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# Health, Economic, and Social Disparities among Lesbian, Gay, Bisexual, and Sexually Diverse Adults: Results from a Population-Based Study

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## ABSTRACT

We investigated health, economic, and social disparities among lesbian, gay, bisexual, and sexually diverse adults, 18 years and older. Analyzing 2011–2019 Washington State Behavioral Risk Factor Surveillance System ( $N=109,527$ ), we estimated and compared the prevalence rates of background characteristics, economic and social indicators, health outcomes, chronic conditions, health care access, health behaviors, and preventive care by gender and sexual identity. Sexual minority adults reported heightened risks of poor general health, physical and mental health, disability, subjective cognitive decline, and financial barriers to health care, compared with their straight counterparts. Economic disparities and disability were evident for lesbians and both bisexual adult women and men. We found higher rates of smoking and excessive drinking among lesbians and bisexual women, and higher rates of smoking and living alone among gay men. Sexually diverse adults experience disparities in health care access. This study is one of the first to identify disparities among sexually diverse populations, in addition to lesbian, gay, and bisexual adults. More research is required to understand the mechanisms of disparities within these groups to address their distinct intervention needs.

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## Introduction

Sexual minority (e.g., lesbian, gay, bisexual, and sexually diverse) adults are more likely to experience adverse health outcomes compared to straight adults.<sup>1,2</sup> The U.S. Department of Health and Human Services defined health disparities as variations in health “closely linked with social, economic, and/or environmental disadvantage” based on characteristics “historically linked to discrimination or exclusion.”<sup>3</sup> The goals of Healthy People 2020 identified health disparities related to sexual identity as one of the main gaps in current health research.<sup>3</sup> Foundational work has documented health disparities by sexual identity using population-based data. These studies revealed disparities between lesbian, gay, and bisexual adults, and their straight counterparts, including higher risks of poor mental and physical health,<sup>4</sup> disability, limitations in activities, and chronic conditions and comorbidities.<sup>5</sup>

Investigations of health disparities among sexual minorities have increased over the last decade, yet critical gaps remain in examining social determinants

(e.g., economic, social, environmental conditions<sup>6</sup>) influence on health and well-being. According to Healthy People 2030, the five social determinants of health – economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context – contribute to health disparities and inequalities. One of the overarching goals of Healthy People 2030 is to “create social, physical, and economic environments that promote attaining the full potential for health and well-being for all.”<sup>7</sup> The Health Equity Promotion Model<sup>2</sup> emphasizes the social determinants of health, illustrating the intersection of socio-economic factors (e.g., income, education) and social characteristics (e.g., relationship status, living arrangement) and how they influence health across diverse sexual identities. For sexual minorities, each of these determinants may be influenced by social exclusion and marginalization at both individual and structural levels.<sup>2</sup> For example, while discrimination and victimization are strong direct predictors of poor health among sexual minorities, discriminatory interpersonal experiences and

policies can also restrict access to social<sup>8,9</sup> and health-care<sup>10</sup> resources, limiting important supports for achieving optimal health.

This study is needed to fill several important existing gaps in the literature. For example, most past research treats sexual minorities as a monolithic group comparing them with those who are straight, obscuring important subgroup differences. While some recent research has begun to document health variability within sexual minorities, including that bisexual women are at higher risk than lesbians for poor general health, mental distress, and disability,<sup>11</sup> most studies have not attended to other sexual identities. Given expanding self-identifications of sexuality,<sup>12</sup> a recent National Academy of Sciences, Engineering, and Medicine report<sup>13</sup> recognizes limited attention to identities other than lesbian, gay, bisexual, or straight, and recommends examination of the growing population of sexually diverse individuals.

To better understand and address the comprehensive needs of the increasingly diverse population, and develop responsive interventions and public health policies, further research is needed on social and economic characteristics and health inequities among diverse sexual minorities, including those who identify as something other than lesbian, gay, or bisexual. The current paper analyzed population-based data from the Washington State Behavioral Risk Factor Surveillance System (WA-BRFSS) to estimate prevalence rates among sexual minorities, including those who are sexually diverse, lesbian, gay and bisexual, and compare sex-stratified sexual minority subgroups with straight women and men, to identify differences in economic, social, and health indicators. While gender minorities are often considered together in research with sexual minorities, rarely does this research examine the intersection of gender identity and sexual orientation. In the current study, cell size became extremely low among gender minority respondents when positing this intersection, in some cases  $n < 10$ . Accordingly, Fredriksen-Goldsen and colleagues separately examined health, economic, and social outcomes among distinct subgroups of gender minority BRFSS respondents.<sup>14</sup>

## Methods

### Data

We analyzed the WA-BRFSS collected from 2011 to 2019. The WA-BRFSS is an annual telephone survey using the random-digit-dial method and conducted in collaboration with the Centers for Disease Control

and Prevention. Each year, eligible households are selected via disproportionate stratified random sampling, and one adult aged 18 or older from each selected household is randomly selected as the respondent.<sup>15</sup> This study included those who completed the survey's sexual identity question ( $N = 109,527$ ). Respondents were asked to select one of the following: straight, lesbian (if women) or gay (if men), bisexual or something else. Those who selected "something else" were grouped as sexually diverse. To address sampling bias from nonresponse, sampling design, and households or individuals without telephones, we applied sampling weights provided by the WA-BRFSS. According to weighted estimation, 5.9% (unweighted  $n = 4,967$ ) were sexual minorities including 2.0% (unweighted  $n = 1,966$ ) lesbian or gay, 2.7% (unweighted  $n = 1,952$ ) bisexual, and 1.2% (unweighted  $n = 1,044$ ) sexually diverse, and 94.1% (unweighted  $n = 104,560$ ) were straight. Among women, 1.6% (unweighted  $n = 914$ ) were lesbians, 3.8% (unweighted  $n = 1,339$ ) bisexual, 1.3% (unweighted  $n = 625$ ) sexually diverse, and 93.3% (unweighted  $n = 58,671$ ) straight. Among men, 2.3% (unweighted  $n = 1,052$ ) were gay, 1.7% (unweighted  $n = 613$ ) bisexual, 1.0% (unweighted  $n = 419$ ) sexually diverse, and 95.0% (unweighted  $n = 45,868$ ) straight. The data used for this study are all publicly available from the State of Washington's Department of Public Health, so informed consent procedures are not applicable. All study materials and procedures were reviewed and approved by the University of Washington Human Subject's Division.

