

## Lesbian and Bisexual Women's Physical Health

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Researchers have documented alarming health disparities between people of color and white individuals in the United States (Adler & Rehkopf, 2008), but only recently have they begun to examine potential disparities based on sexual orientation—especially for sexual minority women. The U.S. Department of Health and Human Services (HHS, 2010) characterized health disparities as differences in health impacting groups of people who have systematically encountered obstacles to healthcare as a result of social, economic, and environmental disadvantage. In fact, the U.S. Centers for Disease Control and Prevention (CDC) (2011) identified health disparities related to sexual orientation as one of the main gaps in current health disparities research. This research is important in determining whether sexual minority women as a group are at risk for adverse health outcomes and, if so, what preventive measures or other interventions are needed to address the disparities. To date, we know little about the health needs of sexual minority women, hindering the development of relevant public policies and programs (Krehely, 2009).

The limited data on the health of lesbians, gay men, bisexuals, and transgender individuals were evident in Boehmer's (2002) analysis of 3.8 million citations of articles published between 1980 and 1999. She found only 3800 (0.1%) related to lesbian, gay, bisexual, and transgender issues; a recent review is consistent (Snyder, 2011). The dearth of relevant data on sexual minority women specifically led the U.S. Institute of Medicine in 1991 to commission a report on lesbian health, highlighting the need for population-based research on the prevalence and incidence of clinical problems in lesbians (Solarz, 1999), and again in 2010 to commission a report on lesbian, gay, bisexual, and transgender health (Institute of Medicine, 2011).

To date, most of the research on health disparities among sexual minorities has focused not on physical health but on mental health outcomes, including alcohol and substance use (e.g., Cochran, Sullivan, & Mays, 2003); see Cochran and Mays, Chapter 15, this volume. Fewer studies have focused specifically on physical health outcomes among lesbian and bisexual women, whose situations and concerns appear to be largely different from those of gay men (Conron, Mimiaga, & Landers, 2010).

In this chapter, we consider the challenges of conducting research to examine health disparities based on sexual orientation, particularly for sexual minority women, and describe some of the major studies in this area. We briefly review the evidence for disparities in cardiovascular disease and cancer as well as sexually transmitted infections, asthma, and diabetes. Disparities in risk factors (e.g., obesity, smoking) for adverse health outcomes are also presented. We consider the factors and mechanisms that might place sexual minority women at greater risk for compromised health and conclude with directions for future research.

### METHODOLOGICAL CHALLENGES IN HEALTH RESEARCH ON SEXUAL MINORITY WOMEN

Several methodological factors render research on physical health disparities among sexual minority women especially challenging. First, there is no clear consensus for defining sexual minority status. Basing it on same-sex behavior (ever, within a definitive time frame, or ongoing), relationship status, attraction and desire, or self-identity each leads to the identification of different target populations. Even if a consensus could be reached regarding defining characteristics, there is no clear sampling

frame from which to randomly select a sample. Even with a clear sampling frame, some sexual minority women might be reluctant to participate in research given the stigma related to minority sexual orientation and, for some, given the cultural irrelevance of the lesbian, gay, bisexual, and transgender nomenclature to capture same-sex romantic relationships or identities. Any particular sample, therefore, may suffer from a lack of generalizability to the population overall.

Given these barriers, most research on physical health disparities among sexual minority women relies on one of two methodological approaches. In the first approach, some measure of sexual orientation is included in a large population-based health survey. The major advantages to this approach are that a population-based sample of sexual minority women can be included (or at least invited to participate) and identical outcomes can be assessed among both sexual minority women and other women. If the overall response rate is high, it may be possible to generalize findings from this sample to the overall population. One drawback is that a certain percentage of participants in such surveys consistently fails to provide data on their sexual orientation and those that do may not always feel comfortable providing accurate information on other variables. The small subgroup sizes reduce the statistical power to detect differences and limit opportunities to explore within-group differences among sexual minority women that might be related to protective or risk-enhancing factors. Finally, although this approach yields provide some initial descriptive and comparative data, it often fails to allow for the exploration of explanatory or theoretical pathways because some important factors may not be included or are not measurable across groups (e.g., coming out experiences and other sexual orientation-specific stressors).

A second methodological approach is to target sexual minority women specifically, ideally in a population-based fashion, and collect extensive data on their health outcomes and risk factors. This approach can result in a rich data set developed from a large sample of sexual minority women and can provide an opportunity to explore within-group differences—identifying potential pathways for risk and resiliency. On the other hand, no clear comparison group exists for the purpose of identifying disparities. Dibble, Roberts, and Nussey (2004) overcame this limitation by recruiting a sample of

lesbians and their heterosexual sisters as a comparison group. In another innovative approach, Aaron et al. (2001) collected data from sexual minority women with measures similar to those used in a prior population-based study of women so that they could compare their sample with that in the original study. Of course, the different sampling strategies in each limit the validity of the comparisons.

