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Disparities in Physical Health Conditions Among Lesbian and Bisexual Women: A Systematic Review of Population-Based Studies

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ABSTRACT

We conducted a systematic review to assess evidence for disparities for lesbian and bisexual women (i.e., sexual minority women [SMW]) in comparison with heterosexual women across a range of nine physical health conditions. Among the $k = 11$ studies meeting eligibility criteria, almost every comparison (i.e., heterosexual vs. (a) lesbian, (b) bisexual, or (c) both lesbian and bisexual women) was in a direction indicating SMW disparities. Despite limited power due to small samples of SMW, we found evidence of disparities as indicated by a statistically significant adjusted odds ratios for asthma (5 of 7 comparisons), obesity (8 of 12), arthritis (2 of 3), global ratings of physical health (4 of 7), and cardiovascular disease (1 of 1). Evidence was lacking for cancer (1 of 4), diabetes and hypertension (both 1 of 5), and high cholesterol (0 of 3). Future work should confirm findings in more diverse, larger samples and should examine potential explanatory factors.

KEYWORDS

Bisexual women; lesbian; LGBT; physical health disparities; systematic review

The Institute of Medicine (2011) has identified insufficient information on health disparities related to sexual orientation as a critical gap in current health research. Health disparities are defined as

> a particular type of health difference that is closely linked with social or economic disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater social or economic obstacles to health based on their racial or ethnic group, religion, socioeconomic status, gender, mental health, cognitive, sensory, or physical disability, sexual orientation, geographic location, or other characteristics historically linked to discrimination or exclusion. (U.S. Department of Health and Human Services, 2010)

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In *Healthy People 2020*, lesbian, gay, and bisexual (LGB) people are for the first time identified in U.S. national health priorities as an at-risk population (U.S. Department of Health and Human Services, 2011). Most of the early research on disparities by sexual orientation focused on mental health, indicating elevated prevalence of mental health problems among lesbians, gay men, and bisexuals compared to heterosexuals, particularly with respect to depression and anxiety (Meyer, 2003; Meyer, Dietrich, & Schwartz, 2008). Research also has documented that LGB people have elevated risk of some adverse health behaviors compared to heterosexuals. For example, studies have found higher rates of tobacco use (Burgard, Cochran, & Mays, 2005; Fredriksen-Goldsen, Kim, & Barkan, 2012; Fredriksen-Goldsen, Kim, Barkan, Muraco, & Hoy-Ellis, 2013) and alcohol and drug abuse (Burgard et al., 2005; Fredriksen-Goldsen et al., 2013; King et al., 2008).

A more recent and growing emphasis has focused on investigating physical health disparities in these populations. Although many of these studies have been limited by methodological shortcomings, including the use of small convenience samples, a growing number of both community and population-based studies suggest that LGB people are a health-disparate population, experiencing a wide array of physical health difficulties ranging from poor overall health status to heightened incidence of specific health conditions (Lick, Durso, & Johnson, 2013). However, to date there has been insufficient attention to differences in health within the LGB population by sex, including health differences and risks among lesbians and bisexual women, that is, sexual minority women (SMW).

Only a few systematic literature reviews have examined physical health disparities among SMW, with most focusing on a single health condition, including breast cancer (Meads & Moore, 2013) and obesity (Eliason, 2014). Meads and Moore, for example, found that the findings were mixed in terms of breast cancer prevalence and risks between SMW compared to nonsexual minority women (Meads & Moore, 2013). In a review of the literature on differences in weight, Eliason and colleagues (2015) concluded that SMW have greater body mass index (BMI) compared to heterosexual women. Higher rates of obesity among SMW compared to heterosexual women and sexual minority men may place SMW at greater risk for additional chronic health conditions, such as diabetes, and poorer cardiovascular health.

Guided by a stress-response framework, Eliason (2014) conducted a review of both population and non-probability-based studies examining stress-related chronic conditions among SMW, including diabetes, hypertension, asthma, cardiovascular disease, and cancer. Eliason (2014) concluded that only asthma appeared to be consistently more common in SMW compared to heterosexual women but did not find evidence suggesting differences in diabetes, hypertension, or cardiovascular disease. However, the review did

not consistently report the adjusted odds ratios of the comparisons nor control for potential confounding factors, such as race and ethnicity, education levels, socioeconomic status, and age. Although studies of varying rigor suggest health disparities among SMW, a systematic review of methodologically robust studies is needed to assess the extent of disparities for SMW across specific chronic physical health conditions.

