Published in final edited form as:

J Rural Health. 2016 June ; 32(3): 321–331. doi:10.1111/jrh.12161.

Gay Acres: Sexual Orientation Differences in Health Indicators Among Rural and Non-rural Individuals

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Abstract

Purpose—Geographic location is a significant factor that influences health status and health disparities. Yet, little is known about the relationship between geographic location and health and health disparities among lesbian, gay, and bisexual (LGB) persons. This study used a US population-based sample to evaluate the associations of sexual orientation with health indicators by rural/non-rural residence.

Methods—Data were pooled from the 10 states that collected sexual orientation in the 2010 Behavioral Risk Factor Surveillance System (BRFSS) surveys. Rural status was defined using metropolitan statistical area (MSA), and group differences by sexual orientation were stratified by gender and rural/non-rural status. Chi-square tests for categorical variables were used to assess bivariate relationships. Multivariable logistic regression models stratified by gender and rural/non-rural status were used to assess the association of sexual orientation to health indicators, while adjusting for age, race/ethnicity, education, and partnership status. All analyses were weighted to adjust for the complex sampling design.

Findings—Significant differences between LGB and heterosexual participants emerged for several health indicators, with bisexuals having a greater number of differences than gay men/lesbians. There were fewer differences in health indicators for rural LGB participants compared to heterosexuals than non-rural participants.

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Disclosures: The authors have no conflicts of interest to disclose.

Conclusions—Rural residence appears to influence the pattern of LGB health disparities. Future work is needed to confirm and identify the exact etiology or rural/non-rural differences in LGB health.

Keywords

bisexuality; health disparities; homosexuality; rural health; sexual orientation

Although population-based health surveillance data for sexual minorities is limited due to the omission of sexual orientation questions from the majority of US state and federal health surveillance programs, a growing body of evidence suggests that lesbian, gay, and bisexual (LGB) persons experience health disparities in a number of areas relative to their heterosexual peers. LGB persons are more likely than heterosexuals to be current smokers, to use alcohol and other drugs,² and to experience poor mental health and self-directed violence.³ In addition to disparities in health behaviors, LGB persons are more likely to be at risk for chronic conditions including cardiovascular disease and certain forms of cancer,⁴ asthma and respiratory diseases,⁵ headaches, allergies, osteoarthritis, and serious gastrointestinal problems than heterosexuals. LGB persons are also more likely to delay or avoid getting medical care than their heterosexual counterparts.⁶

A 2011 Institute of Medicine (IOM) report identified geographic location as 1 of 4 critical domains that may significantly influence health status and health disparities among LGB persons. In particular, the IOM report suggests that LGB persons living in rural areas or areas with a lower density of LGB persons may feel less comfortable disclosing their sexual orientation, have fewer supports from families and friends, and may lack access to an LGB community. In contrast, LGB persons living in urban areas may be more likely to find support services and have greater access to health care providers experienced in treating LGB persons. If these assertions are true, LGB persons residing in rural areas may have significantly poorer health outcomes relative to their urban counterparts. Other sexual minority populations (ie, persons unsure/questioning their sexual orientation) and gender minority populations (ie, transgender) likely experience health disparities related to geography; however, for the purposes of this investigation and scope of data for our analyses, we limit our review to LGB disparities.

There is evidence of health disparities on several key health indicators between rural and non-rural residents.⁷ For example, rural residents face limited health care availability due to transportation difficulties, lack of medical providers and too few health care facilities. After completing medical training, less than 10% of medical doctors practice in rural settings and in the past 25 years 470 rural hospitals have closed.⁸ When rural hospitals and medical doctors are available to rural patients, evidence-based recommended treatments are often unavailable or not offered. Additionally 20% of rural areas lack mental health services (as compared to 5% of urban areas).⁹ Taken together, these rural barriers could produce even greater health disparities among rural residents who are also sexual minority, as sexual minority individuals often report their own barriers to accessing health care, such as fear of disclosing sexual orientation to their providers and discrimination because of their sexual

orientation. Consequently, rural sexual minority individuals may experience greater disparities than their rural heterosexual peers.

Unfortunately, there is limited evidence about the influence of rural residence on LGB health. To date, an overwhelming majority of LGB health research has either relied on data from mostly urban samples or has lacked the ability to make meaningful comparisons between urban and rural participants. Among the few studies that have examined the influence of geographic location on LGB health, results have been mixed with regard to the relationship between urban versus rural residence and LGB health. For instance, studies have found that LGB persons living in rural areas are more likely to have increased psychological distress, lower self-esteem, increased stigma, higher levels of depression, increased substance use, greater rates of verbal and physical harassment, and are less likely to disclose their sexual orientation than their urban counterparts. Conversely, studies have also found that LGB persons living in rural areas are more likely to have a greater sense of belonging, greater self-esteem and lower rates of assault than their urban counterparts, or such studies have failed to find significant differences in health status by rural residence. The reasons for these mixed findings are unclear; however, factors likely contributing to the heterogeneity in their findings include using convenience samples and drawing participants from a single geographic region. These factors also limit the generalizability of these findings to the broader LGB population.