## MAJOR HEALTH STUDIES AMONG SEXUAL MINORITY WOMEN

We identified eight large population-based health studies in which sexual orientation was assessed, and three large health studies specifically targeting sexual minority women (see Table 13.1). The studies summarized in Table 13.1, along with other smaller studies, have explored a range of outcomes with the aim of examining health disparities among sexual minority women. The variables of interest can be grouped as (1) major health conditions such as cardiovascular disease and cancer and, to a lesser extent, sexually transmitted illnesses, diabetes, and asthma and (2) risk factors for adverse health outcomes such as obesity and smoking.

## DISPARITIES IN MAJOR HEALTH CONDITIONS

### Cardiovascular Disease

Cardiovascular disease (CVD) affects the heart or blood vessels and includes arteriosclerosis, coronary artery disease, and hypertension. Leading to heart attacks and strokes, CVD is one of the primary causes of death in the United States, accounting for nearly 50% of all deaths among women each year (Roberts, Dibble, Nussey, & Casey, 2003). Three studies have demonstrated that sexual minority women report higher levels of CVD-related conditions. First, in the Massachusetts Behavioral Risk Factor Surveillance Study (BRFSS) (Conron et al., 2010), compared to the referent group of heterosexual women (1.3%), bisexual women (3.3%) and lesbians (1.8%) were more likely to report that they suffered from heart disease. Similar results were found for risk of cardiovascular disease: compared to the reference group of heterosexual women (27.3%), both bisexual women (41.0%) and lesbians (34.0%) were more likely to report risk. All analyses were adjusted for age, gender, and education attainment. The second study, the Washington State BRFSS study (Dilley, Simmons, Boysun, Pizacani, & Stark,

**TABLE 13.1. MAJOR STUDIES EXAMINING PHYSICAL HEALTH DISPARITIES AMONG WOMEN  
ACCORDING TO SEXUAL ORIENTATION**

<b>Population-Based Surveys Comparing Women Based on Sexual Orientation</b>		
<b>Study and Reference</b>	<b>Sampling Procedures and Sexual Minority Selection Criteria</b>	<b>Total Sample of Sexual Minority Women (N) (n, % total sample)</b>
<i>California Women's Health Survey</i> (Burgard et al., 2005)	<b>Sampling Procedures:</b> Cross-sectional random digit-dial survey of women ( $\geq 18$ years) residing in California (1998–2000). <b>Selection Criteria:</b> Sexually active female respondents self-reporting the gender of their sexual partners. Proportions of sexual minority women shown had reported any same-gender sexual partners in the previous 5 years (1998 survey) or in their lifetime (1999–2000 surveys).	$N = 11,204$ Any reported female sexual partners = 350 (3.12%)
<i>Nurses' Health Study II</i> (Case et al., 2004)	<b>Sampling Procedure:</b> Biennial mail survey, starting in 1989, of all registered nurses (RNs), 25–43 years, residing in 14 U.S. states. <b>Selection Criteria:</b> Female RNs who self-reported a sexual orientation identity on a single item added to the survey in 1995.	$N = 90,823$ Bisexual = 317 (0.3%) Lesbian = 694 (0.8%)
<i>California Quality of Life Survey</i> (Cochran & Mays, 2007)	<b>Sampling Procedures:</b> Follow-back to the 2003 California Health Interview Survey (CHIS), a stratified multistate random-digit telephone interview of adults assessing gender of sexual partners in the past year and sexual orientation identity. <b>Selection Criteria:</b> A probability subsample (18–70 years during CHIS) of those who were willing to be recontacted and originally responded in English or Spanish. Overselected for sexual minorities.	$N = 1,172$ Lesbian = 48 (4.09%) Bisexual = 38 (3.24%) Homosexually experienced heterosexual = 28 (2.39%)
<i>Massachusetts Behavioral Risk Factor Surveillance Surveys (2001–2008)</i> (Conron et al., 2010)	<b>Sampling Procedures:</b> Annual geographically stratified random-digit dial telephone survey of one adult ( $\geq 18$ years) per participating household in Massachusetts in English, Spanish, or Portuguese. <b>Selection Criteria:</b> Aggregate data from 2001–2008 on female respondents (18–64 years) who self-reported sexual orientation identity.	$N = 40,852$ Lesbian = 719 (1.76%) Bisexual = 432 (1.06%)
<i>Los Angeles County Health Survey</i> (Diamant & Wold, 2003)	<b>Sampling Procedures:</b> Cross-sectional population-based random-digit dial telephone survey of one adult ( $\geq 18$ years) per participating household in Los Angeles County (September–December 1999) in English, Spanish, Cantonese, Mandarin, Korean, or Vietnamese. <b>Selection Criteria:</b> Female respondents (18–64 years) who self-reported a sexual orientation identity.	$N = 4,135$ Lesbian = 43 (1.04%) Bisexual = 69 (1.7%)
<i>2000 National Alcohol Survey</i> (Drabble & Trocki, 2005)	<b>Sampling Procedures:</b> Cross-sectional (November 1999–June 2000) household computer-assisted telephone survey of adults ( $\geq 18$ years) in 50 U.S. states in English and Spanish. <b>Selection Criteria:</b> Females who self-reported the sexual orientation identity or gender of their sexual partners over the previous 5 years.	$N = 3,880$ Lesbian = 36 (0.9%) Bisexual = 50 (1.3%) Homosexually experienced heterosexual = 71 (1.8%)
<i>No Study Name Reported</i> (Gruskin et al., 2001)	<b>Sampling Procedures:</b> Stratified random mail survey of adult ( $\geq 20$ years) members of the Kaiser Permanente Medical Care Program in Northern California in 1996. <b>Selection Criteria:</b> Females who self-reported their sexual orientation identity as either lesbian/bisexual or heterosexual.	$N = 8,113$ Lesbian/Bisexual = 120 (1.5%)

