wolff et al. have suggested possible health outcome disparities depend upon whether a person's sexual identity and sexual attraction are congruent. (17) For instance, a person might identify as heterosexual but be either strongly or somewhat attracted to persons of the opposite sex. Alternatively, a person identifying as gay might express having some attraction to the opposite sex. Persons whose sexual identity and attraction match are concordant whereas persons whose identity and attraction do not match are discordant. (24) Our third study goal was to determine if the odds/probability of having a medical condition or infectious disease varied for sexual majority and minority men contingent on whether their sexual identity and attraction were concordant or discordant.

2. METHOD

This study was a secondary analysis of data collected for the 2015 NSDUH.

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Details on the NSDUH sampling design, protocol, response rate, questionnaire, public use data set, and codebook are available at the Substance Abuse and Mental Health Data Archive (https://www.datafiles.samhsa.gov/). As the NSDUH public use data set is fully de-identified and the study involved no interaction with human participants, an exemption was granted by the University of Illinois at Chicago Institutional Review Board.

2.1 Sample

We used data collected from male participants 18 years of age and older. The study was restricted to males because research indicates important health differences by gender (13, 18), warranting a separate, parallel study of the same research issues for women. We restricted the study to adults as NSDUH participants younger than 18 are not asked the sexual orientation questions. Application of these two selection criteria yielded a sample of 19,828 adult male participants. Of these, 281 (1.4%) had missing data on sexual identity. Sample size was further reduced to 18,667 (94.1% of all eligible participants) for the medical condition and infectious disease multivariable models due to missing data on sexual attraction or concordance or other model covariates. For HIV/AIDs, the available N was 17,228 (86.8%) because of additional missing data for this specific variable.

2.2. Measures
Independent variables
2.2.1 Sexual Identity, attraction, and concordance. Sexual identity was assessed as a three-category variable: heterosexual, bisexual, or gay. Sexual attraction was treated as an interval-level measure in the statistical models and was assessed by the NSDUH questionnaire with a single question to which responses were captured using a five-point scale ranging from *only attracted to members of the opposite sex* (1) to *only attracted to members of the same sex* (5). Responses of *not sure* (N = 634, 1.1%) were set to missing. A two-category variable was created to capture sexual concordance/discordance between identity and attraction. Concordance was defined as identifying as heterosexual and being attracted only to the opposite sex; identifying as gay and being attracted only to the same sex; or identifying as bisexual with non-exclusive attraction to either sex. All other participants were classified as discordant.

2.2.2. Demographics. The multivariable models adjusted for the following demographics: race/ethnicity (White, African-American/Black, Hispanic, and Asian/Pacific Islander/Multi-ethnic/Other); age (five categories from 18-25 years through 65 and older); education (four categories from less than high school through college graduate); marital status (married, widowed, separated/divorced, never married); poverty level (living in poverty, income up to twice the poverty level, income greater than twice the poverty level); population density (living in a core based statistical area (CBSA) with greater than a million population, living in a CBSA with less than a million, not living in a CBSA). Body mass index (BMI) was treated as an interval-level measure calculated from participant height and weight.

2.2.3. Past-year mental illness. Past-year mental illness was assessed as a

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four-category variable (none, mild, moderate, severe) using thresholds based on predicted probabilities of having a mental illness and severity level given a respondent's age, level of functional disability, thoughts of suicide, and major depressive episode as developed for the NSDUH. Sub-sample studies comparing this measure with the results of clinical interviews using a semi-structured diagnostic instrument supported the criterion validity of the measure. (25)

2.2.4. Substance abuse/dependence. Alcohol and other drug abuse/dependence except for nicotine were assessed with two binary (no/yes) variables reflecting past-year alcohol abuse/dependence and past-year abuse/dependence on drugs other than alcohol. Criteria for abuse/dependence were based on the DSM-IV-TR as implemented in the NSDUH. (26) Past-month nicotine dependence was also assessed as a binary variable but based on participant responses to the Nicotine Dependence Syndrome Scale included in the NSDUH questionnaire. (27)

Dependent variables

2.2.5. Medical conditions and infectious diseases.

The NSDUH asks participants if they have ever been told by a doctor or other health care professional they had any of eight medical conditions: asthma, heart condition, hypertension, diabetes, chronic bronchitis or chronic obstructive pulmonary disease (COPD), cirrhosis, kidney disease, or cancer of any kind. Because of the small number of participants reporting they had ever had cirrhosis (N = 72, < 1.0%) we dropped this condition from the analyses. The survey also asks participants if they have ever had any of the following infectious/contagious diseases: hepatitis B or C; sexually transmitted infections such as syphilis, gonorrhea, chlamydia, or herpes; or HIV/AIDs. Each of the seven remaining medical conditions and three infectious diseases were coded as binary (no/yes) dependent variables for the analyses.

2.3. Analyses

All analyses were conducted using Stata version 14.2 (28) Prior to running the multivariable binary logistic models, simple bivariate analyses were run and likelihood ratios were used to compare the unadjusted prevalence rates of each medical condition and infectious disease by sexual identity. A separate binary logistic model was run for each medical condition and infectious disease to test for the effects of sexual identity, attraction, and concordance on the odds of having the condition or disease. Estimated odds for the sexual orientation variables were adjusted for demographics, mental illness, substance abuse/dependence, and nicotine dependence. Post-estimation, models were assessed for misspecification error using the Stata 'linktest' procedure. Model effect sizes were estimated using Tjur's "coefficient of discrimination". (29) This is calculated as the difference between the mean predicted probabilities of having a given condition for observed cases and non-cases and tested for significance using a t-test.