Methods

We conducted a systematic review of the literature on the nine key physical health conditions commonly addressed in the relevant literature (i.e., asthma, arthritis, cancer, cardiovascular disease, diabetes, high cholesterol, hypertension, obesity, general physical health). We performed a systematic search on PubMed for the period March 4, 2009–June 26, 2013. Search terms were a combination of female sexual minority identity (lesbian, bisexual, sexual minority women, homosexual female); health (health, health status indicators, health outcomes); disparities (minority health, health status disparities, health care disparities); specific health conditions (major illness, chronic conditions, cancer, cardiovascular disease, diabetes, asthma, obesity); and risk factors for these conditions (risk factors, smoking, diet, exercise, nulliparity).

To identify the most reliable evidence, we restricted our search to population-based published studies that used random sampling methods. Specifically, we sought to include studies in which a specific sampling frame (in any setting) was used and each individual in the sampling frame had an equal chance of being involved. Self-selection at the point of invitation to join the study was allowed (because, of course, no one could be coerced to participate). To meet our inclusion criteria, results needed to report the statistical examination (via adjusted odds ratios) of the frequency of at least one of the key physical health conditions we identified by sexual orientation status among women by comparing heterosexual women versus (a) lesbians, (b) bisexual women, or (c) lesbians and bisexual women combined. Samples had to have a majority of participants over the age of 18 years. To ensure an accurate interpretation of the available data by the authors, we limited the search to articles published in the English language.

A minimum of two authors (who were all content experts) independently completed a data abstraction form in which they recorded the information depicted in Tables 1 and 2, including sample description, procedures, method for assessing health condition, and results. Any discrepancies in abstracted data were resolved by consensus after the introduction of a third reviewer. No authors were contacted. The evidence from these studies was then synthesized for the current qualitative review in terms of frequency of comparisons for the nine health conditions (of heterosexual women vs. (a) lesbian, (b) bisexual, or (c) both lesbian and bisexual women) and frequency of statistically significant findings (at $p < .05$) in adjusted analyses (odds ratios). The heterogeneity of the measures to identify

health conditions; the means by which the sample of sexual minority women were categorized (i.e., by identity, behavior, or both); and the small number of studies meeting eligibility criteria precluded a formal meta-analysis.

As seen in Figure 1, of the 1,826 citations originally identified, 353 were retained after a review of titles and abstracts. The majority of articles were omitted because they examined HIV among men who have sex with men or health disparities among racial and ethnic minority populations without addressing sexual orientation. A more in-depth review of the 353 full-text articles revealed that 120 were population-based studies, and 11 of these met the full inclusion criteria.

In Table 1, the $k = 11$ selected studies are described in terms of source and location, method, sample size, operationalization of sexual minority groups, health conditions examined, and factors adjusted in analyses. All studies were conducted in the U.S., and most employed random-digit dialing to capture their sample. They included statewide surveys and the Nurse's Health Study. All but one categorized women based on their self-reported sexual orientation—not by behavior or the sex of their sexual partners. The total samples