*(continued)*

TABLE 13.1. (CONTINUED)

## Population-Based Surveys Comparing Women Based on Sexual Orientation

Study and Reference	Sampling Procedures and Sexual Minority Selection Criteria	Total Sample of Sexual Minority Women ( <i>N</i> ) ( <i>n</i> , % total sample)
<i>No Study Name Reported</i> (Gruskin & Gordon, 2006)	<b>Sampling Procedures:</b> Two independent cross-sectional mail surveys (1999, 2002) of a stratified random sample of English-speaking adult ( $\geq 20$ years) members of the Kaiser Permanente Medical Care Program in Northern California. <b>Selection Criteria:</b> Females (20–64 years) who self-reported their sexual orientation identify as lesbian or heterosexual (bisexual identity was not equivalently assessed across both surveys).	<i>N</i> = 12,398 Lesbian = 210 (1.72%)
<i>Washington State Behavioral Risk Factor Surveillance System</i> (Fredriksen-Goldsen et al., 2010; Dilley et al., 2010)	<b>Sampling Procedures:</b> Annual population-based random-digit dial telephone survey of one noninstitutionalized adult ( $\geq 18$ years) per participating Washington State household in English or Spanish. <b>Selection Criteria:</b> Aggregate data from 2003–2007 on female respondents (18–50+ years) who self-reported their sexual orientation identity.	<i>N</i> = 67, 821 <sup>a</sup> Bisexual = 717 (1.1%) Lesbian = 779 (1.4%)
<i>Women's Health Initiative</i> (Valanis et al., 2000)	<b>Sampling Procedures:</b> A representative sample of postmenopausal women (50–79 years) at 40 U.S. clinical centers recruited using a variety of methods (e.g., postal mailings, public notices, electronic media, community and medical sources) to participate in an observational study or one of three trials. <b>Selection Criteria:</b> Women self-reporting the gender of their sexual partners in their “adult lifetime” (lifetime lesbian) regardless of current sexual activity or “after age 45” (adult lesbian) if sexually active since age 45 and completing a baseline assessment by February 28, 1997.	<i>N</i> = 93,311 No adult sex = 1420 (1.5%) Bisexual = 740 (0.8%) Lifetime lesbian = 264 (0.3%) Adult lesbian = 309 (0.33%)
<b>Large Surveys Targeting Sexual Minority Women</b>		
<i>The Epidemiologic Study of Health Risk in Lesbians</i> (Aaron et al., 2001)	<b>Sampling Procedures:</b> Cross-sectional, community-based survey in the greater Pittsburgh, PA area (1998). Nonprobability sample of self-identified sexual minority women recruited through specific local lesbian and gay mailing lists, social organizations, community-wide events, and volunteer snowball sampling. <b>Selection Criteria:</b> Women ( $\geq 18$ years) self-reported a lesbian sexual orientation identity. The current analysis did not include nonlesbian-identified respondents or lesbians <18 years.	Lesbian = 1010
<i>National Lesbian Healthcare Survey</i> (Bradford, Ryan, & Rothblum, 1994)	<b>Sampling Procedures:</b> Cross-sectional survey of self-identified lesbians (1984–1985) recruited in 50 U.S. states through GLB-specific mental health organizations, practitioners, professional organizations, and newspapers as well as volunteer social networks. Broader (non GLB-specific) strategies included distribution by local and state agencies and outreach efforts of bookstores, women's organizations, and prisons. <b>Selection Criteria:</b> Results reflect the response of 1917 self-identified lesbians out of a total 1925 respondents to the <i>National Lesbian Health Care Survey</i> . Selection criteria of the lesbian sample were not specified.	Lesbian = 1917
<i>(No Study Name Reported)</i> (Diamant et al., 2000)	<b>Sampling Procedures:</b> Health survey printed in a major gay and lesbian biweekly magazine (March 21, 1995 issue of <i>The Advocate</i> ). <b>Selection Criteria:</b> Female respondents self-reporting a lesbian sexual orientation identity. The current analysis did not include international, bisexual, or “unsure” respondents.	Lesbian = 6935