Table 1 presents the study measures. Sexual identity was measured as the independent variable, and dependent variables include economic and social indicators as well as health indicators in the areas of health behavior, health care access, preventive care, chronic conditions, disability, and health outcomes. Background characteristics include age and race/ethnicity. Covariates were entered in models where health indicators are examined in association with sexual identity, include age, income, and education.

### Statistical analysis

We first estimated the weighted distribution of background characteristics and economic and social indicators for all sexual minorities, and by gender and sexual identity. Second, weighted prevalence of health behaviors, health care access, preventive care, health outcomes, and chronic conditions/disability were estimated for all sexual minorities and by gender and sexual identity. Third, we examined, by gender,

**Table 1.** Description of measures.

Variables	Description
Sexual identity	Respondents selected one of the following: straight, lesbian (if woman) or gay (if men), bisexual, or something else. Those who selected 'something else' were grouped as sexually diverse.
Background characteristics	Age was reported in years with ages 99 and older coded as 99, and race/ethnicity indicated non-Hispanic Whites versus people of color.
<i>Economic indicators</i>	
Household income	Calculated to indicate $\leq 200\%$ versus $> 200\%$ of federal poverty guidelines <sup>10</sup>
Education	Dichotomized as high school or less education versus some college or more education
Employment	Dichotomized as employed for wages or self-employed versus other
<i>Social indicators</i>	
Relationship status	Dichotomized as currently married or partnered versus other
Number of children	Number of children living in the same household (Range: 0 – 12)
Living arrangement	Calculated to indicate whether respondents are living alone or not
<i>Health behavior</i>	
Current smoking	Defined and dichotomized as having smoked 100 or more cigarettes in lifetime and currently smoking some days or more. <sup>12</sup>
Excessive drinking	Defined and dichotomized as women having four or more and men having five or more drinks on one occasion during the past month. <sup>13</sup>
Physical activity	Assessed and dichotomized as meeting the guidelines for American adults, i.e., moderate-intensity (or vigorous equivalent) aerobic activities for 150 minutes or more a week and strengthening exercises for two or more days a week. <sup>14</sup>
<i>Health care access</i>	
Health care coverage	Respondents indicated ... if they had any kind of health care coverage including health insurance, prepaid plans, and government plans
Health care provider	if they had one person they thought of as personal doctor or health care provider
Financial barrier to care	if there had been a time in the past 12 months when they needed to see a doctor but could not because of cost
<i>Preventive care</i>	
Routine checkup	Respondents indicated if they had ... a routine checkup in the past year
Flu vaccination	a flu vaccine during the past 12 months
Mammogram or PSA test	a mammogram (if women aged 40 and older) or a prostate-specific antigen test (if men aged 40 and older) in the past two years
HIV test	a HIV test in their lifetime
<i>Health outcomes</i>	
Poor general health	Respondents self-rated their own health in general, and responses were dichotomized into "poor" or "fair" versus "good," "very good," and "excellent."
Poor mental health	Dichotomized to indicate respondents' reporting 14 or more days during the previous 30 days when mental health was not good
Poor physical health	Dichotomized to indicate respondents' reporting 14 or more days during the previous 30 days when physical health was not good
<i>Chronic conditions/disability</i>	
Chronic conditions	Whether respondents have ever been told by a doctor, nurse, or other health professional that they have ...
Arthritis	some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia
Asthma	asthma
Diabetes	diabetes with pre- and borderline diabetes and gestational diabetes excluded
Hypertension	high blood pressure with borderline and gestational hypertension excluded
High cholesterol	high level of blood cholesterol
Cardiovascular disease	a heart attack, angina, or a stroke, combined based on recommendations of other studies. <sup>15</sup>
Obesity	Calculated to indicate BMI $\geq 30$ (=weight in kg divided by height in m <sup>2</sup> ). <sup>16</sup>
Number of chronic conditions	Computed by summing the conditions above that respondents have with hypertension and high cholesterol excluded for their unavailability in even years' data
Disability	Defined and dichotomized as having any of the following: (1) deaf or serious difficulty hearing, (2) blind or serious difficulty seeing with glasses, (3) serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition, (4) serious difficulty walking or climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands because of physical, mental, or emotional condition. <sup>17</sup>
Subjective cognitive decline	Respondents indicated whether they had experienced, during the past 12 months, confusion or memory loss that was happening more often or was getting worse.

statistical differences in the odds of each indicator between all sexual minorities and those who are straight, after adjusting for age, income, and education, followed by analyses of subgroup differences where lesbians, bisexual, and sexually diverse women were compared with straight women, and gay, bisexual, and sexually diverse men with straight men. Linear or logistic regressions were performed depending on the measurement of each indicator.

All analyses were conducted with ten datasets generated by multiple imputation, to mitigate

potential bias resulting from systematic missing patterns in study variables. The data had missing values with the highest rate (18.4%, unweighted  $n = 22,244$ ) in the income variable. We identified auxiliary variables significantly associated with the income variable and its missingness (e.g., age, race/ethnicity, relationship status, employment status, and health indicators). Chained equations defined bounds on the values given the binary nature of study variables.<sup>16,17</sup> All analyses were conducted using StataMP 16.<sup>18</sup>

## Results

### Background characteristics

Table 2 illustrates that sexual minority women, overall, were younger ( $b = -12.34$ ) and less likely to be non-Hispanic White (odds ratio [OR] = 0.74) than straight women. Lesbian ( $b = -5.42$ ), bisexual ( $b = -17.16$ ), and sexually diverse women ( $b = -6.86$ ) were younger than straight women. Lesbians were more likely than straight women to be non-Hispanic White (OR = 1.35) whereas bisexual (OR = 0.76) and sexually diverse women (OR = 0.40) were less likely to be non-Hispanic White.

Sexual minority men, overall, were younger ( $b = -6.93$ ) and less likely to be non-Hispanic White (OR = 0.69) than straight men. Gay ( $b = -5.32$ ), bisexual ( $b = -10.83$ ), and sexually diverse men ( $b = -4.14$ ) were younger than straight men. Gay and bisexual men did not differ from straight men in the odds of being non-Hispanic White whereas sexually diverse men (OR = 0.31) were less likely to be non-Hispanic White than straight men.