There are important within-group differences for LGB health, and recent work utilizing large samples that permit the disaggregation of lesbian/gay and bisexual groups have indicated that there is significant variation among LGB persons in regard to many of these health disparities. For instance, using data from the National Health and Nutrition Examination Survey (NHANES), Farmer and colleagues found that bisexual men were at significantly greater risk for cardiovascular disease than heterosexual men, whereas CVD risk among gay men was equivalent to their heterosexual counterparts. Similarly, Matthews and colleagues found that disaggregating bisexual identity and behavior from exclusively same-sex identity and behavior resulted in the attenuation or elimination of health disparities that would have been attributable to exclusively same-sex sexual minorities in their analysis of Massachusetts Youth Risk Behavior Survey (YRBS) data. More recently, Blosnich and colleagues found that bisexual women had the greatest number of health inequalities of any LGB group when examining differences between heterosexuals and LGB persons in a pooled sample of Behavioral Risk Factor Surveillance Surveys (BRFSS) across 10 states that collected sexual orientation. Such findings illustrate that lesbians, gay men, bisexual women, and bisexual men comprise distinct populations, and they also make clear there is a need to examine how other factors related to health may contribute to variation in health disparities among LGB persons.

To extend the science about the relation between LGB health and geographic location and overcome the methodological issues that reduce LGB populations to a homogenous group, a multi-state approach utilizing population-based data is necessary for examining LGB disparities by rural residence. Our primary objective for the current study was to compare differences in health indicators for LGB and heterosexual respondents from rural and non-rural areas. Based on previous literature, we hypothesized that, after controlling for other

demographic characteristics, sexual minority status would be independently associated with health indicators both among men and among women across rural and non-rural strata. For example, gay men in rural areas would report worse mental health than heterosexual men in rural areas, lesbian women in non-rural areas would have greater prevalence of overweight/obesity than heterosexual women in non-rural areas, and bisexual men and women would report greater prevalence of current smoking than heterosexual men and women across both rural and non-rural strata.

Methods

Survey Data

Individual health departments in all US states, territories, and the District of Columbia administer the Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance Survey (BRFSS) through computer-assisted landline telephone interviews with probability-based samples of non-institutionalized adults aged 18 years and over. The CDC creates an annual core survey for all BRFSS samples, and it aggregates individual BRFSS data sets to create a national data set with survey weights to adjust for the complex sampling design. The data for this project come from a prior project that collected individual state BRFSS data which contained sexual orientation in the 2010 survey. BRFSS data in 2010 represent the final year before CDC substantially changed the BRFSS sampling methodology to include sampling of cellular phone users, which prohibits combining BRFSS data from 2010 and prior with data collected since. Further information about the 2010 BRFSS (N=451,075) is available from the CDC.

In 2010, a total of 12 states included sexual orientation in their BRFSS surveys. Two states' data (Colorado and Oregon) were unavailable at the time of analysis. This analysis uses data from the remaining 10 states (Alaska, Arizona, California, Maine, Massachusetts, Montana, New Mexico, North Dakota, Washington, and Wisconsin), yielding a sample of 93,414 adults who were asked about their sexual orientation. Because the analyses focused on self-identified sexual orientation, persons indicating other sexual orientation (n=859), don't know (n=873), and refusal (n=2,005) were excluded. Although core survey items were worded and administered identically across all samples, there was slight variation among the 10 states in their assessment of sexual identity. A table of the sexual orientation measures, sample sizes, and response rates for the 10 states has been published previously.

Sexual orientation is not in the CDC's core survey; consequently, such data are not included in the publically available national BRFSS data set. Several steps were taken to merge state-level sexual orientation data with the national BRFSS data set. First, individual state BRFSS data sets were obtained from the 10 states. Second, each unique, de-identified observation from each state data set was matched to its unique, de-identified observation in the national data set using 2 variables (state and sequence number). Once the observations were matched, sexual orientation data from each state were added into the national BRFSS data set for all respondents in the 10 states. Adding sexual orientation data into the national BRFSS data set facilitated use of the survey weights created by the CDC.