<sup>a</sup>Responses are based on Fredriksen-Goldsen et al. (2010) and Dilley et al. (2010) sampled from 2003–2006 Behavioral Risk Factor Surveillance Study (BRFSS) data.

2010), indicated an increased risk for heart disease among bisexual women but not lesbians. Third, in the Nurses' Health Study II (Case et al., 2004), bisexual (but not lesbian) women were about 50% more likely than heterosexual women to report ever having a nonpregnancy-related high blood pressure reading.

Three other studies show no difference in CVD-related disease according to sexual orientation, or that sexual minority women were at *less* risk. First, the Women's Health Initiative (WHI) (Valanis et al., 2000) compared age-standardized prevalence of various heart health conditions (e.g., myocardial infarctions, angina, hypertension, and stroke). The study differentiated between women who had regarded themselves as lesbian for their entire lives ("lifetime lesbians") and those who had come out in adult life ("adult lesbians"). "Adult lesbian" women (4.3%) and "lifetime lesbian" women (3.1%) reported higher levels of myocardial infarctions than bisexual (1.2%) and heterosexual women (2.0%) but a slightly lower respective prevalence of stroke (0.5% and 1.0%) and hypertension (30.0% and 30.3%) compared to bisexual (1.8% stroke; 32.1% hypertension) and heterosexual (1.2% stroke; 31.6% hypertension) women. In adjusted analyses, however, there were no statistically significant differences according to sexual orientation. Second, the Cochran and Mays' (2007) study, based on the California Quality of Life Survey, also indicated nonsignificant findings in CVD-related disease by sexual orientation in analyses adjusting for age, educational attainment, race/ethnicity, relationship status, U.S. nativity, and family income. Heterosexual women reported similar if not slightly elevated levels of heart disease (weighted prevalence, 3.2%) and hypertension (14.9%) compared to lesbian (2.6%, 12.6%) and bisexual (0.7%, 7.4%) women. As the sample included only 48 lesbian and 38 bisexual women, the results should be interpreted with caution. Third, in the Los Angeles County Health Survey by Diamant and colleagues (2000), 5% of heterosexual women self-reported heart disease compared to 4% of lesbians and no bisexual women; these differences were nonsignificant in unadjusted bivariate analyses. With respect to hypertension, however, unadjusted analyses indicated the prevalence was higher among heterosexual women (17%) than among lesbians (8%) or bisexual women (6%,  $p < 0.01$ ). These findings also should be interpreted with caution because of the

small sample sizes of lesbians ( $n = 51$ ) and bisexual women ( $n = 36$ ).

Overall, the data are mixed. The findings of higher prevalence of CVD-related outcomes in sexual minority women, particularly bisexual women, were inconsistent with null findings or findings of lower risk for sexual minority women (although two of the studies in this latter group used small samples of sexual minority women). Most analyses adjusted for age and education, but only two controlled for race/ethnicity. This is important because women of color, who might be less likely to identify as sexual minority, are more at risk for heart disease. Many of the studies on CVD include respondents who are fairly young (less than 45 years old) and primarily white. As CVD is more prevalent among women of color and women over the age of 55, these studies probably yield an undercount of diagnosable CVD conditions, thereby limiting statistical power and potentially underestimating disparities.

### Cancer

Cancer is second only to heart disease as the most prevalent cause of death in the general United States population (American Cancer Society, 2008). However, the prevalence and mortality of cancer among sexual minority women are unclear. As a reportable disease, cancer is carefully tracked at the federal and state levels of government, but data are not collected on the sexual orientation of individuals diagnosed with cancer. Given methodological limitations, most research to date has examined differences in the prevalence of risk factors associated with various cancers (e.g., breast, cervical, lung) and on rates of cancer screening among sexual minority women compared to heterosexual women (Brown & Tracy, 2008; Rankow, 1995). The few studies examining the actual prevalence of cancer typically rely on self-reported diagnosis and relatively few employ large population-based samples (Bowen, Boehmer, & Russo, 2007).