### Economic indicators

Presented in Table 2, sexual minority women, overall, were more likely than straight women to have income at or below 200% of federal poverty guidelines (OR = 1.83) and high school or less education (OR = 1.21), while they were more likely employed (OR = 1.15). Lesbians did not differ from straight women in the odds of earning income at or below 200% of the guidelines, but they had lower odds of a high school or less education (OR = 0.71). In contrast, bisexual and sexually diverse women had higher odds of an income at or below 200% of the guidelines (OR = 2.02 and 2.85) and high school or less education (OR = 1.19 and 2.18) than straight women. Whereas lesbians were more likely employed than straight women (OR = 1.71), sexually diverse women were less likely employed (OR = 0.75). No difference in employment was found between bisexual and straight women.

Sexual minority men, overall, were more likely to have income at or below 200% of federal poverty guidelines (OR = 1.82) and less likely employed (OR = 0.88) than straight men, despite no difference in education. Gay men did not differ from straight men in income and employment but had lower odds of having a high school or less education (OR = 0.69). Bisexual (OR = 2.12) and sexually diverse men (OR = 3.50) were more likely to earn an income at or below 200% of the guidelines than straight men. Sexually diverse men were also more likely to have a

high school or less education (OR = 2.91) and were less likely to be employed (OR = 0.75) while bisexual men did not differ from straight men in education and employment.

### Social indicators

Presented in Table 2, sexual minority women, overall, were less likely to be married or partnered (OR = 0.55) and had fewer children ( $b = -0.07$ ) than straight women but were also less likely to live alone (OR = 0.85). Lesbian (OR = 0.62), bisexual (OR = 0.52), and sexually diverse women (OR = 0.55) were less likely to be married or partnered than straight women. Lesbians had fewer children than straight women ( $b = -0.27$ ) while no difference in number of children was found among bisexual and sexually diverse women. Bisexual women were less likely to live alone (OR = 0.63) than straight women while no difference was found for lesbian and sexually diverse women.

Sexual minority men, overall, were less likely to be married or partnered (OR = 0.40), had fewer children ( $b = -0.23$ ), and were more likely to live alone than straight men (OR = 1.58). Gay (OR = 0.36), bisexual (OR = 0.38), and sexually diverse men (OR = 0.57) were less likely to be married or partnered, and gay ( $b = -0.41$ ) and bisexual men ( $b = -0.14$ ) had fewer children than straight men. The number of children did not differ among sexually diverse and straight men. Gay men were more likely to live alone (OR = 2.14) than straight men while no difference was found for bisexual and sexually diverse men.

### Health behaviors

Table 3 shows that sexual minority women, overall, were more likely to report current smoking (adjusted odds ratio [AOR] = 1.42) and excessive drinking (AOR = 1.32) than straight women, with no difference in physical activity. Lesbians and bisexual women were more likely to report current smoking (AOR = 1.65 and 1.63) and excessive drinking (AOR = 1.41 and 1.55) than straight women, whereas sexually diverse women were less likely to report excessive drinking (AOR = 0.49).

Sexual minority men, overall, were more likely to report current smoking (AOR = 1.28) than straight men with no difference in excessive drinking and physical activity. Gay men were more likely to report current smoking than straight men (AOR = 1.75). No other differences in health behaviors were found in the subgroups of sexual minority men in comparison with straight men.



**Table 2. Weighted prevalence rates and differences in background, economic, and social characteristics by sexual identity and gender, age 18 and older, WA-BRFSS 2011–2019.**

	Straight adults (n = 104,560), Mean or %		Sexual minorities (n = 4,967), Mean or %, OR or B, p (95% CI)		Straight women (n = 58,671), Mean or %		Sexual minority women, mean or %, OR or B, p (95% CI)				Straight men (n = 45,868), Mean or %		Sexual minority men, mean or %, OR or B, p (95% CI)			
	Mean or %	OR or B, p (95% CI)	Mean or %	OR or B, p (95% CI)	Mean or %	OR or B, p (95% CI)	All (n = 2,878)	Lesbian (n = 914)	Bisexual (n = 1,339)	Sexually diverse (n = 625)	Mean or %	All (n = 2,084)	Gay (n = 1,052)	Bisexual (n = 613)	Sexually diverse (n = 419)	
Age, y	48.36	38.46 (-9.90, p<.001) (-10.51, -9.29)	49.39	37.04 (-12.34, p<.001) (-13.13, -11.55)	43.97	32.23 (-17.16, p<.001) (-18.01, -16.30)	42.53	43.97	32.23	42.53	47.32	40.39	41.99	36.48	43.18	
Non-Hispanic Whites	75.74	69.22 (0.65, 0.79)	76.29	70.47 (0.65, 0.84)	81.27	70.84 (0.64, 0.90)	56.24	81.27	70.84	56.24	75.19	67.50	72.85	71.79	48.16	
<b>Economic indicator</b>																
Income	32.99	47.62 1.85, p<.001 (1.70, 2.01)	35.03	49.62 1.83, p<.001 (1.63, 2.05)	34.57	52.18 2.02, p<.001 (1.72, 2.37)	60.57	34.57	52.18	60.57	30.92	44.86	35.02	48.72	61.00	
≤ 200% FPG																
High school or less	33.97	37.08 1.15, p<.01 (1.05, 1.25)	31.47	35.67 1.21, p<.01 (1.08, 1.36)	24.57	35.39 1.19, p=0.03 (1.02, 1.40)	50.00	24.57	35.39	50.00	36.48	39.07	28.27	39.84	62.55	
Employed	56.60	56.27 0.99, p=0.75 (0.91, 1.07)	49.82	53.33 1.15, p<.01 (1.04, 1.28)	62.93	53.04 1.14, p=0.08 (0.98, 1.31)	42.52	62.93	53.04	42.52	63.46	60.33	61.83	60.61	56.46	
<b>Social indicator</b>																
Married or partnered	60.00	41.72 0.48, p<.001 (0.44, 0.52)	58.84	43.84 0.55, p<.001 (0.49, 0.61)	47.20	42.42 0.52, p<.001 (0.45, 0.60)	43.87	47.20	42.42	43.87	61.17	38.76	36.01	37.44	47.27	
No. of children in household	0.68	0.55 (-0.17, -0.09)	0.73	0.66 (-0.07, p=0.02) (-0.13, -0.01)	0.46	0.71 (-0.02, p=0.57) (-0.09, 0.05)	0.76	0.46	0.71	0.76	0.64	0.41	0.23	0.50	0.66	
Living alone	15.68	17.37 1.13, p<.01 (1.03, 1.24)	16.93	14.70 0.85, p=0.01 (0.74, 0.96)	18.70	11.45 0.63, p<.001 (0.51, 0.78)	19.23	18.70	11.45	19.23	14.40	21.03	26.46	16.20	16.60	