Variables

Health Indicators—The BRFSS contains numerous questions, including mental health, physical health, health risk, preventive health, screening tests, health care utilization, and medical diagnoses. For the current analysis, we selected the following indicators based on previous research concatenated by the IOM. Mental health was assessed using mental distress defined using the Frequent Mental Distress (FMD)-6 scale. Specifically, respondents were asked, “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” Responses were dichotomized into individuals reporting ≥ 6 days in the last 30 days in which mental health was not good versus individuals reporting < 6 days/30 days. Overall physical health was operationalized using self-rated health status (excellent/very good/good versus fair/poor). Barriers to health care access were operationalized by the question, “Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?”

Recent evidence suggests that sexual minority status may be associated with cardiovascular disease (CVD) risk.⁷ BRFSS respondents are asked 3 separate questions regarding CVD: “Has a doctor, nurse, or other health professional ever told you that you had any of the following: (1) a heart attack, also called a myocardial infarction, (2) angina or coronary heart disease, (3) a stroke?” We coded participants as having CVD symptoms if they answered yes to being diagnosed with any of the 3 conditions.

Health risk indicators included being overweight (BMI ≥ 25) or obese (BMI ≥ 30), current smoking (ie, smoked at least 100 cigarettes in lifetime and currently smokes some days or every day); and heavy alcohol use (≥ 5 drinks on one occasion for men and ≥ 4 drinks on one occasion for women). HIV risk was assessed in respondents aged less than 65 years with questions about 4 HIV-related behaviors (ie, intravenous drug use, being treated for a sexually transmitted or venereal disease, given or received money or drugs in exchange for sex, or had anal sex without a condom). Respondents answered yes or no to engaging in any of these behaviors in the past year without identifying how many or specific behaviors. The BRFSS composite measure is one of the major sources for data about behavioral risk for HIV in the US, and it is similar to the measures used in the National Health Interview Study and the National Survey of Family Growth.

Sexual Orientation and Rural/Non-rural Indicators—Wording for all survey items is available from the CDC. Sexual orientation groups were categorized as gay/lesbian, bisexual, and heterosexual. Although many studies of sexual minority populations combine gay/lesbian and bisexual, a growing body of literature suggests that gay/lesbian and bisexual individuals have distinct risk profiles,⁸ and the IOM recommends, where possible, these groups should be studied separately. Consequently, we analyzed gay/lesbian and bisexual individuals as distinct groups. The BRFSS contains a 5-category calculated variable for Metropolitan Statistical Area (MSA) code in which participants are either: in the center city of an MSA; outside the center city of an MSA but inside the county containing the center city; inside a suburban county of the MSA; in an MSA that has no center city; not in an MSA. We followed a previous study using BRFSS data that defined rural individuals as only

those respondents who were “not in an MSA,” and defined all other respondents as “non-rural.”

Demographic Characteristics—Demographic information included gender (female/male); age (in years); and race/ethnicity (non-Hispanic white, non-Hispanic African American/black, non-Hispanic multiple/other race, and Hispanic). Military service history was defined by current or previous active duty or service in the Reserves or the National Guard. Educational attainment was categorized into high school diploma or lower, some college, or college degree or higher. Annual household income was categorized as less than \$25,000, between \$25,000 and \$50,000, and more than \$50,000. Self-defined current marital status was married; unmarried couple; formerly married (ie, divorced, separated, or widowed); or never married.

Analyses—Similar to previous studies,⁷ we stratified all analyses by gender given gender differences in several health indicators across sexual orientation (eg, lesbian women have higher prevalence of overweight/obesity than heterosexual women, yet gay men have lower prevalence of overweight/obesity than heterosexual men⁷). Group differences by sexual orientation, gender, and rural/non-rural status were assessed using chi-square tests for categorical variables. Multivariable logistic regression models stratified by gender and rural/non-rural status were used to assess the association of sexual orientation to health indicators, while adjusting for age, race/ethnicity, education, and partnership status. Odds Ratios (ORs) are presented with 95% confidence intervals (CIs). Missing data were handled using listwise deletion. All analyses were conducted using Stata/SE 12 (StataCorp LP, College Station, Texas) and weighted to adjust for complex sampling design to create estimates representative of the states’ populations. The IRB at the VA Pittsburgh Healthcare System deemed this project exempt from review.