3. RESULTS

3.1 Demographics. Table 1 presents sample demographics disaggregated by sexual identity. A total of 18,718 male NSDUH participants (95.7%) identified as heterosexual, 451(2.3%) as gay, and 378 (1.9%) as bisexual. Majorities of sample

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participants were: white (65.6%), between the ages of 35 and 64 years old (50.1%), had attended college (58.5%), were married (55.0%), had incomes more than twice the federal poverty level (68.4%), lived in a CBSA with a population size greater than one million, and indicated they were attracted only to the opposite sex (95.5%).

Analyses of the distributions of these demographic characteristics indicated that for all but race/ethnicity, there were significant differences by sexual identity. NSDUH participants tended to be younger with higher proportions of bisexual (29.4%) and gay (19.4%) participants in the 18 to 25-year-old age group compared with heterosexual participants (14.7%; $F_{(6.3, 314.3)}$ = 5.2, p < .001). A higher proportion of gay participants were college graduates (44.3%) compared with bisexual (26.2%) and heterosexual participants (29.4%; $F_{(5.5, 272.6)}$ = 7.5, p < .001). Compared with heterosexuals (28.1%), much higher proportions of gay (74.9%) and bisexual participants (57.8%) had never been married ($F_{(5.2, 257.6)}$ = 44.9, p < .001). Bisexual participants (22.9%) were more likely to report poverty level incomes than heterosexuals (12.8%) or gays (12.4%; $F_{(3.6, 181.0)}$ = 5.3, p < .001) while both gay (67.4%) and bisexual (60.7%) participants were more likely to live in CBSA population centers with more than a million residents (53.3% heterosexuals; $F_{(3.0, 151.8)}$ = 10.9, p < .001).

There was a strong and positive correlation between sexual identity and attraction (Pearson's r = .84, p < .001). Large majorities of heterosexual (95.8%) and gay (71.4%) participants indicated they were attracted to the opposite or same sex respectively. Bisexual participants were more variable and more likely to report being mostly attracted to the opposite sex (31.0%) or equally attracted to both sexes (42.9%; $F_{(6.6, 331.4)}$ = 333.4, p < .001). However, gay participants (30.6%) were more likely than bisexual (14.4%) or heterosexual participants (5.6%) to express a sexual attraction that was discordant with their sexual identity ($F_{(1.9, 99.3)}$ = 70.2, p < .001) according to the definition of discordance used for this study.

3.2 Bivariate comparisons of medical conditions, infectious diseases, and behavioral health issues by sexual identity. Results for the bivariate comparisons of the unadjusted lifetime prevalence rates for the seven medical conditions, three infectious disease classes, and behavioral health issues including alcohol and other substance abuse/dependence, nicotine dependence, and mental illness are shown in Table 2. There were no statistically significant associations between the prevalences of any lifetime medical condition by sexual identity.