Larger studies examining self-reported disease or evaluating the relative risk of cancer in sexual minority women have yielded mixed evidence for disparities based on sexual orientation (Cochran et al., 2001; Frisch, Smith, Grulich, & Johansen, 2003; Kavanaugh-Lynch, White, Daling, & Bowen, 2002; Valanis et al., 2000). For example, age-adjusted analyses from the WHI (Valanis et al., 2000) indicated that a higher percentage of bisexual women (17.6%) and lesbians (14%) than heterosexual

women (11.9%) reported having received a cancer diagnosis from a physician. This was true for both breast and cervical cancer.

However, in a study of aggregated data from seven independent survey samples of 11,876 sexual minority women and a nationally representative sample of U.S. women, an age-adjusted analysis comparing self-reported breast cancer rates revealed no disparities (Cochran et al., 2001). Thus, questions about disparities with regard to cancer rates as a function of sexual orientation remain open.

### Other Health Outcomes

Data with respect to other health outcomes are even rarer, but we located some studies addressing disparities in sexually transmitted illnesses, diabetes, and asthma.

Attempts to estimate disparities in sexually transmitted infections (STI) between sexual minority women and other women are made more challenging because national and local STI surveillance data have either excluded same-gender sex among women as a risk factor or subsumed it under a hierarchy of other behaviors viewed as higher risk in risk classification schemes (Marrazzo, 2004). Thus, available data are usually derived from small studies that directly measure the prevalence of common STIs, usually among clinic attendees, and from surveys that query sexual minority women about their STI history. Transmission of human papillomavirus (HPV) requires only skin-to-skin or mucosa contact, which can easily occur in the context of female-to-female sex (Marrazzo, 2004). Although prevalence rates have not been extensively studied, HPV was present in 19% of lesbians who reported no previous sex with men in one study (Marrazzo et al., 1998) and 13% of sexual minority women in another (Eaton et al., 2008).

Beyond female-to-female sex, sexual minority women may be at risk for STIs, including HIV, through several other means, including consensual sex with men, intravenous drug use (IDU), and sexual abuse. For example, in a study of 498 lesbians and bisexual women living in California, 40% reported unprotected vaginal or anal sex with men during the past 3 years, including unprotected sex with gay and bisexual men or with male injection drug users; 10% reported injecting drugs; and 1.2% reported an HIV-positive diagnosis (Lemp et al., 1995). Despite these risks, the CDC does not include female-to-female HIV transmission as an exposure category, and the prevalence of HIV infection

among sexual minority women is not specifically tracked (Aaron et al., 2001; Cochran & Mays, 2007; Marrazzo et al., 1998; Simoni et al., 2010).

The few relevant studies on asthma and diabetes that we could locate pointed to disparities in asthma but not diabetes. Specifically, analyses from the 2003–2006 Washington State BRFSS (controlling for age and education) indicated that compared to heterosexual women (11.2%), lesbian (17.7%) and bisexual women (21.0%) were more likely to have asthma. Compared to heterosexual women (6.3%), neither bisexuals (5.8%) nor lesbians (5.1%) were more likely to have diabetes (Dilley et al., 2010). Based on analyses adjusting for age, race/ethnicity, educational attainment, relationship status, nativity, and family income, Cochran and Mays (2007) reported that lesbian (13.1%), bisexual (13.1%), and homosexually experienced heterosexual (24.5%) women were more likely than exclusively heterosexual women (8.6%) to report asthma; they noted no group differences in diabetes (2.2%, 1.3%, 0.0% versus 6.9%, respectively; all prevalence data are weighted). Based on analyses of data from the Massachusetts BRFSS (adjusting for age and education), lesbians were more likely than heterosexual women to report that a health provider had told them they had asthma but were not more likely to report this about diabetes (Conron et al., 2010).

### DISPARITIES IN RISK FACTORS FOR DISEASE

In the absence of solid data on the incidence and prevalence of disease among sexual minority women, which limits the extent to which disparities with heterosexual women can be identified, researchers have looked to data on risk factors as “proxy indicators” for an at-risk population (Dibble et al., 2004). Next, we consider the major risk factors that have been studied: obesity, smoking, diet and exercise, as well as other cancer-specific risk factors.

#### Obesity

Obesity is pandemic in the United States, with 66% of adults considered overweight (defined as having a body mass index or BMI > 25) and 31% obese (BMI > 30; National Institute of Diabetes and Digestive Kidney Disease, 2006). Obesity is related to hypertension, diabetes, hyperlipidemia, CVD, joint disease, thromboembolic disorders, multiple cancers, and higher all-cause mortality (National Institutes of Health, 1998).