Results

Prevalence of Demographic Characteristics and Health Indicators: Women

Table 1 provides the weighted prevalence of demographic characteristics and health indicators for women stratified by sexual orientation and rural/non-rural status. Among rural women, there were significant differences in mean age and partnership status by sexual orientation. Lesbian and bisexual women were less likely to be married/coupled than heterosexual women (43.5% and 48.2% vs 66.0%, respectively, $P < .01$), and bisexual women were significantly younger than heterosexual women (mean age = 39.2 years vs 48.3 years, $P < .01$). Among non-rural women, lesbian and bisexual women were also less likely to be married/coupled than heterosexual women (59.5% and 38.7% vs 63.1%, respectively, $P < .01$), and both lesbian and bisexual women were younger than heterosexual women (mean age = 42.5 years and 34.5 years vs 47.2 years, respectively, $P < .01$). Non-rural women also differed with regard to education and military service by sexual orientation. Lesbian women were more likely to have received at least a college degree (52.6% vs 37.4%, $P < .01$) and to have served in the military (6.6% vs 1.4%, $P < .01$) compared to heterosexual women. However, bisexual women were less likely to have received at least a college degree than

heterosexual women (21.5% vs 37.4%, $P < .01$), but they had similar levels of military service (1.7% vs 1.4%).

Rural lesbian and bisexual women reported greater prevalence of HIV risk than heterosexual women (5.0% and 13.6% vs 2.8%, respectively, $P < .01$), and were more likely to have cost barriers to health care than heterosexual women (23.2% and 32.0% vs 14.6%, respectively, $P = .01$). Similarly, non-rural lesbian and bisexual women were at greater risk for HIV (4.1% and 13.7% vs 2.9%, respectively, $P < .01$) and were more likely to have cost barriers to health care than heterosexual women (17.8% and 40.9% vs 15.3%, respectively, $P < .01$). Non-rural lesbian and bisexual women were also more likely than heterosexual women to be current smokers (18.2% and 29.6% vs 10.9%, respectively, $P < .01$), to report heavy alcohol use (21.8% and 24.1% vs 12.2%, respectively, $P < .01$), and to report frequent mental distress (24.9% and 33.9% vs 18.8%, respectively, $P < .01$). Among both rural and non-rural strata, when there was a significant difference in prevalence of a health indicator by sexual orientation, the prevalence was highest for bisexual women than for lesbian women.

Prevalence of Demographic Characteristics and Health Indicators: Men

Table 2 provides the weighted prevalence of demographic characteristics and health indicators for men stratified by sexual orientation and rural/non-rural status. Among rural men, there were significant differences in mean age and partnership status by sexual orientation. Gay and bisexual men were less likely to be married/coupled than heterosexual men (50.1% and 19.7% vs 68.3%, respectively, $P < .01$), were less likely to have served in the military than heterosexual men (6.1% and 16.0% vs 24.8%, respectively, $P < .01$), and were significantly younger than heterosexual men (mean age = 32.3 years and 37.4 years vs 47.1 years, respectively, $P < .01$). Among non-rural men, gay and bisexual men were also less likely to be married/coupled (40.0% and 44.2% vs 67.6%, respectively, $P < .01$) and to have had military service (11.2% and 14.0% vs 17.7%, $P < .01$) than heterosexual men; however, there were no significant differences in mean age by sexual orientation. Non-rural men also differed in education and race/ethnicity by sexual orientation, with gay men being more likely to have received at least a college degree (56.9% vs 38.5%, $P < .01$) and to be white (71.8% vs 57.4%, $P < .01$) than heterosexual men, and bisexual men being less likely to have received at least a college degree (25.6% vs 38.5%, $P < .01$) than heterosexual men.

Gay and bisexual men were more likely to report mental distress, current smoking, and greater HIV risk than heterosexual men, and they were less likely to be overweight or obese than heterosexual men, regardless of rural/non-rural status. Significant differences in cost barriers to health care by sexual orientation were found only for non-rural men, with fewer gay men (9.9%) and more bisexual men (22.7%) reporting a cost barrier to health care than heterosexual men (12.9%).

Multivariable Analyses

Tables 3 and 4 report the results of multivariable logistic regression models, predicting the odds of each health indicator by sexual orientation. Models were stratified by sex and rural/non-rural status, and all models were adjusted for age, race/ethnicity, education, and partnership status.

Among rural women, bisexual women had over twice the odds of HIV risk (adjusted odds ratio [aOR]=2.78, 95% confidence interval [95% CI]: 1.14–6.81) and having a cost barrier to health care (aOR=2.16, 95% CI: 1.07–2.10). No differences were observed between rural lesbian and heterosexual women on any health indicator (Table 4). In contrast, both non-rural lesbian and bisexual women were significantly different from heterosexual women on a number of health indicators. Lesbian women had increased odds of heavy alcohol use (aOR=1.65, 95% CI: 1.05–2.59), being overweight/obese (aOR=1.59, 95% CI: 1.10–2.32), and being a current smoker (aOR=1.86, 95% CI: 1.15–3.00). Similarly, bisexual women also had increased odds of current smoking (aOR=2.32, 95% CI: 1.38–3.91) and heavy alcohol use (aOR=1.70, 95% CI: 1.00–2.88), and they were also more likely to report mental distress (aOR=1.72, 95% CI: 1.04–2.84), increased HIV risk (aOR=3.48, 95% CI: 1.88–6.47), and having a cost barrier to health care (aOR=2.80, 95% CI: 1.70–4.60). Non-rural bisexual women were not significantly more likely to be overweight or obese than heterosexual women (Table 3).