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Table 1

Demographics and Self-reported Sexual Attraction by Sexual Orientation

Sexual Orientation	Heterosexual (N = 18,718)		Gay (N = 451)		Bisexual (N = 378)		Totals (N = 19,547)		Sig
	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	
Race/Ethnicity									NS
Non-Hispanic white	65.8	[64.5, 67.1]	61.1	[54.1, 67.6]	58.0	[50.0, 67.6]	65.6	[64.3, 66.8]	
Non-Hispanic black/African-American	11.0	[10.4, 11.5]	10.5	[7.2, 15.1]	11.8	[7.2, 15.1]	11.0	[10.4, 11.5]	
Hispanic	15.7	[14.8, 16.8]	22.2	[17.1, 28.4]	20.6	[17.1, 28.4]	15.9	[15.2, 16.9]	
Asian/Pacific Islander/Native American/multi-ethnic	7.5	[7.0, 8.0]	6.2	[3.9, 9.8]	9.7	[3.9, 9.8]	7.5	[7.0, 8.0]	
Age (in years)									***
18-25	14.7	[14.1, 15.2]	19.4	[15.3, 24.2]	29.4	[23.6, 36.0]	15.0	[14.4, 15.6]	
26-34	16.0	[15.3, 16.8]	21.8	[16.9, 27.7]	16.4	[11.9, 22.2]	16.2	[15.4, 16.9]	
35-49	25.1	[24.2, 26.1]	22.5	[17.0, 29.1]	22.8	[17.4, 29.4]	25.1	[24.2, 26.0]	
50-64	25.8	[24.6, 27.1]	27.9	[21.2, 35.7]	22.6	[14.8, 32.9]	25.8	[24.6, 27.1]	
65+	18.4	[17.2, 19.5]	8.5	[4.8, 14.5]	8.8	[4.4, 16.7]	18.0	[16.9, 19.1]	
Education (highest grade)									***
Less than high school	14.9	[14.1, 15.6]	8.4	[5.4, 12.7]	18.4	[13.7, 24.2]	14.8	[14.0, 15.5]	
High school graduate	27.0	[26.0, 28.1]	14.2	[10.0, 19.9]	28.1	[21.5, 35.9]	26.8	[25.7, 27.8]	
Some college/associate's degree	28.7	[27.5, 29.9]	33.1	[27.8., 38.9]	27.3	[20.8, 35.0]	28.8	[27.6, 29.9]	
College graduate	29.4	[28.4, 30.6]	44.3	[38.5, 50.2]	26.2	(20.0, 33.4]	29.7	[28.6, 30.8]	
Marital Status									***
Married	56.4	[55.3, 57.5]	12.5	[8.1, 18.6]	25.6	[20.2, 32.0]	55.0	[53.8, 56.1]	
Widowed	3.4	[3.0, 3.9]	2.3	[1.1, 4.6]	4.8	[2.2, 9.9]	3.4	[3.0, 3.9]	
Divorced or Separated	12.1	[11.4, 12.9]	10.4	[6.7, 15.8]	11.8	[7.0, 19.4]	12.1	[11.3, 12.9]	
Never been married	28.1	[27.3, 28.9]	74.9	[68.6, 80.3]	57.8	[49.4, 65.7]	29.5	[28.7, 30.4]	
Poverty Level									***
Living in poverty	12.8	[12.2, 13.4]	12.4	[8.8, 17.2]	22.9	[17.6, 29.3]	12.9	[12.3, 13.6]	
Income up to twice the federal poverty level	18.5	[17.6, 19.5]	19.4	[15.0, 24.7]	24.4	[17.8, 32.4]	18.7	[17.8, 19.6]	
Income greater than twice the federal poverty level	68.7	[67.7, 69.7]	68.3	[61.7. 74.2]	52.7	[44.3, 61.0]	68.4	[67.4, 69.4]	
Population Density[a]									***
CBSA > 1 million	53.3	[51.9, 54.7]	67.4	[60.0, 73.9]	60.7	[52.0. 68.8]	53.7	[52.3, 55.1]	
CBSA < 1 million	40.8	[39.3, 42.2]	31.5	[25.3, 38.6]	38.0	[30.0, 46.6]	40.5	[39.1, 42.0]	
Not in CBSA	5.9	[5.4, 6.6]	1.1	[0.4, 2.7]	1.3	[0.6, 3.0]	5.8	[5.3, 6.4]	
Sexual Attraction[b]									***
Only attracted to opposite sex	95.8	[95.4, 96.2]	1.3	[0.5, 3.2]	13.8	[9.1, 20.5]	92.7	[92.0, 93.2]	
Mostly attracted to opposite sex	3.0	[2.7, 3.4]	1.6	[0.6, 4.3]	31.0	[24.5, 38.4]	3.4	[3.0, 3.7]	
Equally attracted to both sexes	0.6	[0.5, 0.9]	0.7	[0.2, 2.6]	42.9	[36.1, 50.0]	1.2	[1.0, 1.5]	
Mostly attracted to same sex	0.1	[0.1, 0.2]	25.1	[19.8, 31.2]	11.7	[7.2, 18.5]	0.8	[0.6, 1.0]	
Only attracted to same sex	0.4	[0.3, 0.6]	71.4	[65.2, 76.8]	0.5	[0.1, 3.0]	1.9	[1.7, 2.3]	
Sexual Attraction (mean score)	1.06	[1.0, 1.1]	4.6	[4.6, 4.7]	2.5	[2.4, 2.7]	1.2	[1.1, 1.2]	***

Note. All figures reflect weighted percentages and are based on 19,547 male NSDUH participants 18 years of age and older. Sample N's at the top of each column are unweighted. All figures are percentages unless otherwise indicated. Design-based F-tests based on the weighted data and controlling for stratification and clustering were used to test statistical significance.

[a]Population density is based on Core Based Statistical Areas (CBSA), which are used by the U. S. Office of Management and Budget to define population centers in the U.S.

[b] Sexual attraction was self-reported using a scale from 1 to 5 with the lowest score indicating exclusive attraction to members of the opposite sex and higher scores indicating increasingly greater attraction to the same sex.

NS = non-significant;   ***p < .001

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However, there were significant associations between sexual identity and the prevalences of all three infectious diseases. Gay men (7.2%) were more likely to report having had Hepatitis B or C compared with heterosexual (1.7%) or bisexual (2.1%) men ($F_{(1.8, 91.2)}$ = 11.8, p < .001). Similarly, gay men were much more likely to report having HIV/AIDS (11.9%) compared with bisexual (3.3%) or heterosexual men (.05%, $F_{(1.9, 92.4)}$ = 94.1, p < .001). Finally, gay men (7.1%) also reported higher rates of STIs other than HIV (bisexual men, 3.1%; heterosexual men, 1.6%; $F_{(1.8, 90.5)}$ = 14.2, p < .001).

In terms of behavioral health issues, gay men had the highest rates of alcohol ($F_{(2.0, 99.9)}$ = 5.2, p < .001) and substance abuse/dependence ($F_{(1.7, 82.8)}$ = 19.1, p < .001). Bisexual men had significantly higher rates of all levels of mental illness, from mild to severe, followed by gay men; heterosexual men had the lowest rates of past-year mental illness ($F_{(5.1, 258.8)}$ = 22.0.2, p < .001). The only behavioral health issue where there was not a significant difference by sexual identity was past-month nicotine dependence.

3.3. Multivariable models of medical conditions and infectious diseases. Table 3 presents the odds ratios of having these same conditions by sexual identity, attraction, and concordance, adjusted for demographics, substance abuse/dependence, and mental illness. Except when HIV/AIDS was the dependent variable, all multivariable models adjust for HIV/AIDS. Table 3 also presents the odds ratios and confidence intervals for all model covariates which, because they are not the focus of this study, are not discussed but are shown for the purpose of presenting complete model results.