Note. All sexual minority includes lesbians, gay men, bisexuals, and sexually diverse individuals. All sexual minority women include lesbians, bisexual women, and sexually diverse women, and all sexual minority men include gay, bisexual, and sexually diverse men. Linear regressions of age and the number of children in household, and logistic regressions of the other indicators were conducted. *n*'s are unweighted. OR=Odds Ratio. CI=Confidence Interval. FPG=Federal Poverty Guidelines.

**Table 3.** Weighted prevalence rates and differences in health care access, behavior, and preventive care by sexual identity and gender, age 18 and older, WA-BRFSS 2011–2019.

	Straight adults (n = 104,560), Mean or %	Sexual minorities (n = 4,967), Mean or %, AOR or B, p (95% CI)		Straight women (n = 58,671), Mean or %	Sexual minority women, Mean or %, AOR or B (95% CI), p				Sexual minority men, Mean or %, AOR or B (95% CI), p			
		Sexual diverse (n = 625)	Bisexual (n = 1,339)		Lesbian (n = 914)	All (n = 2,878)	Bisexual (n = 1,339)	Lesbian (n = 914)	All (n = 2,084)	Gay (n = 1,052)	Bisexual (n = 613)	Sexually diverse (n = 419)
<b>Behavior</b>												
Current smoking	14.59	21.52 1.33, p<0.01 (1.19, 1.48)	13.13	21.04 1.42, p<0.001 (1.23, 1.64)	19.64 1.65, p<0.001 (1.28, 2.13)	24.07 1.63, p<0.001 (1.36, 1.97)	13.96 0.74, p=0.08 (0.53, 1.04)	16.06	22.22 1.28, p<0.01 (1.08, 1.52)	24.4 1.75, p<0.001 (1.38, 2.22)	21.29 1.14, p=0.38 (0.86, 1.51)	18.78 0.78, p=0.20 (0.53, 1.14)
Excessive drinking	15.68	20.78 1.11, p=0.06 (1.00, 1.24)	11.65	19.10 1.32, p<0.001 (1.13, 1.53)	17.76 1.41, p=0.01 (1.08, 1.85)	23.84 1.55, p<0.001 (1.29, 1.87)	7.02 0.49, p<0.01 (0.32, 0.76)	19.76	23.04 1.05, p=0.60 (0.89, 1.23)	23.82 1.13, p=0.31 (0.90, 1.41)	25.26 1.07, p=0.63 (0.82, 1.38)	17.59 0.82, p=0.37 (0.54, 1.26)
Physical activity	23.02	23.49 1.00, p=0.98 (0.88, 1.14)	21.73	23.83 1.123, p=0.19 (0.94, 1.34)	28.18 1.33, p=0.06 (0.99, 1.79)	24.75 1.16, p=0.24 (0.91, 1.47)	16.49 0.81, p=0.81 (0.54, 1.19)	24.34	23.05 0.91, p=0.33 (0.74, 1.10)	24.98 0.95, p=0.71 (0.72, 1.25)	21.04 0.79, p=0.20 (0.56, 1.13)	22.39 1.01, p=0.96 (0.66, 1.56)
<b>Health care access</b>												
Health care coverage	88.89	85.41 1.18, p=0.02 (1.02, 1.35)	90.46	87.11 1.27, p=0.01 (1.06, 1.54)	93.11 1.75, p<0.01 (1.16, 2.63)	87.72 1.53, p<0.01 (1.19, 1.98)	78.07 0.68, p=0.03 (0.48, 0.96)	87.31	83.04 1.01, p=0.95 (0.82, 1.23)	87.69 1.16, p=0.37 (0.84, 1.60)	83.86 1.26, p=0.20 (0.89, 1.79)	71.02 0.62, p<0.01 (0.44, 0.88)
Health care provider	77.32	69.58 1.06, p=0.30 (0.96, 1.17)	83.88	71.79 0.81, p<0.01 (0.71, 0.93)	78.76 0.85, p=0.22 (0.65, 1.10)	70.22 0.89, p=0.19 (0.74, 1.06)	67.78 0.59, p<0.001 (0.44, 0.79)	70.68	66.49 1.18, p=0.03 (1.02, 1.37)	74.28 1.50, p<0.01 (1.19, 1.88)	64.25 1.29, p=0.047 (1.00, 1.66)	52.20 0.63, p<0.01 (0.47, 0.84)
Financial barrier to care	12.30	21.04 1.43, p<0.001 (1.28, 1.60)	13.19	23.17 1.42, p<0.001 (1.23, 1.64)	19.58 1.51, p<0.01 (1.17, 1.95)	24.40 1.39, p<0.01 (1.14, 1.68)	24.00 1.43, p=0.03 (1.05, 1.94)	11.39	18.09 1.37, p<0.01 (1.14, 1.63)	12.56 1.03, p=0.85 (0.77, 1.37)	20.49 1.47, p=0.01 (1.10, 1.97)	26.79 1.90, p<0.001 (1.35, 2.68)
<b>Preventive care</b>												
Routine checkup	64.74	61.60 1.14, p<0.01 (1.04, 1.24)	69.58	63.55 0.99, p=0.88 (0.88, 1.11)	62.65 0.80, p=0.03 (0.66, 0.97)	62.43 1.04, p=0.66 (0.88, 1.21)	67.87 1.13, p=0.33 (0.88, 1.46)	59.82	58.97 1.21, p<0.01 (1.06, 1.38)	63.35 1.35, p<0.01 (1.11, 1.63)	55.25 1.16, p=0.19 (0.93, 1.45)	55.1 1.02, p=0.92 (0.76, 1.35)
Flu vaccination	41.55	38.34 1.19, p<0.001 (1.09, 1.30)	45.01	38.43 1.06, p=0.35 (0.94, 1.18)	41.92 0.97, p=0.77 (0.81, 1.17)	35.98 1.07, p=0.39 (0.91, 1.26)	41.25 1.12, p=0.35 (0.88, 1.44)	38.05	38.26 1.31, p<0.001 (1.14, 1.50)	44.04 1.51, p<0.001 (1.25, 1.82)	35.89 1.34, p=0.02 (1.06, 1.70)	28.94 0.87, p=0.38 (0.65, 1.18)
Mammogram or PSA test <sup>a</sup>	58.20	49.47 0.80, p<0.01 (0.69, 0.91)	70.97	62.73 0.75, p<0.01 (0.63, 0.91)	74.41 1.18, p=0.22 (0.90, 1.55)	52.88 0.53, p<0.001 (0.39, 0.72)	57.00 0.65, p=0.02 (0.44, 0.945)	33.45	24.59 0.83, p=0.17 (0.65, 1.08)	25.04 0.88, p=0.43 (0.64, 1.21)	25.55 0.86, p=0.58 (0.50, 1.48)	21.19 0.62, p=0.15 (0.32, 1.18)
HIV test	36.30	56.53 1.87, p<0.001 (1.71, 2.03)	38.19	52.98 1.24, p<0.001 (1.10, 1.40)	50.34 1.38, p<0.01 (1.12, 1.69)	59.19 1.38, p<0.001 (1.17, 1.63)	38.03 0.78, p=0.08 (0.60, 1.03)	34.41	61.34 2.82, p<0.001 (2.48, 3.22)	79.13 6.74, p<0.001 (5.33, 8.52)	52.48 1.85, p<0.001 (1.49, 2.3)	33.97 1.00, p=0.99 (0.75, 1.34)