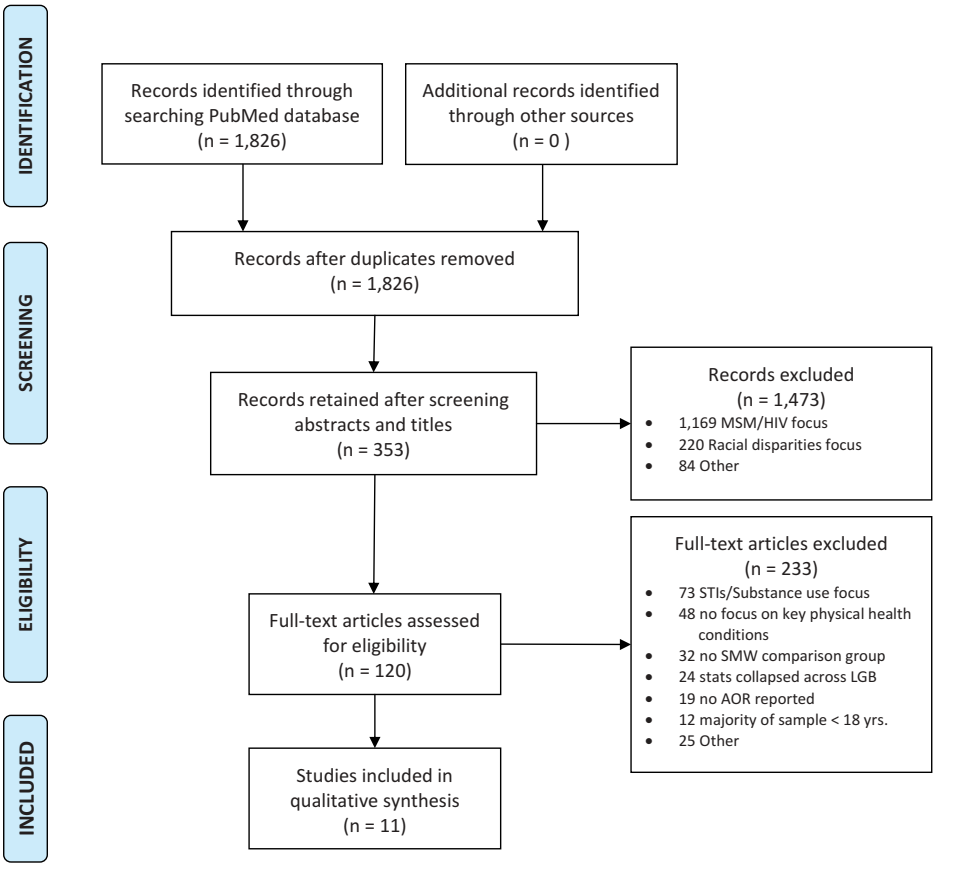

Figure 1. Results of study selection process.

Table 1. Description of population-based studies examining health disparities among sexual minority women.

Study authors and source	Sample size	Methods	Health conditions	Statistical controls
Austin et al. (2012) Nurses' Health Study II, 1989–2005; 14 of the most populous U.S. states, representing Northeast, Midwest, South, and West regions	*N* = 116,430 Bi *n* = 309 Les *n* = 665 Het *n* = 86418	Baseline questionnaire mailed to 520,000 registered nurses. Restricted to premenopausal women aged 25–42 years (*n* = 87,392) at baseline	Breast cancer	A, I, R
Boehmer and Bowen (2009) California Women's Health Survey, 2001–2005	*N* = 14,197 Bi *n* = 52 Les *n* = 151 Het *n* = 13,994	Annual probability random-digit dial survey of representative sample of California Groups[1]: Self-reported gender of sexual partners over the last 12 months	Obesity	A, E, R, health insurance, nativity, parity, general health, days of poor mental health, and alcohol consumption
Boehmer et al. (2011a) Massachusetts Cancer Registry (MCR)	*N* = 316 Bi *n* = 14 Les *n* = 55 Het *n* = 257	35-minute telephone survey between August 2007 and November 2008 Groups: Self-report sexual orientation identity and gender of preferred sexual partners	Obesity	A, E, I, R, comorbidities
Boehmer et al. (2011b) Pooled data from the California Health Interview Survey from 2001, 2003, and 2005	*N* = 71,112 Bi *n* = 1,116 Les *n* = 918 Het *n* = 69,078	Two-stage geographically stratified random-digit-dial sample of households, surveying one randomly selected adult from each sampled household	Cancer prevalence	A, E, I, R, nativity (was weighted)
Conron, Mimiaga, and Landers (2010) Massachusetts BRFSS, 2001–2008	*N* = 40,853 Bi *n* = 432 Les *n* = 719 Het *n* = 39,701	Random-digit-dial of state residents	Asthma, CVD risk, diabetes, heart disease, obesity, and self-reported general health	A, E
Dilley, Simmons, Boysun, Pizacani, and Stark (2010) Washington State BRFSS, 2003–2006	*N* = 48,655 Bi *n* = 561 Les *n* = 589 Het *n* = 47,505	Random-digit-dial of state residents	Asthma, diabetes, HTN, high cholesterol, poor physical health	A, E

(*Continued*)

Table 1. (Continued).