Among rural men, both gay and bisexual men had increased odds of HIV risk compared to heterosexual men. The odds of HIV risk among gay men was over 16 times that of heterosexual men (aOR=16.31, 95% CI: 4.57–58.17), and bisexual men had over 7 times the odds of HIV risk compared to heterosexual men (aOR=7.12, 95% CI: 1.16–43.67) (Table 4). No other significant health indicator differences were observed for rural gay men; however, rural bisexual men had significantly higher odds of mental distress than heterosexual men (aOR=6.03, 95% CI: 1.88–19.33). Non-rural gay and bisexual men were similar to their rural counterparts in terms of increased odds of HIV risk, with gay men having over 16 times the odds of HIV risk (aOR=16.58, 95% CI: 9.76–28.16), and bisexual men having over 5 times the odds of HIV risk (aOR=5.87, 95% CI: 2.83–12.17) of heterosexual men. In addition, non-rural gay and bisexual men were also more likely to have mental distress (aOR gay =1.73, 95% CI: 1.13–2.63; aOR bisexual = 2.50, 95% CI: 1.40–4.45) and to be current smokers (aOR gay =1.61, 95% CI: 1.04–2.51; aOR bisexual = 1.90, 95% CI: 1.08–3.34) than non-rural heterosexual men. Non-rural gay men were also less likely to be overweight/obese (aOR=0.60, 95% CI: 0.43–0.85) than non-rural heterosexual men (Table 4).

Discussion

Our findings indicate that significant differences exist between LGB and heterosexual persons on the key health indicators measured in the BRFSS, and that geographic location of residence influences these differences. Among our sample, there were fewer differences on key health indicators between rural LGB persons and their rural heterosexual counterparts than among non-rural LGB participants and their non-rural heterosexual counterparts. By and large, these differences indicated poorer health for LGB persons; however, gay and bisexual men had a lower prevalence of being overweight/obese than heterosexual men in both rural and non-rural settings. Multivariable analyses showed that the association between minority sexual orientation and poorer health persisted for the majority of the health indicators, even after adjustment for age, race/ethnicity, education, and partnership status. These analyses also indicated that bisexual men and women had more negative health indicators than gay men and lesbian women, regardless of rural/non-rural status.

Our findings are congruent with other studies that have found bisexuals tend to be at greater risk for poor health than their gay/lesbian counterparts.” Zinik proposed that bisexual persons may experience enhanced stress from having to hide the lesbian/gay aspects of their lives from their heterosexual peers and their heterosexual aspects from their lesbian/gay peers; a phenomenon deemed a “double closet.” Our findings support the existence of this phenomenon; however, further research is needed to confirm differences in and etiology of health disparities among lesbian/gay and bisexual groups.

Our findings run counter to the ideas asserted by the IOM report on the health of LGBT persons; that LGB persons living in rural areas have poorer health than their non-rural counterparts, which has been supported in several other studies.” The reason for this discrepancy is not clear, but it may be due, at least in part, to differences in types of health indicators assessed, in sampling and study design, or in the definition of rural/non-rural status used in the present analyses. Many of the previous studies that found poorer health among rural LGB persons examined health indicators related to mental health and well-being such as self-esteem, depression and the experience of physical or verbal harassment. While our study included frequent mental distress as an outcome, the majority of our health indicators were related to physical health. In addition, studies that have found a negative association between rural status and LGB health have utilized either convenience samples of adults or population-based samples of adolescents, and 2 of these studies utilized samples from outside of the US. As such, the results of these studies may not be directly comparable with our findings, as we utilized a population-based sample of US adults from 10 states. If in fact the IOM report’s assertion that LGB persons living in rural areas face increased burdens that limit their health is true, it is also plausible that this environment may make them less likely to disclose their sexual minority status to the BRFSS interviewer, thus masking additional disparities. Future research in this area is needed using large-scale, nationally representative population-based samples with oversampling for sexual minority status in order to confirm differences in health disparities among LGB groups and to ascertain the exact relationship of rural status to LGB health.