Note. All sexual minority includes lesbians, gay men, bisexuals, and sexually diverse individuals. All sexual minority women include lesbians, bisexual women, and sexually diverse women, and all sexual minority men include gay, bisexual, and sexually diverse men. Logistic regressions of the indicators were conducted, adjusting for age, income, and education. *n*'s are unweighted. <sup>a</sup>Women and men aged 40 and older only. AOR=Adjusted Odds Ratio. CI=Confidence Interval. PSA test=Prostate-Specific Antigen test.

**Table 4. Weighted prevalence rates and differences in health outcomes and chronic conditions by sexual identity and gender, age 18 and older, WA-BRFSS 2011–2019.**

	Straight adults (n = 104,560), Mean or %		Sexual minority women, Mean or %, AOR or B, p (95% CI)		Sexual minority men, Mean or %, AOR or B, p (95% CI)		Sexually diverse (n = 419),		
	Mean or %	AOR or B, p (95% CI)	Lesbian (n = 914)	Bisexual (n = 1,339)	Sexually diverse (n = 625)	Straight men (n = 45,868), Mean or %		Bisexual (n = 613),	
<b>Health outcomes</b>									
Poor general health	15.32	20.41 1.55, p<.001 1.39, 1.72	21.34 1.69, p<.001 1.47, 1.95	18.11 1.51, p<.01 1.15, 1.99	20.52 1.75, p<.001 1.44, 2.12	15.36 1.35, p<.001 1.14, 1.58	13.09 0.96, p=0.78 0.75, 1.24	21.94 1.75, p<.001 1.35, 2.28	28.30 1.56, p<.01 1.13, 2.17
Poor mental health	11.15	26.10 2.31, p<.001 2.09, 2.55	29.10 2.14, p<.001 1.88, 2.43	20.84 1.70, p<.001 1.33, 2.17	34.45 2.59, p<.001 2.18, 3.07	9.20 2.38, p<.001 2.03, 2.79	20.11 2.45, p<.001 1.94, 3.09	23.56 2.47, p<.001 1.91, 3.19	23.13 2.12, p<.001 1.49, 3.00
Poor physical health	11.99	14.94 1.43, p<.001 1.27, 1.61	16.60 1.53, p<.001 1.31, 1.78	14.52 1.34, p=0.02 1.05, 1.72	17.08 1.73, p<.001 1.40, 2.13	11.04 1.22, p=0.04 1.01, 1.48	10.48 1.09, p=0.60 0.79, 1.51	12.57 1.30, p=0.10 0.95, 1.78	17.88 1.35, p=0.10 0.95, 1.92
<b>Chronic conditions</b>									
Arthritis	26.13	20.58 1.21, p<.001 (1.10, 1.34)	22.91 1.30, p<.001 (1.14, 1.47)	31.36 1.51, p<.001 (1.23, 1.85)	19.41 1.45, p<.001 (1.21, 1.74)	21.73 1.05, p=0.51 (0.90, 1.24)	19.55 1.22, p=0.06 (0.99, 1.51)	15.23 1.10, p=0.52 (0.82, 1.48)	15.73 0.69, p=0.07 (0.46, 1.04)
Asthma	15.20	23.09 1.53, p<.001 1.39, 1.69	27.31 1.62, p<.001 1.43, 1.83	24.66 1.51, p<.001 1.21, 1.88	29.61 1.78, p<.001 1.51, 2.11	12.77 1.30, p<.001 1.02, 1.59	16.51 1.28, p=0.04 1.00, 1.63	20.21 1.51, p<.01 1.15, 1.99	14.22 1.03, p=0.89 0.71, 1.48
Diabetes	9.35	7.58 1.18, p=0.02 (1.02, 1.36)	6.48 1.09, p=0.40 (0.89, 1.33)	8.16 1.23, p=0.22 (0.89, 1.69)	4.26 0.88, p=0.43 (0.65, 1.20)	9.81 1.32, p=0.16 (0.89, 1.95)	8.94 1.25, p=0.11 (0.95, 1.65)	9.63 1.65, p<.01 (1.14, 2.40)	8.66 0.89, p=0.62 (0.56, 1.41)
Hyper-tension	31.37	23.46 1.02, p=0.73 0.90, 1.16	18.47 1.05, p=0.60 0.87, 1.26	20.81 0.92, p=0.56 0.69, 1.23	15.47 1.25, p=0.11 0.95, 1.65	34.62 0.86, p=0.41 0.61, 1.23	30.34 1.07, p=0.60 0.83, 1.37	27.45 1.39, p=0.05 1.00, 1.92	27.45 0.74, p=0.10 0.52, 1.06
High cholesterol	35.72	28.28 1.03, p=0.70 0.90, 1.17	26.52 1.16, p=0.11 0.97, 1.39	31.27 1.17, p=0.24 0.90, 1.53	22.33 1.26, p=0.12 0.94, 1.67	38.16 0.97, p=0.87 0.68, 1.39	27.28 0.92, p=0.39 0.76, 1.11	31.94 1.17, p=0.36 0.83, 1.66	35.97 0.90, p=0.62 0.60, 1.36
Cardio-vascular disease	7.86	5.72 1.21, p=0.02 1.03, 1.42	4.77 1.33, p=0.01 1.07, 1.66	5.84 1.38, p=0.07 0.97, 1.97	3.35 1.38, p=0.08 0.96, 1.98	9.10 1.23, p=0.33 0.81, 1.85	7.41 1.24, p=0.22 0.88, 1.76	5.58 1.06, p=0.79 0.70, 1.6	8.53 0.93, p=0.78 0.57, 1.51
Obesity	27.95	29.66 1.13, p<.01 1.03, 1.24	33.06 1.38, p<.001 1.23, 1.55	35.25 1.57, p<.001 1.30, 1.91	31.79 1.34, p<.001 1.14, 1.57	29.00 1.29, p=0.06 0.99, 1.68	22.29 0.75, p<.01 0.61, 0.92	28.90 1.07, p=0.58 0.84, 1.37	24.69 0.77, p=0.11 0.56, 1.06
No. of chronic conditions <sup>a</sup>	0.86	0.86 0.15, p<.001 (0.11, 0.18)	0.94 0.22, p<.001 (0.17, 0.27)	1.05 0.26, p<.001 (0.16, 0.35)	0.88 0.24, p<.001 (0.18, 0.31)	0.82 0.12, p=0.03 (0.01, 0.23)	0.74 0.04, p=0.15 (-0.01, 0.09)	0.79 0.02, p=0.48 (-0.04, 0.09)	0.71 -0.11, p=0.06 (-0.22, 0.00)
Disability <sup>b</sup>	23.23	33.29 2.07, p<.001 1.82, 2.34	36.57 2.36, p<.001 1.99, 2.78	37.84 2.49, p<.001 1.83, 3.39	37.47 2.78, p<.001 2.25, 3.43	21.82 1.39, p=0.09 0.95, 2.02	21.84 1.23, p<.001 0.91, 1.65	34.22 2.43, p<.001 1.79, 3.29	29.58 1.06, p=0.81 0.67, 1.67
Subjective cognitive decline <sup>c</sup>	11.16	21.43 2.27, p<.001 (1.53, 3.37)	24.55 2.68, p<.001 (1.57, 4.59)	13.91 1.33, p=0.33 (0.75, 2.35)	31.45 4.24, p<.001 (1.93, 9.33)	11.29 1.95, p=0.08 (0.92, 4.11)	14.66 1.69, p=0.06 (0.97, 2.93)	29.17 3.60, p=0.02 (1.29, 10.06)	9.26 0.48, p=0.20 (0.16, 1.48)