Study authors and source	Sample size	Methods	Health conditions	Statistical controls
Everett and Mollborn (2013) Wave IV of the National Longitudinal Study of Adolescent Health (Add Health)	*N* = 14,800 Het = 6,072 Mostly Het/ Bi = 1,345 Mostly Gay/Gay = 13	Non-random selection of U.S. high schools and middle schools	HTN	A, E, R
Fredriksen-Goldsen et al. (2012) Washington State BRFSS, 2003, 2005, 2007, and 2009	*N* = 82,531 Bi *n* = 536 Les *n* = 626 Het *n* = 49,092	Random-digit-dial of state residents	Asthma, arthritis, obesity, poor physical health	Age
Fredriksen-Goldsen et al. (2013) Washington State BRFSS, 2003–2010	*N* = 96,992 Bi *n* = 291 Les *n* = 562 Het *n* = 58,319	Random-digit-dial of state residents age 50 years and older	Arthritis, asthma, CVD, diabetes, high cholesterol, HTN, obesity, poor physical health, disability	A, E, I
Jun et al. (2012) Nurses' Health Study (NHS) II, 1989–2005	*N* = 90,713 (subgroups n's not reported)	Baseline questionnaires mailed to over 520,000 registered nurses	Obesity	A, R, region
Struble, Lindley, Montgomery, Hardin, and Burcin (2010) Spring 2006 National College Health Assessment	*N* = 31,500 college females aged 18–25 Bi *n* = 1,073 Les *n* = 301 Het = *n* = 30,126	123 postsecondary educational institutions in U.S. and Canada (4) self-selected to participate, with 117 using random sampling techniques	Overweight/obesity	A

Notes. BI = Bisexual women. HET = Heterosexual women. LES = Lesbian women. HTN: = Hypertension. [1]Sexual orientation operationalized by self-report sexual orientation identity unless otherwise noted.

[2]Was weighted to estimate population of sexual minority women at 6.3% (from current survey) and 3.1% (from Massachusetts Behavioral Risk Factors Surveillance System).

[3]A = age, E = education, I = income, R = race.

ranged from 316 to 116,430, though samples of sexual minority women were quite small (14 to 1,116). Methods typically included adjustments for age, race/ethnicity, education, and income. Some studies focused on a subset of a sample described in another study or focused on different conditions—these were all included for completeness.

The 11 studies described 48 comparisons between heterosexual women and SMW across nine health conditions (see Table 2). The trend overall indicated SMW were at risk for disparities, with the adjusted odds ratio (AOR) greater than 1.0 in 39 of the 48 comparisons. However, not all of these were statistically significant, and the evidence varied considerably, with the number of studies available for each condition ranging from $k = 1$ for cardiovascular disease to $k = 7$ for obesity.

In terms of the number of studies available, the number of comparisons conducted, and the percentage of those indicating a statistically significant disparity for SMW (i.e., AOR ≥ 1.0 AND either $p < .05$ or a 95% CI not including 1.0), the evidence was strongest for asthma (5 of 7 comparisons indicated a disparity for SMW), obesity (8 of 12), arthritis (2 of 3), and general physical health (4 of 7). The one comparison for CVD showed evidence of disparity. There was little evidence of disparities for high cholesterol (0 of 3), diabetes and hypertension (both 1 of 5), and cancer (1 of 4).

One of the few population-based studies to directly compare lesbians and bisexual women (24) found no difference in obesity but reported worse general physical health among bisexual women. In the 19 instances in our review that researchers conducted separate comparisons (i.e., lesbians versus heterosexuals as well as bisexual women versus heterosexuals) for the same condition, 13 indicated comparable findings for each group. Of the six that found differences, four indicated that bisexual women were at risk for disparities (in terms of asthma, diabetes, hypertension, and general physical health) but that lesbians were not. The other two studies indicated that lesbians fared worse than bisexuals with respect to obesity.

Discussion

This systematic review of population-based studies provided overall evidence for physical health disparities among SMW. However, there was considerable variation across conditions and studies, possibly due to limited samples of SMW women, data coming from state or local and not national surveys, variation in the measurement of key constructs, and the lack of uniform adjustment for key covariates (i.e., age, income, education, race/ethnicity). Furthermore, some studies drew from the general population, some were restricted to women of a certain age, and others focused on a specific profession (e.g., nurses).

Table 2. Results from population-based studies examining health disparities among sexual minority women.