Our results must be viewed in light of several limitations. First, at the conceptual level, sexual orientation is comprised of 3 major dimensions: self-identification, sexual behavior and sexual attraction. Our study captures only one of these dimensions, self-identification. Moreover, there were slight variations in the wording of sexual identity items. It is unclear if these nuances may have resulted in differential disclosure of sexual identity, or if our results would be consistent across all 3 dimensions of sexual orientation. Second, the sample included only 10 states and was missing states from the US South, where rural areas may be qualitatively different from rural areas elsewhere, limiting the representativeness of the findings. Third, although our sample of LGB persons is large when compared with previous studies of LGB health, the number of LGB persons surveyed is still relatively small, especially for rural participants. This small sample size may have hampered our ability to detect significant differences in health indicators. Fourth, some survey measures (eg, mental distress) are crude and cannot identify specific mental health problems (eg, depression), and the age limits on questions (eg, only persons aged <65 years answered HIV risk items) may result in underestimates for certain groups. Fifth, the relationship between LGB health and rural/non-rural status may have been influenced by state-level policies towards sexual

minorities (eg, recognition of same-sex marriage, presence of non-discrimination laws that include LGBT persons), as participants living in states with more progressive policies towards LGBT persons are likely to have better health outcomes regardless of rural/non-rural status. Unfortunately, we were unable to account for the influence of state-level policies on rural/non-rural differences in health due to sample size limitations at both the individual and state levels. Future research is needed to evaluate the influence of state-level policies on sexual and gender minority health, especially as states with fewer LGBT-affirming policies are underrepresented in population-based LGBT health research. This limitation will only be overcome when state and federal health surveillance programs add and maintain standard items on both sexual orientation and gender identity/expression on their surveys.

Conclusion

By aggregating state/federal health surveillance across a wide geographic area, this study significantly improves upon previous studies of rural status and LGB health that have relied on smaller convenience samples. The present report does not confirm previous findings of poorer health among LGB persons in rural areas, and as such, it both illustrates the importance of considering location when examining health disparities by sexual orientation and the need for future work in this area. In order to fulfill the IOM's call for better information about the health and well-being of LGBT populations, state/federal health surveillance should add and maintain standard items both on sexual orientation and gender identity/expression and implement oversampling strategies for sexual and gender minorities, so that we may better understand the influence of LGBT status on health at the population level.

Acknowledgments

Drs. Blosnich, Jabson, and Matthews dedicate this manuscript in memory of Dr. Grant Wesley Farmer, a talented young scholar who pursued health equity for LGBT populations. He was a treasured colleague who enriched our lives because he was both a dedicated scientist and the kindest friend. We are ever indebted to him, ever better because of him, and ever resolved to continue the pursuit of health equity and social justice for him. The authors acknowledge the training experiences that brought together the 4 of them: the Summer Institute in LGBT Population Health supported by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) (award# R25HD064426), and the Mentoring Program of The Center for Population Research in LGBT Health, supported by NICHD (award# R21HD051178). The content is solely the responsibility of the authors and does not necessarily represent the official views of funders, institutions, the Department of Veterans Affairs, or the US Government.

Funding: This research was supported in part by the National Cancer Institute (grant 5U54CA155496), the National Institute of Mental Health (grant T32MH094174), National Institute on Minority Health and Health Disparities (grant L60 MD009167), and a postdoctoral fellowship through the Department of Veterans Affairs Office of Academic Affiliations (TPP 72–013).

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Table 1
Demographics and Health Indicators Among Women, by Rural/Non-rural Status and Sexual Minority Status