Note: All sexual minority includes lesbians, gay men, bisexuals, and sexually diverse individuals. All sexual minority women include lesbians, bisexual women, and all sexual minority men include gay, bisexual, and sexually diverse men. Linear regressions of the number of chronic conditions, and logistic regressions of the other indicators were conducted. Adjusted for age, income, and education. *n*'s are unweighted. <sup>a</sup>Includes obesity, arthritis, asthma, diabetes, and cardiovascular disease. Hypertension and high cholesterol were excluded because they were available for odd years only. <sup>b</sup>Data available in 2016 through 2019. <sup>c</sup>Data available in 2011 and 2016. AOR=Adjusted Odds Ratio. CI=Confidence Interval.



### Health care access

Table 3 shows that sexual minority women, overall, were more likely than straight women to have health care coverage (AOR = 1.27), yet less likely to have a health care provider (AOR = 0.81), and more likely to experience financial barriers to care (AOR = 1.42). Lesbians and bisexual women were more likely to have health care coverage than straight women (AOR = 1.75 and 1.53) with no differences in having a health care provider. However, both lesbians and bisexual women were more likely to experience financial barriers to health care than straight women (AOR = 1.51 and 1.39). Sexually diverse women, compared to straight women, had lower odds of health care coverage (AOR = 0.68) and having a health care provider (AOR = 0.59), and higher odds of experiencing financial barriers to care (AOR = 1.43).

Sexual minority men, overall, were more likely to have a health care provider than straight men (AOR = 1.18) with no difference in health care coverage. However, they were more likely to experience financial barriers to care (AOR = 1.37). Gay and bisexual men were more likely than straight men to have a health care provider (AOR = 1.50 and 1.29) with no difference in having health care coverage. Bisexual men were more likely than straight men to experience financial barriers to care (AOR = 1.47) and barriers to care was not different among gay men. Sexually diverse men had lower odds of health care coverage (AOR = 0.62) and having a health care provider (AOR = 0.63), and higher odds of financial barriers to care (AOR = 1.90).

### Preventive care

Presented in Table 3, sexual minority women, overall, did not differ from straight women in the odds of receiving a routine checkup and a flu vaccine while they were more likely to have a HIV test (AOR = 1.24). However, sexual minority women, 40 and older, were less likely to receive a mammogram than straight women (AOR = 0.75). Lesbians were less likely to have a routine checkup than straight women (AOR = 0.80), while no difference was observed among bisexual and sexually diverse women. Bisexual and sexually diverse women, 40 and older, were less likely to have a mammogram (AOR = 0.53 and 0.65) than straight women with no difference among lesbians. Lesbians (AOR = 1.38) and bisexual women (AOR = 1.38), but not sexually diverse women, were more likely to receive a HIV test than straight women. There were no differences in the odds of flu

vaccination for lesbian, bisexual, and sexually diverse women compared to straight women.