	Definition	Bi versus het	Les versus het	Bi/les versus het
Asthma				
Dilley et al. (2010)	HP ever told them had asthma (and still had asthma at time of survey)	↑Bi AOR = 2.0 (1.5, 2.6)	↑Les AOR = 1.7 (1.3, 2.3)	
Conron et al. (2010)	HP ever told them had asthma		↑Les AOR = 1.7 (1.3, 2.1)	
Fredriksen-Goldsen et al. (2012)	HP ever told them had asthma	↑Bi AOR = 2.2, $p < .001$	↔ AOR = 1.2, $p = .14$	
Fredriksen-Goldsen et al. (2013)	HP ever told them had asthma			↔ AOR = 1.2 (1.0, 1.5)
Arthritis				
Fredriksen-Goldsen et al. (2012)	HP ever told them had some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia	↑Bi AOR = 1.5, $p = .002$	↑Les AOR = 1.5, $p < .001$	
Fredriksen-Goldsen et al. (2013)	HP ever told them had arthritis			↔ AOR = 1.3 (1.0, 1.7)
Cancer				
Austin et al. (2012)	Breast cancer risk assessment	↑Bi IRR = 1.1 (1.1, 1.1)	↑Les IRR = 1.1 (1.1, 1.1)	
Boehmer et al. (2011)	HP ever told them had cancer of any kind	↔ AOR = 1.1 (0.8, 1.6)	↔ AOR = 1.1 (0.8, 1.4)	
Cardiovasuclar disease				
Fredriksen-Goldsen et al. (2013)	HP ever told them had heart attack, angina, or stroke			↑Bi/Les AOR = 1.4 (1.0, 1.9)
Diabetes				
Dilley et al. (2010)	HP ever told them had diabetes (not included if prediabetes or gestational diabetes alone)	↑Bi AOR = 1.8 (1.1, 2.8)	↔ AOR = 1.3 (0.8, 2.0)	
Conron et al. (2010)	HP ever told them they had diabetes	↔ AOR = 1.0 (0.6, 1.8)	↔ AOR = 1.2 (0.7, 2.0)	
Fredriksen-Goldsen et al. (2013)	HP ever told them had diabetes (not included if prediabetes or gestational diabetes alone)			↔ AOR = 1.3 (1.0, 1.6)
High cholesterol				
Dilley et al. (2010)	HP ever told them had high cholesterol	↔ AOR = 1.0 (0.7, 1.6)	↔ AOR = 1.1 (0.8, 1.6)	
Fredriksen-Goldsen et al. (2013)	HP ever told them had high cholesterol			↔ AOR = 1.0 (0.8, 1.3)
Hypertension				
Dilley et al. (2010)	HP ever told them had high blood pressure (not included if borderline or during pregnancy alone)	↑Bi AOR = 1.6 (1.1, 2.5)	↔ AOR = 1.0 (0.6, 1.7)	

(*Continued*)

Table 2. (Continued).

	Definition	Bi versus het	Les versus het	Bi/les versus het
Everett & Mollborn (2013)	Hypertensive blood pressure measurement (≥140 systolic and ≥90 diastolic) collected at time of interview	↔ AOR = 1.0 (0.8, 1.3)	↔ AOR = 0.8 (0.4, 1.6)	
Fredriksen-Goldsen et al. (2013)	HP ever told them had high blood pressure (not included if borderline or during pregnancy alone)			↔ AOR = 0.9 (0.6, 1.2)
Obesity				
Boehmer and Bowen (2009)	BMI ≥30, determined by self-reported weight and height	↔Bi AOR = 0.5 (0.2, 1.3)	↑Les AOR = 4.1 (2.5,6.7)	
Boehmer et al. (2011)	BMI ≥30, determined by self-reported weight and height			↔ AOR = 1.7 (0.2, 11.5)
Conron et al. (2010)	BMI ≥30, determined by self-reported weight and height	↔ AOR = 1.3 (0.8, 2.0)	↑Les AOR = 2.0 (1.6, 2.7)	
Fredriksen-Goldsen et al. (2012)	BMI ≥30, determined by self-reported weight and height	↔ AOR = 1.3 p = .09	↑Les AOR = 1.6, p < .001	
Fredriksen-Goldsen et al. (2013)	BMI ≥30, determined by self-reported weight and height			↑Bi/Les AOR = 1.4 (1.2, 1.7)
Jun et al. (2012)	BMI ≥30, determined by self-reported weight and height	↑Bi AOR = 2.4 (1.3, 4.7)	↑Les AOR = 1.8 (1.1, 3.0)	
Struble et al. (2010)	BMI ≥30, determined by self-reported weight and height	↑Bi AOR = 1.9 (1.5, 2.4)	↑Les AOR = 1.8 (1.2, 2.8)	
Poor general physical health				
Dilley et al. (2010)	Reported health as poor/fair	↑Bi AOR = 2.3 (1.7, 3.1)	↑Les AOR = 1.5 (1.1, 2.1)	
Conron et al. (2010)	Reported health as poor/fair (vs. good/better)	↑Bi AOR = 3.1 (2.0, 4.9)	↔ Les AOR = 1.4 (1.0, 2.0)	
Fredriksen-Goldsen et al. (2012)	Self-reported 14 or more days of poor physical health during the previous 30 days	↑Bi AOR = 2.4, p < .001	↔ AOR = 1.2, p = .205	
Fredriksen-Goldsen et al. (2013)	Self-reported 14 or more days of poor physical health during the previous 30 days			↔Bi/Les AOR = 1.0 (0.8, 1.3)