A greater prevalence of obesity among sexual minority women compared to heterosexual women is one of the most consistent findings of health disparities between these groups. A review of 19 articles that included measures of obesity and sexual orientation concluded that a higher percentage of sexual minority than heterosexual women are obese (Bowen, Balsam, & Ender, 2008). Results from three large population-based studies are consistent with this conclusion (Boelmer, Bowen, & Bauer, 2007; Case et al., 2004; Valanis et al., 2000). For example, in the Nurses' Health Study II, lesbians had a 20% greater prevalence of being overweight and a 50% (40% for bisexuals) greater prevalence of obesity compared to heterosexual women. Importantly, it appears that disparities in weight status among sexual minority women begin as early as adolescence. In a prospective study of youth who provided self-reported information from six waves of data, sexual minority female adolescents reported consistently elevated BMI relative to their heterosexual peers (Austin et al., 2009). Evidence suggests the greater BMI is not due to greater muscle density or lean body mass rather than fat (Roberts et al., 2003).

### Smoking

Almost half a million people die prematurely from smoking or exposure to secondhand smoke in the United States each year, and another 8.6 million have a serious illness caused by smoking (Centers for Disease Control and Prevention, 2010). Despite the risks, over 46 million people, 20.6% of all adults age 18 and older (23.1% of men and 18.3% women), are current smokers (American Lung Association, 2010).

The literature on tobacco use and sexual orientation demonstrates clear and consistent disparities. Several studies, including those based on data from the large population-based surveys, have demonstrated higher rates of smoking among sexual minority women compared to heterosexual women, with rates among adult sexual minority women ranging from 11% to 50% compared to 28% in general adult samples (Ryan, Wortley, Easton, Pederson, & Greenwood, 2001). In a review article, Hughes and Jacobson (2003) identified 16 studies of lesbian and bisexual women, nine of which had comparison groups. On average, lesbians reported rates of smoking rates that were 1.5 to 2 times higher than rates among heterosexual women (Lee, Griffin, & Melvin, 2009). As is the case with obesity, smoking

disparities in sexual minority women appear to begin before adulthood.

### Diet and Exercise

Evidence for disparities in diet and exercise between sexual minority women and heterosexual women is mixed. Several studies have found no disparities. Specifically, Valanis et al. (2000) and Case et al. (2004) reported lesbians and heterosexual women exercise similarly, and Dilley et al. (2010) found no differences among lesbian, bisexual, and heterosexual women in sufficiency of physical activity or in consumption of fruit and vegetables.

Some studies have found that sexual minority women were more likely than other women to report risk factors relating to diet and exercise, whereas others found the reverse. For example, Aaron et al. (2001) reported that although there was little difference based on sexual orientation in the reporting of any physical activity in the past month, a higher percentage of lesbians reported engaging in vigorous activity compared with the general population of women. In their study of lesbians and their sisters, Roberts et al. (2003) found that lesbians were less likely to have eaten red meat in the past year but did not differ from their sisters on other nutritional variables. With regard to exercise, the lesbians were significantly more likely to exercise at least weekly yet did not differ in the number of times per week they exercised, the length of the exercise session, or the exercise vigor (Roberts et al., 2003).

### Cancer-Specific Risk Factors

Although cancer etiologies vary, some risk factors have been identified as more or less strongly associated with cancer. Most theorized risks do not differ by sexual orientation, but some of the weakly associated risks are related (Henderson, 2009; Koh, 2010). Factors more prevalent among lesbians and their relative risk of association with cancer include nulliparity, delay of childbearing until after the age of 30 years (versus before age 20), daily consumption of two to five alcoholic drinks (versus no alcohol), and urban residence (Case et al., 2004; Koh, 2010). Sexual minority women also have fewer of the protective factors for cancer, including a history of lactation and lower postmenopausal BMI. However, lesbians are less likely to report hormone replacement therapy, which is a risk factor for cancer.

In a comprehensive review of 51 studies from 1981 to 2007 examining cancer disparities among

lesbians, Brown and Tracy (2008) found most of the studies focused on issues related to screening and prevention in cervical and breast cancers. These studies consistently reported higher rates of risk factors, fewer reproductive-related protective factors, and less frequent routine screenings, which can lead to earlier detection and treatment in samples of sexual minority women. In comparison, ovarian, colorectal, and lung cancer among sexual minority women have received limited attention.

### FACTORS TO EXPLAIN DISPARITIES BASED ON SEXUAL ORIENTATION

Disparities in health outcomes between sexual minority women and heterosexual women are likely determined by greater exposure to adversity and unequal access to health-promoting resources. Most of the factors involved may be rooted in the pervasive social stigma that affects sexual minority women at multiple levels (Krehely, 2009; Meyer, 2003).