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Table 2

Bivariate Comparisons of the Lifetime Prevalences of Medical Conditions, Infectious Diseases, and Behavioral Health Isssues by Sexual Identity

Sexual Identity	Heterosexual (N = 18,718)		Gay (N = 451)		Bisexual (N = 378)		Totals (N = 19,547)		Sig
Medical Conditions	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	
Asthma	7.6	[7.1, 8.1]	8.0	[5.2, 12.1]	10.2	[6.9, 14.8]	7.6	[7.2, 8.1]	NS
Heart condition	12.0	[11.1, 12.8]	9.8	[6.2, 15.2]	11.2	[6.2, 19.2]	11.9	[11.1, 12.8]	NS
Hypertension	18.5	[17.7, 19.3]	20.6	[15.3, 27.2]	17.3	[10.6, 27.0]	18.5	[17.8, 19.3]	NS
Diabetes	10.7	[9.9, 11.6]	8.6	[5.1, 14.0]	7.4	[4.4, 12.2]	10.6	[9.8, 11.4]	NS
Chronic bronchitis or COPD	3.5	[3.0, 3.9]	3.6	[1.6, 8.0]	6.1	[3.9, 9.5]	3.5	[3.1, 4.0]	NS
Cirrhosis	0.3	[0.2, 0.5]	0.0	-	0.0	[0.0 - 0.1]	0.3	[0.2 - 0.5]	NS
Kidney Disease	1.9	[1.6, 2.3]	1.7	[0.5, 6.1]	3.1	[0.8, 11.8]	1.9	[1.6, 2.3]	NS
Cancer (any kind)	5.2	[4.7 - 5.8]	5.0	[2.4, 10.1]	5.0	[2.4, 9.8]	5.2	[4.7, 5.8]	NS
Infectious Diseases									
Hepatitis B or C	1.7	[1.4, 2.1]	7.2	[4.4, 11.5]	2.1	[0.9, 4.8]	1.8	[1.5, 2.2]	***
Sexually transmitted infections[a]	1.6	[1.4, 1.9]	7.1	[4.5, 11.1]	3.1	[1.4, 6.6]	1.7	[1.5, 2.0]	***
HIV/AIDS	0.1	[0.0, 0.1]	11.9	[8.0, 17.1]	3.3	[1.2, 8.7]	0.3	[0.3, 0.5]	***
Behavioral Health Issues									
Body Mass Index	28.3	[28.2, 28.5]	27.2	[26.6, 27.8]	27.1	[26.3, 27.8]	28.3	[28.2, 28.4]	***
Past-year mental illness[b]									***
Mild	7.5	[7.0, 8.1]	12.7	[8.6, 18.3]	15.6	[11.0, 21.7]	7.8	[7.1, 8.4]	
Moderate	3.7	[3.3, 4.1]	5.2	[3.1, 8.4]	11.1	[7.3, 16.4]	3.8	[3.4, 4.2]	
Serious	2.5	[2.3, 2.8]	9.6	[6.6, 13.7]	12.3	[8.9, 16.7]	2.8	[2.6, 3.1]	
Past-year substance abuse or dependence									
Nicotine	8.6	[8.1, 9.1]	10.5	[7.0, 15.6]	10.9	[7.2, 16.2]	8.7	[8.2, 9.2]	NS
Alcohol	8.3	[7.8, 8.9]	14.0	[10.5, 18.4]	9.1	[5.9, 13.8]	8.5	[8.0, 9.0]	**
Other drugs	3.6	[3.3, 4.0]	12.5	[8.4, 18.4]	7.1	[4.7, 10.7]	3.9	[3.5, 4.2]	***

Note. All figures reflect weighted percentages and are based on 19,547 male NSDUH participants 18 years of age and older. Subgroup N's at the top of each column are unweighted. All figures are percentages unless otherwise indicated. Design-based F-tests based on the weighted data and controlling for stratification and clustering were used to assess statistical significance.

[a] Sexually transmitted infections includes gonorrhea, chlamydia, syphillis, or herpes.

[b] Past-year mental illness category is based on thresholds derived from a logistic regression model of mental illness as predicted by age, functional disability, thoughts of suicide, and major depressive episode.

NS = non-significant; ** p < .01; ***p < .001

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As with the bivariate results, there were no significant associations between sexual identity and any medical condition in the multivariable models. Additionally, there were also no significant associations with either sexual attraction or sexual attraction-identity concordance. The only model where a significant association was found for any of the measures of sexual orientation was for HIV/AIDS; both bisexual (AOR = 11.3, $p <$ .01) and gay men (AOR = 19.7, $p < .01$) had substantially higher odds of having HIV/AIDS compared with heterosexual men. Sexual attraction was also significant whereby increased odds of having HIV/AIDS (AOR = 2.1, $p < .01$) was associated with higher scores on the sexual attraction scale (i.e., indicating increasingly stronger attraction to the same sex). In contrast to the bivariate models, however, neither Hepatitis B or C or STIs other than HIV/AIDS were associated with any of the sexual orientation measures.

4. DISCUSSION

4.1 Main findings. Contrary to findings from other studies including our own past research, the findings from the present study do not indicate differences in either the prevalence or the adjusted odds of chronic health conditions between sexual minority and sexual majority men. One possibility for this discrepancy, in our opinion, is that the data for this study are based on a national sample whereas other studies have used samples of more limited scope. For instance, in our own prior study, the sample of sexual minority men was based on respondents to an online survey that drew largely from Chicago and surrounding-area communities. Even then, we found only modestly increased risk for ulcers and hypertension, and moderately increased risk for liver disease such as hepatitis which, in the case of Hepatitis B and C, can be sexually transmitted. (30)

Based on the findings from the current study and (to a large extent) our prior research, it would seem that the medical profiles of sexual minority men inclusive of gay as well as bisexual men, do not appreciably differ from those of heterosexual men *ceteris paribus*. This finding held for the unadjusted prevalences of the medical conditions in the bivariate analyses as well as for the multivariable models where we adjusted for demographics and psychosocial factors generally associated with poorer health such as mental illness, substance abuse/dependence, and nicotine dependence.(30) In addition to non-significant differences by sexual identity, we did not find significant differences in the adjusted odds of health conditions for either sexual attraction or concordance for sexual identity and attraction. As we concluded in our previous study, we believe that HIV and other STIs remain the most distinctive health concerns for sexual minority men, although these are in addition to the same health concerns shared by all men regardless of their sexual identity (e.g., prostate cancer). The pervasive research focus on HIV and other STIs for gay, bisexual, and other men who have sex with men appears to be well founded.