Sexual minority men, overall, were more likely to receive a routine checkup (AOR = 1.21), a flu vaccine (AOR = 1.31), and a HIV test (AOR = 2.82) than straight men while no difference in a prostate-specific antigen test was found. Gay and bisexual men were more likely than straight men to receive a flu vaccine (AOR = 1.51 and 1.34) and a HIV test (AOR = 6.74 and 1.85). Gay men were also more likely to have a routine checkup than straight men (AOR = 1.35). Sexually diverse men did not differ from straight men in the odds of preventive care, including a routine checkup, flu vaccination, and HIV test. No differences in the odds of a prostate-specific antigen test were found for gay, bisexual, and sexually diverse men aged 40 and older compared to straight men.

### Health outcomes

Table 4 shows that sexual minority women, overall, were more likely than straight women to report poor general health (AOR = 1.69), poor mental health (AOR = 2.14), and poor physical health (AOR = 1.53). Both lesbians and bisexual women had higher odds than straight women for poor general health (AOR = 1.51 and 1.75), poor mental health (AOR = 1.70 and 2.59), and poor physical health (AOR = 1.34 and 1.73). Sexually diverse women had higher odds than straight women for poor general health (AOR = 1.76) and poor mental health (AOR = 1.52).

Sexual minority men, overall, were also more likely than straight men to report all three poor health outcome indicators, i.e., poor general health (AOR = 1.35), poor mental health (AOR = 2.38), and poor physical health (AOR = 1.22). Gay men had higher odds than straight men for poor mental health (AOR = 2.45) while bisexual and sexually diverse men for poor general health (AOR = 1.75 and 1.56) and poor mental health (AOR = 2.47 and 2.12). No subgroups of sexual minority men had elevated odds of poor physical health, compared with straight men.

### Chronic conditions

Presented in Table 4, sexual minority women, overall, had higher odds for arthritis (AOR = 1.30), asthma (AOR = 1.62), cardiovascular disease (AOR = 1.33), obesity (AOR = 1.38), disability (AOR = 2.36), and subjective cognitive decline (AOR = 2.68), and a higher number of chronic conditions ( $b=0.22$ ) than straight women. Both lesbians and bisexual women

had higher odds than straight women for arthritis (AOR = 1.51 and 1.45), asthma (AOR = 1.51 and 1.78), obesity (AOR = 1.57 and 1.34), and disability (AOR = 2.49 and 2.78), with additional higher odds for subjective cognitive decline among bisexual women (AOR = 4.24). Sexually diverse women had higher odds only for asthma (AOR = 1.34). No subgroups of sexual minority women had elevated odds of diabetes, hypertension, high cholesterol, and cardiovascular disease. Regarding the number of chronic conditions, lesbian ( $b=0.26$ ), bisexual ( $b=0.24$ ), and sexually diverse women ( $b=0.12$ ) had more chronic conditions than straight women.

Sexual minority men, overall, had higher odds than straight men for asthma (AOR = 1.30), diabetes (AOR = 1.27), disability (AOR = 1.57), and subjective cognitive decline (AOR = 1.82), but lower odds for obesity (AOR = 0.85). Gay men had higher odds for asthma (AOR = 1.28) and lower odds for obesity (AOR = 0.75) than straight men while bisexual men had higher odds for asthma (AOR = 1.51), diabetes (AOR = 1.65), hypertension (AOR = 1.39), disability (AOR = 2.43), and subjective cognitive decline (AOR = 3.60). Sexually diverse men did not differ from straight men in the odds of any chronic conditions. No subgroups of sexual minority men had elevated odds of arthritis, high cholesterol, and cardiovascular disease. The number of chronic conditions was higher only among bisexual men ( $b=0.14$ ) compared with straight men.

## Discussion

This study documents key health disparities along with critical social and economic inequities among sexual minority adults. Aligning with the Health Equity Promotion Model, disparities within four primary social determinants of health - health care access, economic stability, education, and social context<sup>19</sup> - were found, providing important insights into sexual minority health and well-being.

Among sexual minority adults, we found elevated risks of poor general health, poor mental health, poor physical health, disability, and subjective cognitive decline. Subgroup analyses elucidated different patterns of disparities within sexual minority communities, contributing to a more robust understanding of heterogeneity<sup>2</sup> and differing configurations of risks and resources in the economic, social, and health-related well-being of these populations, suggesting differing points of potential intervention. Paired with findings that identified varying constellations of economic, social, and health disparities

among transgender subgroups (transgender men, women, and nonbinary adults),<sup>14</sup> the current study adds to evidence of social determinants and health heterogeneity across LGBTQ communities.

Consistent with prior research,<sup>5</sup> lesbians faced disparities in health (i.e., poor general, mental, and physical health, more chronic conditions and comorbidity, and disability). Health disparities may contribute to findings regarding lesbians' heightened health care costs and financial barriers relative to straight women despite their increased odds of being employed and having health coverage. Further, different types of insurance plans (e.g., individually purchased; employer-based; Medicare, Medicaid, or other government-assisted plans) may contribute to financial barriers.<sup>20,21</sup> Some research suggests, for example, that a higher proportion of sexual minority adults are covered by individually-purchased plans with inadequate benefits, higher premiums and deductibles that lead to dissatisfaction, and ultimately greater out-of-pocket costs.<sup>20, 22</sup> While insured at higher rates, lesbians may still experience difficulties paying for health care cost due to these systemically derived barriers. Health behaviors, as modifiable factors, may be important targets for interventions to promote health and reduce health care cost.<sup>23</sup> While individual-level interventions for lesbians might include promoting routine checkups, healthy eating, and reducing excessive drinking and smoking, it is important to remain aware that the root of healthcare avoidance and many coping-motivated behaviors among sexual minorities lie at the intersection of their individual- and structural-level stigma contexts.<sup>2</sup> To remain strengths-focused, it will be important to integrate the physical activities, work histories, and economic independence achieved by lesbian respondents, while simultaneously attending to identified health risks.