The most widely cited reasons for sexual minority women's health disparities is lack of routine screening and preventive care and delayed treatment (Koh, 2010). Indeed, several studies have shown that despite evidence that sexual transmission of HPV between women occurs, sexual minority women (including young lesbians) undergo routine Pap smear screening less often than national guidelines advise and less often than do heterosexual women (Aaron et al., 2001; Cochran et al., 2001; Diamant & Wold, 2003; Marrazzo, Koutsky, Kiviat, Kuypers, & Stine, 2001).

There are, however, some exceptions. In a community-based survey of 1010 self-identified lesbians, Aaron et al. (2001) reported that compared to women in a comparison sample drawn from the general population, lesbians were more likely to report ever having had a mammogram. Aaron et al. (2001) and Conron et al. (2010) found that for women at least 40 years old, there were no statistically significant sexual orientation differences in lifetime mammography or receipt of a Pap test within the prior 3 years. Moreover, lesbians were 1.8 times more likely than heterosexual women to have had an HIV test.

Although the exact reasons for suboptimal screening and preventive care among lesbians are unclear (Marrazzo et al., 2001), the main barriers likely relate to sexual minority women's reduced access to insurance, which in turn results from lack of financial resources (i.e., greater poverty) and

inequities in the structure of employment-sponsored programs. Lack of data limit our ability to determine the full impact of financial barriers, but inequities in insurance coverage are well documented (Diamant et al., 2000; Dilley et al., 2010; Valanis et al., 2000), with potentially even less coverage for bisexual than lesbian women (Conron et al., 2010).

Even if they have insurance, sexual minority women might not seek services because they do not perceive the medical necessity. In one study of over 1000 sexual minority women, fewer than half of those with a clear risk factor for HIV perceived themselves to be at risk (Einhorn & Polgar, 1994). In another study, many lesbians were found to mistakenly believe that they did not need to have Pap smears because they were not sexually active with men (Marrazzo et al., 2001).

Beyond lack of access and misconceptions about appropriate screening, another major barrier for sexual minority women is fear of discriminatory or inappropriate treatment once they do enter care. Indeed, overt homophobia and lack of culturally competent care for sexual minority women in the healthcare system have been documented (O'Hanlan, 2007). This may be due in part to the lack of instruction at most medical schools on the health needs of nonheterosexual people (Makadon, 2006; Tesar & Rovi, 1998), leaving few providers trained in how to offer competent care. Not surprisingly, many sexual minority women decline to disclose their sexual orientation to healthcare providers, which only further diminishes the chances that their physicians can provide optimal care or educate them about specific risk behaviors and other health concerns.

Comorbidity with documented disparities in mental health issues, sexual abuse, and victimization also might contribute to worse health outcomes among sexual minority women. Specifically, there are consistent reports of mental health disparities among sexual minority compared to heterosexual individuals (see Cochran and Mays, Chapter 15, this volume), and mental health is associated with physical health outcomes. Based on data from the California Quality of Life Survey ( $N = 2272$  adults), Cochran and Mays (2007) found that lesbian, bisexual, and homosexually experienced heterosexual women reported a greater variety of health conditions and limitations compared with exclusively heterosexual women; however, these differences mostly disappeared when mental distress levels were taken into account.

Sexual minority women appear to be at elevated risk for sexual abuse, compared to heterosexual women (see Balsam and Hughes, Chapter 19, this volume). Sexual abuse is associated with adverse mental and physical health outcomes (Lehavot, Walters, & Simoni, 2010; Midei, Matthews, & Bromberger, 2010). Reports from population-based studies of adolescents suggest that disparities in unwanted sexual contact begin early in life (Saewyc et al., 2006). These have been linked empirically with obesity and other negative outcomes among adult sexual minority women (Aaron & Hughes, 2007; Midei et al., 2010).

### FUTURE DIRECTIONS

The literature on physical health disparities among sexual minority versus heterosexual women is characterized by a dearth of population-based epidemiological data and by a reliance on self-report assessments. Consequently, much of the work on disparities is based on conclusions derived from differential risk factors rather than clear indicators of differences in health outcomes. Some clarity is beginning to emerge from the few studies that do provide empirical data, however. Specifically, there seems to be consistent support for the finding that sexual minority women are more likely than their heterosexual peers to smoke, be overweight, and have asthma. Data on cardiovascular disease are limited and fail to indicate clear differences between lesbians and heterosexual women; however, there are consistent findings for the increased risk among bisexual women. The findings for diet and exercise are mixed. Few cancer studies have documented disparities based on sexual orientation, but there seem to be clear differences in some risks for cancer.