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Table 3

Bivariate Logistic Regression Results for Medical Conditions and Infectious Diseases

Medical Condition/Infectious Disease	Asthma OR	[95% CI]	Heart Condition OR	[95% CI]	Hypertension OR	[95% CI]	Diabetes OR	[95% CI]	Chronic Bronchitis/COPD OR	[95% CI]
Sexual identity										
Bisexual	0.9	[0.5, 1.7]	1.1	[0.5, 2.7]	1.5	[0.7, 3.1]	1.2	[0.6, 2.6]	2.1	[1.0, 4.6]
Gay	0.6	[0.2, 1.4]	0.7	[0.3, 1.7]	1.9	[0.9, 4.1]	2.1	[0.8, 5.7]	1.3	[0.3, 5.6]
(Heterosexual = reference)										
Sexual attraction[b]	1.1	[0.9, 1.4]	1.2	[0.9, 1.5]	1.0	[0.8, 1.2]	0.9	[0.7, 1.2]	1.0	[0.7, 1.4]
Discordant sexual identity and attraction	0.9	[0.6, 1.5]	0.8	[0.5, 1.3]	0.7	[0.5, 1.1]	1.0	[0.6, 1.6]	1.0	[0.5, 2.1]
(Concordant = reference)										
Race/ethnicity										
Non-Hispanic black/African-American	0.9	[0.7, 1.2]	0.6	[0.5, 0.9]**	1.4	[1.1, 1.8]**	1.8	[1.3, 2.3]***	0.4	[0.2, 0.7]**
Hispanic	0.6	[0.4, 0.8]***	0.7	[0.5, 0.9]**	0.7	[0.5, 0.9]**	1.3	[1.0, 1.7]	0.5	[0.3, 0.8]**
Asian/Pacific Islander/Native American/multi-ethnic	1.0	[0.8, 1.4]	0.8	[0.5, 1.2]	1.1	[0.8, 1.4]	2.0	[1.5, 2.8]***	0.8	[0.5, 1.2]
(White = reference)										
Age in years										
26-34	0.7	[0.5, 0.9]***	0.8	[0.6, 1.1]	2.4	[2.0, 2.9]***	1.3	[0.9, 2.0]***	1.1	[0.6, 2.1]
35-49	0.5	[0.4, 0.7]***	1.5	[1.2, 2.0]**	5.9	[4.7, 7.4]***	4.6	[3.2, 6.7]***	2.1	[1.3, 3.5]**
50-64	0.5	[0.3, 0.6]***	4.4	[3.4, 5.7]***	13.5	[10.4, 17.5]***	11.0	[7.5, 16.4]***	5.1	[3.0, 8.6]***
65+	0.4	[0.3, 0.6]***	15.9	[11.9, 21.1]***	25.9	[19.8, 33.9]***	24.2	[16.0, 36.6]***	12.6	[7.4, 21.3]***
(18 - 25 = reference)										
Education level										
High school graduate	0.9	[0.7, 1.2]	1.1	[0.8, 1.5]	1.3	[1.0, 1.7]*	0.7	[0.6, 0.9]	0.7	[0.5, 0.9]*
Some college/associate's degree	1.1	[0.9, 1.5]	1.2	[0.9, 1.5]	1.5	[1.2, 1.9]**	0.8	[0.7, 1.2]	0.7	[0.5, 1.1]
College graduate	1.3	[0.9, 1.7]	1.2	[0.9, 1.6]	1.7	[1.3, 2.2]***	0.6	[0.4, 0.8]**	0.5	[0.3, 0.7]**
(Less than high school = reference)										
Marital Status										
Widowed	0.6	[0.3, 1.1]	1.4	[1.0, 1.9]	1.7	[1.2, 2.3]**	0.9	[0.6, 1.2]**	0.6	[0.3, 1.4]
Divorced or separated	1.0	[0.8, 1.4]	0.8	[0.6, 1.0]*	1.0	[0.9, 1.2]	0.9	[0.7, 1.1]	1.1	[0.7, 1.8]
Never been married	1.1	[0.9, 1.4]	0.8	[0.6, 1.1]	1.0	[0.8, 1.2]	0.7	[0.5, 0.9]**	1.0	[0.7, 1.4]
(Married = reference)										
Poverty Level										
Income up to twice the federal poverty level	0.9	[0.8, 1.2]	1.0	[0.7, 1.4]	0.8	[0.6, 0.9]*	1.2	[0.9, 1.5]	1.6	[1.0, 2.6]
Income greater than twice the federal poverty level	1.1	[0.9, 1.3]	1.3	[1.1, 1.6]**	0.9	[0.8, 1.2]	1.2	[1.0, 1.5]	1.5	[0.9, 2.3]
(Living in poverty = reference)										
Population Density[c]										
CBSA > 1 million	1.0	[0.8, 1.2]	1.1	[0.7, 1.5]	0.8	[0.6, 1.0]	0.8	[0.6, 1.2]	1.2	[0.6, 2.4]
CBSA < 1 million	1.1	[0.9, 1.4]	1.2	[0.8, 1.6]	1.0	[0.8, 1.2]	0.9	[0.6, 1.3]	1.8	[1.0, 3.2]*
(Not in CBSA = reference)										
HIV/AIDs ever	0.9	[0.2, 3.8]	0.2	[0.1, 1.1]	0.4	[0.1, 1.9]	0.8	[0.2, 4.3]	2.2	[0.4, 11.0]
(Never/unknown = reference)										
Body Mass Index	1.1	[1.0, 1.0]**	1.0	[1.0, 1.1]***	1.1	[1.1, 1.1]***	1.1	[1.1, 1.1]***	1.0	[1.0, 1.1]
Past-year mental illness[d]										
Mild	1.6	[1.3, 2.0]***	1.5	[1.1, 2.0]*	1.6	[1.2, 2.1]**	1.6	[1.2, 2.1]**	2.2	[1.4, 3.4]**
Moderate	1.3	[1.0, 1.9]	1.8	[1.3, 2.6]**	2.0	[1.3, 2.6]**	1.7	[1.2, 2.4]**	1.9	[1.1, 3.4]*
Serious	1.8	[1.2, 2.6]**	1.7	[1.1, 2.6]*	2.6	[1.7, 3.9]***	1.5	[0.9, 2.4]	2.4	[1.4, 3.9]**
(None = reference)										
Past-month nicotine dependence	0.6	[0.5, 0.8]***	1.0	[0.8, 1.3]	0.8	[0.6, 0.9]*	1.1	[0.8, 1.5]	2.1	[1.5, 3.1]***
(Not dependent = reference)										
Past-year alcohol dependence/abuse	1.3	[1.0, 1.6]	0.8	[0.5, 1.2]	1.4	[1.1, 1.7]**	0.8	[0.5, 1.2]	0.9	[0.5, 1.7]
(Not dependent/abusing = reference)										
Past-year other drug dependence/abuse	0.9	[0.6, 1.2]	2.0	[1.3, 3.0]**	1.3	[0.9, 1.9]	0.9	[0.5, 1.2]	1.1	[0.6, 1.9]
(Not dependent/abusing = reference)										
Model Statistics and Diagnostics										
$F_{(29,32)}$[e]	8.3***		23.9***		58.5***		20.4***		17.2***	
Squared Residuals[f]	-0.16 NS		0.04 NS		-0.07**		-0.02 NS		0.01 NS	
Coefficient of Discrimination[g]	-22.2***		-65.2***		-91.1***		-70.0***		-57.3***	