Demographics	Rural Women				Non-rural Women			
	Lesbian (n=117)	Bisexual (n=135)	Heterosexual (n=14,727)	P	Lesbian (n=498)	Bisexual (n=316)	Heterosexual (n=36,912)	P
	% (SE)	% (SE)	% (SE)		% (SE)	% (SE)	% (SE)	
Race/ethnicity								
White	68.1 (.107)	78.8 (.055)	82.2 (.007)	.17	71.0 (.041)	58.4 (.059)	59.1 (.005)	.07
Racial/ethnic minority	31.9 (.107)	21.2 (.055)	17.8 (.007)		29.0 (.041)	41.6 (.059)	40.9 (.005)	
Partnership status								
Married/coupled	43.5 (.095)	48.2 (.072)	66.0 (.009)	<.01	59.5 (.042)	38.7 (.053)	63.1 (.005)	<.01
Not partnered	56.5 (.095)	51.8 (.072)	34.0 (.009)		40.5 (.042)	61.3 (.053)	36.9 (.005)	
Education								
High diploma	21.2 (.078)	48.3 (.071)	37.9 (.009)	.13	18.4 (.036)	39.1 (.058)	36.1 (.004)	<.01
Some college	44.4 (.099)	33.4 (.065)	32.5 (.009)		28.9 (.044)	39.4 (.055)	26.5 (.004)	
College degree	34.4 (.082)	18.3 (.052)	29.6 (.009)		52.6 (.043)	21.5 (.033)	37.4 (.004)	
Military service	6.1 (.043)	0.8 (.006)	1.7 (.002)	.06	6.6 (.020)	1.7 (.009)	1.4 (.001)	<.01
Age (M, SE)	48.6 (2.66)	39.2 (2.79)	48.3 (.361)	<.01	42.5 (1.41)	34.5 (1.52)	47.2 (.178)	<.01
<u>Health indicators</u>								
Poor physical health	18.5 (.093)	9.6 (.040)	8.4 (.004)	.20	7.2 (.015)	11.3 (.025)	8.7 (.002)	.31
Mental distress	16.6 (.067)	21.4 (.052)	16.3 (.006)	.62	24.9 (.038)	33.9 (.052)	18.8 (.004)	<.01
Overweight or obese	70.6 (.082)	60.6 (.073)	58.1 (.009)	.34	59.7 (.045)	61.1 (.052)	53.8 (.005)	.18
Current smoker	28.0 (.097)	29.8 (.064)	18.4 (.008)	.10	18.2 (.033)	29.6 (.051)	10.9 (.003)	<.01
Heavy alcohol use	16.9 (.069)	26.6 (.067)	14.0 (.008)	.07	21.8 (.037)	24.1 (.052)	12.2 (.003)	<.01
CVD symptoms	3.6 (.016)	7.8 (.028)	5.9 (.003)	.44	5.1 (.013)	6.9 (.027)	5.8 (.002)	.75
HIV risk	5.0 (.041)	13.6 (.050)	2.8 (.004)	<.01	4.1 (.024)	13.7 (.032)	2.9 (.002)	<.01
Cost barrier to health care	23.2 (.091)	32.0 (.067)	14.6 (.007)	.01	17.8 (.035)	40.9 (.060)	15.3 (.004)	<.01

Note: Percentages, means, and standard errors are weighted

Table 2
Demographics and Health Indicators Among Men, by Rural/Non-rural Status and Sexual Minority Status

<u>Demographics</u>	<u>Rural Men</u>				<u>Non-rural Men</u>			
	Gay (n=95)	Bisexual (n=65)	Heterosexual (n=9,967)	P	Gay (n=559)	Bisexual (n=167)	Heterosexual (n=23,271)	P
Race/ethnicity								
White	84.4 (.072)	61.9 (.178)	81.3 (.009)	.26	71.8 (.040)	55.4 (.063)	57.4 (.006)	<.01
Racial/ethnic minority	15.6 (.072)	38.1 (.178)	18.7 (.009)		28.2 (.040)	44.6 (.063)	42.6 (.006)	
Partnership status								
Married/coupled	50.1 (.144)	19.7 (.076)	68.3 (.011)	<.01	40.0 (.038)	44.2 (.061)	67.6 (.006)	<.01
Not partnered	49.9 (.144)	80.3 (.076)	31.7 (.011)		60.0 (.038)	55.8 (.061)	32.4 (.006)	
Education								
High diploma	48.6 (.146)	62.8 (.142)	42.0 (.011)	.52	21.0 (.036)	45.6 (.060)	37.9 (.006)	<.01
Some college	25.0 (.098)	25.2 (.129)	30.3 (.011)		22.1 (.032)	28.8 (.063)	23.6 (.005)	
College degree	26.4 (.106)	11.9 (.052)	27.7 (.009)		56.9 (.040)	25.6 (.045)	38.5 (.006)	
Military Service	6.1 (.033)	16.0 (.069)	24.8 (.008)	<.01	11.2 (.019)	14.0 (.031)	17.7 (.004)	<.01
Age (M, SE)	32.3 (3.62)	37.4 (4.99)	47.1 (.407)	<.01	43.7 (1.24)	42.8 (2.20)	44.9 (.204)	.99
<u>Health indicators</u>								
Poor physical health	6.2 (.033)	8.8 (.043)	8.8 (.006)	.78	7.8 (.020)	6.4 (.020)	6.9 (.003)	.81
Mental distress	18.2 (.090)	52.9 (.157)	12.3 (.007)	<.01	20.9 (.032)	31.3 (.062)	13.8 (.004)	<.01
Overweight or obese	39.4 (.127)	55.2 (.167)	71.6 (.011)	.02	54.0 (.040)	57.8 (.062)	69.9 (.006)	<.01
Current smoker	43.3 (.153)	49.4 (.163)	18.7 (.010)	.01	20.8 (.034)	29.9 (.057)	15.5 (.005)	<.01
Heavy alcohol use	36.7 (.167)	51.3 (.160)	22.9 (.011)	.12	28.9 (.042)	27.5 (.061)	22.8 (.006)	.19
CVD symptoms	2.3 (.011)	30.1 (.189)	9.9 (.005)	.07	7.2 (.012)	11.3 (.029)	7.2 (.002)	.21
HIV risk	32.3 (.128)	22.4 (.145)	2.4 (.004)	<.01	28.1 (.044)	16.6 (.045)	2.8 (.003)	<.01
Cost barrier to health care	23.5 (.115)	13.9 (.075)	11.6 (.008)	.27	9.9 (.022)	22.7 (.052)	12.9 (.005)	.03