This review suggests multiple avenues for future research. Clearly, more research is needed on physical health outcomes and chronic conditions based on representative samples of sexual minority women and comparable groups of heterosexual women. The recent decision to incorporate items on sexual orientation into many U.S. national surveys is a substantial step in this direction (<http://www.hhs.gov/news/press/2011pres/06/20110629a.html>). Future research should not continue to rely on samples composed disproportionately of white, middle-class women, but should include sexual minority women in all their diversity. Data on low-income women, women of color, adolescents, and older adults are

needed to represent the diversity of sexual minority communities. In addition, research that samples sexual minority women across age and ethnicity could yield important information on potential pathways to health inequities. Such studies could also highlight protective factors that may buffer the impact of traumatic stressors on physical and mental health outcomes. Important subgroup differences (Fredriksen-Goldsen, Kim, Barkan, Balsam, & Mincer, 2010) and distinctions among women who identify as lesbian, as bisexual, or as heterosexual but have a history of same-sex sexual partners, need to be considered more closely, given reports of disproportionate health burdens among the last two groups (Cochran & Mays, 2007; Conron et al., 2010).

Research on transgender individuals is desperately needed (Lawrence, 2007). Despite the unique health concerns of transgender people, very few studies of this population have been reported (for more information, see Sánchez and Vilain, Chapter 4, this volume). Also, almost all of the research in this field has been conducted in the United States. Studies of transgender individuals in other countries are needed to understand the health concerns of women in diverse political, economic, and cultural environments. The results of such studies might also provide a better context for interpreting studies based in the United States.

Methodologically sound studies based on clear conceptual frameworks that consider both mental and physical health outcomes as well as mechanisms underlying potential disparities would be helpful in illuminating not only disparities but also underlying determinants. Researchers in this area need to expand theoretical frameworks to understand how social inequities can become embodied as poor health among sexual minority women. Studying the embodiment of trauma and associated stressors (e.g., stigma, discrimination, and hate crimes) and corresponding health consequences could assist in identifying the forces driving intergenerational patterns of health and disease among sexual minority women (Krieger, 1999). In addition, resistance, positive coping, and resiliency can be studied by utilizing a stress-and-coping framework (e.g., Walters & Simoni, 2002) to delineate not only how stressful events have direct effects but also how protective factors can buffer the impact of these events on health and wellness.

Research requires support from funding agencies, yet historically, lesbian, gay, bisexual, and

transgender health issues, especially those of sexual minority women, have been marginalized compared to those of the general population (Boehmer, 2002; Institute of Medicine, 2011). Furthermore, lesbian, gay, bisexual, and transgender people have historically not been regarded by U.S. federal agencies as a "minority" population for the purpose of research on health disparities. To overcome the lack of data and to provide a more accurate assessment of lesbian, gay, bisexual, and transgender health outcomes and concerns, advocates have called for the creation of a dedicated U.S. Office of Lesbian, Gay, Bisexual, and Transgender Health (Krehely, 2009).

It is not premature to consider intervening to promote sexual minority women's health, especially in areas in which there is clear evidence of disparities, such as with smoking, obesity, and asthma. Intervention is needed at multiple levels and should involve the evaluation and dissemination of the most effective strategies. Interventions should specially target sexual minority women, as they are unlikely to engage in health promotion activities geared to gay men or to heterosexual women, at least according to research in the area of safer sex (Power, McNair, & Carr, 2009). Interventions should be firmly grounded in relevant theory and empirical research. For example, recent work offers suggestions for heightening lesbians' perceptions of vulnerability to STI acquisition that might guide intervention development (Eaton et al., 2008).

Health promotion interventions for sexual minority women might address any of the factors implicated in their health disparities. For example, media campaigns to destigmatize sexual minority status, with accompanying changes in the legal system, might decrease underlying minority stress. Moreover, capitalizing on lesbian social networks would facilitate creative strategies for diffusion of innovative prevention campaigns. Key opinion leaders at the community level could lead health intervention campaigns utilizing natural support systems (Morris, Zavisca, & Dean, 1995). Reducing financial barriers and expanding insurance coverage might also improve access to care among sexual minority women. In the meantime, prioritizing cultural competency training among providers could reduce provider ignorance and bias; Krehely (2009) suggests that federally funded programs might be required to incorporate such training in their curricula.

In conclusion, the literature on sexual orientation and health disparities among women is limited,

although it is increasing rapidly in both quality and scope. Compared to other women, sexual minority women seem to shoulder an additional burden of minority stress, and they are often at an economic disadvantage as well; as a result of these and related processes, the health of sexual minority women suffers. Although more definitive findings are needed in some areas, there is already sufficient evidence to justify address. Ignoring the health concerns of sexual minority women in national health care priorities was never acceptable and can no longer be tolerated.

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