Note. Bivariate logistic regression models are based on analyses of NSDUH 2015 data obtained from 19,547 male respondents 18 years of age and older. Owing to missing data on covariates, the unweighted N for HIV/AIDS was 17,228 and 18,667 for all other medical conditions. Data were weighted to adjust for variation in sampling probabilities. Standard error estimates and significance levels account for design effects owing to stratification and clustering.

[a] Sexually transmitted infections includes gonorrhea, chlamydia, syphilis, or herpes.

[b] Sexual attraction was self-reported using a scale from 1 to 5 with the lowest score indicating exclusive attraction to members of the opposite sex and higher scores indicating increasingly greater attraction to the same sex.

[c] Population density is based on Core Based Statistical Areas (CBSA), which are used by the U. S. Office of Management and Budget to define population centers in the U.S.

[d] Past-year mental illness category is based thresholds as derived from a logistic regression model of mental illness as predicted by age, functional disability, thoughts of suicide, and major depressive episode.

[e] Reflects an F statistic testing improvement in model fit with included parameters versus a model with only the constant term. Significance indicates a statistically reliable improvement in model fit with inclusion of the parameter estimates.

[f] Reflects a t-test of the squared residuals term after fitting the main effects model. Significance indicates unexplained residual variance for the main effects only model and potential model misspecification.

[g] Based on the mean difference between the predicted probabilities of having a condition for observed cases and non-cases. Significance was assessed using a t-test.

NS = Not significant; NE = Not estimated; *p < .05; **p < .01; ***p < .001

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Table 3 (continued)
Bivariate Logistic Regression Results for Medical Conditions and Infectious Diseases