Notes. Bi = bisexual women. Les = lesbian women. Het = heterosexual women. Bi/Les = combined bisexual and lesbian women. HP = health care provider. IRR = incident rate ratio. AOR = adjusted odds ratio followed by 95% confidence interval; values are reported when they were provided in the original reports. Arrows indicate direction of the disparity based on statistical significance (i.e., p value < .05 or confidence interval not including 1.0). Blank spaces indicate no relevant data were reported.

Interestingly, given the relatively strong evidence for obesity among SMW, there was little evidence for higher prevalence of diabetes, hypertension, and high cholesterol. Our review, in which most studies surveyed general adult populations, cannot explain these findings, although one possibility is that participants were, on average, too young to have developed these chronic conditions. In the one study targeting SMW over 50 years age (Fredriksen-Goldsen et al., 2013), lesbian and bisexual women were shown to have higher rates of cardiovascular disease.

It would be useful to have future studies identify subgroups of SMW that may be at greater risk for disparities and specific health conditions (e.g., by age, ethnicity, or nulliparity status). For example, some of the studies in this review found that bisexual women may be at greater risk than lesbians for poor health outcomes.

Overall, our review was limited by the number of studies meeting the inclusion criteria (k = 11) and small samples of SMW compared to heterosexual women (e.g., one study included 58,319 heterosexual women but only 853 SMW). We cannot account for possible publication bias; perhaps studies not showing disparities are less likely to be submitted and accepted for publication; nor can we account for potential selective outcome reporting by the population-based studies we reviewed (Chan, Hrobjartsson, Haahr, Gotzsche, & Altman, 2004; Chan, Krleza-Jeric, Schmid, & Altman, 2004). Most importantly, health status was determined by self-report across all studies with the exception of one study on hypertension, which assessed the condition during the time of the interview (Everett & Mollborn, 2013). Fortunately, the literature base is improving, with more population-based studies, separate analyses for lesbian and bisexual subgroups, operationalization by self-identity as well as sex of sexual partners, and the inclusion of appropriate statistical controls for potential demographic confounders. Future reviews might expand the timeframe, search additional data bases, and examine the gray literature.

The increasing inclusion of items assessing sexual orientation and sex of sexual partners in state and national population-based surveys (Miller & Ryan, 2011) will significantly improve the database on disparities among SMW. Larger databases will enable subgroup analyses to better determine health disparities of lesbian and bisexual women of color as well as those of differing gender identities, socioeconomic statuses, and geographic regions.

Work in this area should continue to be informed by conceptual models (Lick et al., 2013; Meyer et al., 2008) depicting likely mechanisms so that not only can we identify health disparities that exist for SMW but begin to develop strategies to eliminate them. A recent model, proposed by Fredriksen-Goldsen and colleagues, highlights the influence of structural and environmental context on health disparities among SMW and

considers behavioral, social, psychological, and biological processes that either promote or diminish health (Fredriksen-Goldsen et al., 2014).

Finally, although all the studies in this review were cross-sectional, longitudinal studies are needed to begin to understand the health trajectories of SMW over time. Such research will allow us to investigate age and cohort effects as well as to obtain the information necessary to develop tailored interventions aimed at improving the health and wellbeing of lesbian and bisexual women.

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