Note: Percentages, means, and standard errors are weighted

Table 3
Association of Lesbian and Bisexual Status With Health Indicators Among Women, by Rural/Non-rural Status

	Rural Women				Non-rural Women			
	aOR	(95%CI)	aOR	(95%CI)	aOR	(95%CI)	aOR	(95%CI)
Poor self-rated health status	2.41	(0.83–7.03)	1.31	(0.52–3.31)	1.16	(0.72–1.86)	1.66	(0.99–2.79)
Mental Distress	0.93	(0.34–2.53)	1.15	(0.61–2.19)	1.50	(1.00–2.26)	1.72	(1.04–2.84) ^a
Overweight or Obese	1.72	(0.82–3.61)	1.09	(0.58–2.06)	1.59	(1.10–2.32) ^a	1.48	(0.94–2.31)
Current smoker	1.74	(0.62–4.91)	1.28	(0.71–2.30)	1.86	(1.15–3.00) ^a	2.32	(1.38–3.91) ^a
Heavy alcohol use	1.23	(0.44–3.43)	1.89	(0.92–3.90)	1.65	(1.05–2.59) ^a	1.70	(1.00–2.88) ^a
Symptoms of CVD	0.60	(0.22–1.67)	1.69	(0.75–3.81)	1.51	(0.90–2.53)	2.28	(0.88–5.93)
HIV risk	1.92	(0.30–12.16)	2.78	(1.14–6.81) ^a	1.49	(0.47–4.77)	3.48	(1.88–6.47) ^a
Cost barrier to health care	1.62	(0.60–4.37)	2.16	(1.07–4.40) ^a	1.27	(0.77–2.10)	2.80	(1.70–4.60) ^a

Note: analyses are weighted; all models adjusted for age, race/ethnicity, education, and partnership status; reference category is heterosexual women.

^a $P < .05$

Table 4
Association of Gay and Bisexual Status With Health Indicators Among Men, by Rural/Non-rural Status

	Rural Men			Non-rural Men		
	aOR	Gay (95%CI)	Bisexual aOR (95%CI)	aOR	Gay (95%CI)	Bisexual aOR (95%CI)
Poor self-rated health status	1.07	(0.37–3.16)	1.06 (0.40–2.77)	1.35	(0.76–2.40)	0.80 (0.41–1.54)
Mental distress	1.47	(0.46–4.66)	6.03 (1.88–19.33) ^a	1.73	(1.13–2.63) ^a	2.50 (1.40–4.45) ^a
Overweight or obese	0.34	(0.11–1.02)	0.70 (0.16–3.06)	0.60	(0.43–0.85) ^a	0.64 (0.37–1.12)
Current smoker	2.60	(0.78–8.55)	2.77 (0.92–8.29)	1.61	(1.04–2.51) ^a	1.90 (1.08–3.34) ^a
Heavy alcohol use	1.35	(0.34–5.28)	2.83 (0.80–10.04)	1.38	(0.92–2.05)	1.21 (0.64–2.28)
CVD Symptoms	0.50	(0.20–1.24)	9.09 (0.65–126.79)	1.37	(0.95–1.96)	1.68 (0.88–3.22)
HIV risk	16.31	(4.57–58.17) ^a	7.12 (1.16–43.67) ^a	16.58	(9.76–28.16) ^a	5.87 (2.83–12.17) ^a
Cost barrier to health care	2.09	(0.49–8.98)	0.80 (0.20–3.24)	0.92	(0.55–1.52)	1.69 (0.88–3.24)

Note: analyses are weighted; all models adjusted for age, race/ethnicity, education, and partnership status; reference category for each stratum is heterosexual men.

^a $P < .05$