Medical Condition/Infectious Disease	Kidney Disease OR	[95% CI]	Cancer OR	[95% CI]	Hepatitis B or C OR	[95% CI]	Sexually Transmitted Infections[a] OR	[95% CI]	HIV/AIDs OR	[95% CI]
Sexual Orientation										
Bisexual	1.6	[0.5, 4.8]	1.4	[0.6, 3.2]	1.1	[0.4, 2.9]	1.2	[0.4, 3.6]	11.3	[2.9, 44.0] **
Gay	0.3	[0.1, 2.1]	0.7	[0.2, 2.4]	1.7	[0.5, 5.7]	1.2	[0.3, 5.5]	19.7	[2.8, 140.0] **
(Heterosexual = reference)										
Sexual attraction[b]	1.4	[0.8, 2.3]	1.2	[0.9, 1.5]	1.1	[0.8, 1.5]	1.1	[0.8, 1.6]	2.1	[1.3, 3.4] **
Discordant sexual identity and attraction	0.6	[0.1, 2.3]	1.0	[0.6, 1.8]	1.7	[0.8, 3.6]	1.4	[0.7, 2.6]	0.6	[0.2, 1.8]
(Concordant = reference)										
Race/ethnicity										
Non-Hispanic black/African-American	0.9	[0.5, 1.7]	0.8	[0.5, 1.3]	0.8	[0.4, 1.6]	1.2	[0.7, 2.0]	2.7	[0.8, 8.9]
Hispanic	1.0	[0.6, 1.8]	0.6	[0.4, 0.9] *	0.8	[0.5, 1.3]	1.0	[0.7, 1.5]	2.6	[1.1, 6.3]
Asian/Pacific Islander/Native American/multi-ethnic	1.0	[0.5, 1.9]	0.5	[0.2, 0.9] *	0.8	[0.4, 1.7]	0.5	[0.4, 0.7] **	0.5	[0.3, 6.2]
(White = reference)										
Age in years										
26-34	3.6	[1.6, 8.0] **	1.8	[0.8, 3.7]	2.1	[0.8, 5.3]	1.0	[0.7, 1.5]	7.1	[1.5, 32.9] *
35-49	6.9	[2.3, 17.0] ***	3.4	[1.6, 7.3] **	4.9	[2.1, 11.5] ***	0.7	[0.4, 1.1]	20.4	[4.9, 84.4] ***
50-64	18.1	[8.2, 40.3] ***	12.4	[5.4, 28.3] ***	24.5	[10.8, 55.7] ***	1.0	[0.5, 2.0]	7.4	[1.2, 45.9] *
65+	59.2	[24.5 142.9] ***	49.0	[22.7, 106.1] ***	20.9	[7.2, 61.0] ***	0.8	[0.4, 1.6]	6.4	[1.3, 31.2] *
(18 - 25 = reference)										
Education level										
High school graduate	0.8	[0.5, 1.5]	1.0	[0.7, 1.6]	1.0	[0.6, 1.6]	0.8	[0.5, 1.2]	0.6	[0.2, 2.2]
Some college/associate's degree	1.2	[0.6, 2.2]	1.6	[1.0, 2.4] *	1.1	[0.7, 1.7]	0.8	[0.4, 1.1]	1.1	[0.3, 4.2]
College graduate	1.1	[0.6, 1.7]	2.3	[1.5, 3.4] ***	0.8	[0.5, 1.3]	0.9	[0.5, 1.6]	0.5	[0.1, 1.5]
(Less than high school = reference)										
Marital Status										
Widowed	1.5	[0.7, 3.1]	1.0	[0.6, 1.6]	0.9	[0.4, 1.8]	0.2	[0.1, 0.5] ***	8.0	[1.4, 43.7] *
Divorced or separated	1.1	[0.7, 1.9]	0.6	[0.4, 0.9] *	1.2	[0.7, 2.1]	1.5	[0.9, 2.4]	1.4	[0.3, 6.0]
Never been married	1.8	[1.0, 3.3] *	0.7	[0.5, 1.2]	1.4	[0.8, 2.2]	1.3	[0.7, 2.2]	1.4	[0.4, 4.6]
(Married = reference)										
Poverty Level										
Income up to twice the federal poverty level	1.6	[0.9, 2.9]	1.6	[0.9, 2.7]	1.5	[0.8, 2.6]	1.0	[0.7, 1.4]	1.3	[0.4, 4.4]
Income greater than twice the federal poverty level	1.2	[0.8, 1.9]	0.8	[0.6, 1.1]	1.7	[1.0, 2.6]	0.9	[0.6, 1.4]	1.1	[0.4, 3.6]
(Living in poverty = reference)										
Population Density[c]										
CBSA > 1 million	1.1	[0.6, 2.1]	1.4	[0.9, 2.2]	0.7	[0.4, 1.5]	2.2	[1.2, 4.2] *	1.9	[0.9, 3.9]
CBSA < 1 million	1.0	[0.5, 2.1]	1.8	[1.1, 2.8]	0.6	[0.3, 1.2]	2.4	[1.3, 4.4] **	NE	
(Not in CBSA = reference)										
HIV/AIDS ever	1.5	[0.2, 13.1]	2.6	[0.8, 9.0]	5.4	[1.7, 16.6] **	7.3	[2.5, 21.1] ***	NE	
(Never/unknown = reference)										
Body Mass Index	1.0	[1.0, 1.1] **	1.0	[1.0, 1.0]	1.0	[0.9, 1.0]	1.0	[1.0, 1.1]	0.9	[0.8, 1.0] *
Past-year mental illness[d]										
Mild	0.3	[0.1, 0.7] **	1.9	[1.2, 2.9] **	1.7	[0.9, 3.1]	1.8	[1.1, 2.8] *	2.2	[0.6, 7.5]
Moderate	1.9	[0.8, 4.5]	2.2	[1.3, 3.9] **	2.3	[1.0, 5.2] *	1.7	[1.0, 2.9]	1.5	[0.3, 7.9]
Serious	2.8	[1.5, 5.1] **	0.9	[0.4, 2.2]	3.1	[1.5, 6.4] **	1.3	[0.6, 2.6]	2.9	[0.6, 14.4]
(None = reference)										
Past-month nicotine dependence	0.8	[0.5, 1.5]	0.6	[0.5, 0.9] *	1.6	[1.0, 5.2]	1.1	[0.7, 1.6]	0.7	[0.3, 2.2]
(Not dependent = reference)										
Past-year alcohol dependence/abuse	0.4	[0.1, 0.9] **	0.9	[0.5, 1.4]	1.1	[0.6, 2.0]	1.7	[1.1, 2.7]	0.9	[0.3, 2.9]
(Not dependent/abusing = reference)										
Past-year other drug dependence/abuse	1.1	[0.1, 0.9] *	1.0	[0.5, 2.0]	2.9	[1.4, 6.1] **	2.5	[1.4, 4.4]	2.2	[0.7, 7.3]
(Not dependent/abusing = reference)										
Model Statistics and Diagnostics										
$F_{(28, 22)}$[e]	5.1 ***		36.0 ***		15.6		8.3 ***		37.8 ***	
Squared Residuals[f]	0.02 NS		0.00 NS		0.00 NS		-0.11 NS		0.03 NS	
Coefficient of Discrimination[g]	-25.1 ***		-53.7 ***		-28.8 ***		-23.0 ***		-62.0 ***	

Note. Bivariate logistic regression models are based on analyses of NSDUH 2015 data obtained from 19,547 male respondents 18 years of age and older. Owing to missing data on covariates, the unweighted N for HIV/AIDS was 17,228 and 18,667 for all other medical conditions. Data were weighted to adjust for variation in sampling probabilities. Standard error estimates and significance levels account for design effects owing to stratification and clustering.