Gay men evidenced fewer health disparities, but like lesbians, were more likely than straight adults to experience poor mental health and smoke, both of which have been linked to higher levels of stress<sup>24,25</sup> and are amenable to intervention.<sup>26</sup> Notably, BRFSS data does not include HIV/AIDS, which has had a significant impact on gay and bisexual men's health in the U.S. An important protective factor for gay men was being more likely than straight men to receive more preventive care: routine checkups, HIV testing, and flu vaccination. Engagement in this preventive care may represent distancing from masculinity norms informing males' health beliefs and lower help-seeking behaviors.<sup>21</sup> Increased HIV testing, specifically, may reflect gay men's or providers' knowledge of the population's elevated risk and need.<sup>27</sup> Gay men

in this study are also at risk of lacking support and constrained social networks (e.g., less likely to be married or partnered; more likely to live alone), elevating the risk of social isolation. Many gay and bisexual men who lived through the early HIV/AIDS pandemic had their social networks desecrated, and restricted social connections may impact their health; thus, interventions supporting social connection are needed. Indeed, the majority of informal elder care is provided by adult children and/or partners, but fewer LGBTQ older adults receive similar care.<sup>1</sup>

Bisexual adults, compared to straight adults, had elevated health disparities, compounded by significant income disparities and financial barriers to health care. Bisexual women, like lesbians, were more likely than straight women to smoke and excessively drink. These health behaviors would likely benefit from targeted behavioral health awareness campaigns and programs. Economic disparities among bisexual, compared to straight, women may be intensified as bisexual women had lower education levels, were younger, and more were women of color, factors that can each impact earning capacity. Intersecting marginalized identities likely impact health outcomes and deserve more research attention. Existing research has shown bisexual people<sup>28</sup> and people of color<sup>29</sup> are vulnerable to discrimination from inside and outside of the LGBTQ community, escalating the risk for poor health. Bisexual men had disadvantaged health and more adverse outcomes compared to straight men. The source of these health differences may be bisexual men's increased stress resulting from identity concealment, internalized heterosexism, and exclusion from both gay and straight communities,<sup>30</sup> potentially increasing the risk of poor mental and physical health. Interestingly, bisexual men did not report higher rates of adverse health behaviors, which may be an important protective factor in this community and used in the development of interventions to reduce adverse health outcomes.

Bisexual and sexually diverse women were less likely to receive a mammogram screening. Research shows tobacco<sup>31</sup> and alcohol<sup>32</sup> use elevate the risk for breast cancer, thus attention to screenings may be particularly salient for bisexual respondents who had increased odds of smoking and drinking compared to straight women. Sexual minority women may also hold lower breast cancer screening intentions due to lower perceived cancer vulnerability, negative beliefs about mammography, and decreased provider trust.<sup>33</sup> Tailored education interventions might link health behaviors with breast cancer risk, provide information around screening needs, and address negative

mammography beliefs or expectancies. Outreach to communities of bisexual and sexually diverse women may enhance trust and connections to care.

Elevated risks of economic disparities were more pronounced among sexually diverse adults, who also reported lower rates of employment. Differences in types of work, employment stability/consistency, wages, and employment discrimination might contribute to economic disparities.<sup>34</sup> Economic disparities limit access to healthful foods, shelter, leisure activities, and other factors affecting health.<sup>19</sup> About half of sexually diverse adults were people of color. Escalatory effects of systemic heterosexism and racism<sup>29</sup> may restrict opportunities for higher education and exacerbate economic inequities, and in-turn health and well-being.

Sexually diverse adults reported the greatest health care access disparities. Sexually diverse adults were less likely married, which may decrease access to insurance coverage through spousal plans.<sup>35</sup> Sexually diverse adults were less likely employed, which, along with contributing to their increased financial barriers to care, may also reduce the likelihood of insurance coverage.<sup>35</sup> Furthermore, queer and questioning individuals report higher rates of negative healthcare experiences based on their sexual identity compared to lesbian, gay, and bisexual peers, leading to healthcare avoidance.<sup>36</sup>

Lack of access to care likely contributes to the finding that sexually diverse adults reported fewer adverse health conditions. Since they were more likely to experience financial barriers to health care and less likely to have a provider or engage in preventive screenings, their risk of not being diagnosed with a health condition may increase. A critical point of intervention to improve the health of sexually diverse populations is to improve health care access. While sexually diverse adults may accrue more health risks through lower engagement in health care, they are also protected through relatively lower participation in smoking for both women and men and less excessive drinking for women. Since sexually diverse respondents were younger than other sexual minorities,<sup>8</sup> they may have less chronic exposure to sexual identity-based discrimination associated with these coping behaviors.<sup>2</sup> Additionally, they may not be as embedded in LGBTQ community activities, historically influenced by the bar and nightclub scene.<sup>27</sup>

Regarding limitations, the BRFSS collected cross-sectional data, which does not allow examining pathways among health, social, and economic disparities, and there could be additional covariates including differences in psychological, social, community,

and regional resources. Measures are based on self-report, which may add errors in estimates partly due to social desirability bias and/or unawareness of their health conditions. Only WA-BRFSS data was analyzed, and the findings may not be applicable to other states. Furthermore, many more subgroups may lie among those sexually diverse (e.g., queer, pansexual, asexual), each potentially experiencing distinct combinations of exposures, risks, and resiliencies. Future research is needed to understand the scope of identities within this population, including those with multiple marginalized identities that may be at increased risk for health, social, and economic inequalities, as key social determinants of health. Finally, one of the five social determinants of health, neighborhood and built environment, was not assessed in this study due to lack of environment-related measures in BRFSS. The neighborhood and built environment, the fifth social determinant of health as identified by Healthy People 2030, which is beyond the scope of this study, is a research area ripe for future study. It is important for future research to examine the influence of the physical living environment in areas such as crime, water/air quality, and access to transportation on the health and well-being of sexually diverse people.

## Conclusions

This study contributes to the literature by examining health, social, and economic disparities among sexual minorities, highlighting the importance of understanding sexual identity heterogeneity within sexual minority communities, including those who identify themselves outside traditional identities. Sexually diverse people are an understudied population, and more research across the life course is needed to investigate the meaning of these identities and their trajectories in health and well-being. Interventions are needed that address the underlying mechanisms of disparities, such as elevated stress, higher rates of bias and victimization experience, and more limited social supports, which impact the health and well-being of sexual minorities. Identification of factors contributing to unique challenges and resilience experienced by at-risk sexual minority subgroups will enable the design of more culturally responsive interventions and policies.

## Data availability statement

The data used for this study are all publicly available from the State of Washington's Department of Public Health.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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