[a] Sexually transmitted infections includes gonorrhea, chlamydia, syphilis, or herpes.

[b] Sexual attraction was self-reported using a scale from 1 to 5 with the lowest score indicating exclusive attraction to members of the opposite sex and higher scores indicating increasingly greater attraction to the same sex.

[c] Population density is based on Core Based Statistical Areas (CBSA), which are used by the U. S. Office of Management and Budget to define population centers in the U.S.

[d] Past-year mental illness category is based thresholds as derived from a logistic regression model of mental illness as predicted by age, functional disability, thoughts of suicide, and major depressive episode.

[e] Reflects an F statistic testing improvement in model fit with included parameters versus a model with only the constant term. Significance indicates a statistically reliable improvement in model fit with inclusion of the parameter estimates.

[f] Reflects a t-test of the squared residuals term after fitting the main effects model. Significance indicates unexplained residual variance for the main effects only model and potential model misspecification.

[g] Based on the mean difference between the predicted probabilities of having a condition for observed cases and non-cases. Significance was assessed using a t-test.

NS = Not significant; NE = Not estimated; *p < .05, **p < .01; ***p < .001

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More surprisingly, although participants who identified as gay or bisexual had higher prevalences of STIs in the bivariate analyses than men who identified as heterosexual, we did not find differences in the odds of STIs other than HIV for either gay or bisexual men in terms of identity, attraction, or concordance in the multivariable model. We believe the reason for this is the multivariable model adjusted for HIV/AIDs, which was statistically significant; persons infected with HIV were about seven times more likely than non-infected persons to report having ever had an STI. To the extent there are elevated rates of STIs among sexual minority relative to sexual majority men, much of the difference appears to be accounted for by the subgroup of men who are already infected or who become infected with HIV. It is well established that having an STI makes one more susceptible to HIV infection and consequently co-occurrence is common. (31) The ability to include HIV/AIDS as a covariate in multivariable models is another important advantage of having national data available to assess health issues related to sexual orientation.

Although not a focus of the study, we found having a mental illness and having a substance use disorder was significantly associated with higher odds of having a majority of the assessed health conditions. To the extent that sexual minorities (both men and women) are more likely to evidence mental illness or substance abuse, they would be at higher risk for these health conditions owing not to their sexual minority status *per se*, but to the higher prevalence rates of these psychosocial risk factors and their co-occurrence with medical morbidity among sexual minorities. (32)

4.2. Limitations. The NSDUH study is cross-sectional and the health data self-reported. Consequently, the findings must be weighed against these two important limitations. The cross-sectional nature of the data did not allow us to model the potential health consequences of sexual minority status over time. It is very possible that the health effects of various factors, including sexual identity, are cumulative and only become manifest after an extended period, possibly many years (i.e., cumulative adversity). Younger participants, for example, including those with co-occurring mental illnesses and substance use disorders, might not have any health consequences while young with the health effects not fully evident until years later.(33, 34) Additionally, because the data are self-reported, under- or over-reporting of the different health conditions is possible as some NSDUH participants might have been unaware they have a condition, particularly one that could be asymptomatic such as hypertension, whereas others might mistakenly have thought they have a condition that would not meet clinical diagnostic criteria. A review of the literature on the validity of self-reported health data, however, found that self-reported health information is valid and reliable. (35)

We have noted the sample was restricted to men because it is possible and also probable that there are important health differences between men and women. Obviously, the findings from this study do not apply to women. A separate, parallel study assessing for possible health

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disparities between lesbian, bisexual, and heterosexual women is clearly needed.

Finally, another important limitation is that the measures of sexual identity included in the NSDUH, while laudable improvements that will allow for more robust research on sexual minority health, do not include questions on sexual behavior. This is an important omission. It is possible, for instance, that some men identifying as gay and solely attracted to the same sex, might not have had sexual contact or only had very infrequent sexual contact with other men and that behaviorally, they might not be much different from men who identify as heterosexual, are attracted to the opposite sex, but who also have no or only infrequent sexual contact. To fully assess sexual orientation and its association to health then, sexual behavior needs to be included in national surveys. And finally, we assessed only a small number of health conditions. While the number of conditions assessed was broader than in most previous studies of the health concerns of sexual minority men, it is still limited. It is possible that among the many health conditions not assessed, some might vary by sexual orientation.

5. CONCLUSION

The main finding that the adjusted odds of having different health conditions do not vary by sexual identity, attraction, or concordance highlights the importance of using data drawn from general population surveys rather than from surveys based on more limited samples to study the health of gay and bisexual men. The study findings shed doubt on those of the more circumscribed studies, which found that sexual minority men were at modestly higher risk for health conditions, with the specific health conditions emerging as significantly different varying by study. The just-noted limitations, particularly the range of health conditions assessed and the cross-sectional data warrant further studies based on full medical evaluations for a higher number of conditions as well as on longitudinal data. Additionally, as noted, comparable studies of potential associations between sexual orientation and health for women are needed as the results could be quite different for women.

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