Cancer-Related Risk Indicators and Preventive Screening Behaviors Among Lesbians and Bisexual Women

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ABSTRACT

Objectives. This study examined whether lesbians are at increased risk for certain cancers as a result of an accumulation of behavioral risk factors and difficulties in accessing health care.

Methods. Prevalence estimates of behavioral risk factors (nulliparity, obesity, smoking, and alcohol use), cancer screening behaviors, and self-reported breast cancer histories derived from 7 independently conducted surveys of lesbians/bisexual women (n=11 876) were compared with national estimates for women.

Results. In comparison with adjusted estimates for the US female population, lesbians/bisexual women exhibited greater prevalence rates of obesity, alcohol use, and tobacco use and lower rates of parity and birth control pill use. These women were also less likely to have health insurance coverage or to have had a recent pelvic examination or mammogram. Self-reported histories of breast cancer, however, did not differ from adjusted US female population estimates.

Conclusions. Lesbians and bisexual women differ from heterosexual women in patterns of health risk. These women would be expected to be at especially greater risk for chronic diseases linked to smoking and obesity. (*Am J Public Health.* 2001;91:591–597)

Whether or not lesbians are at higher risk than other women for breast and gynecologic cancer is an emerging controversy.[1–8] A recent Institute of Medicine report[9] documented the potential for double to triple the risk of breast cancer, in particular, among lesbians in comparison with other women. Possible reasons are greater prevalence rates of known reproductive-related risk factors, including nulliparity or older age at first childbirth,[10–12] and behavioral risk factors, including more frequent alcohol consumption[13–16] and perhaps obesity.[11,17] Although none of these individual risk factors is exclusive to lesbians, the possible concentration of these risks within a single group is unique.

Coupled with worries about patterns of higher risk are concerns that lesbians may be less likely than heterosexual women to use preventive cancer-related screening services such as mammography or Papanicolaou (Pap) tests.[1,11,18,19] Lower rates of screening, if they exist, might result in later detection of cancers, thereby increasing morbidity and mortality rates.[20] Several factors have been hypothesized as barriers to the use of routine screening in this population, including experiences with discrimination in health care settings, lower rates of insurance in the absence of the safety net of spousal health benefits, and fewer cues, such as contraceptive needs, to trigger seeking of routine gynecologic care.[1,9,19,21–23]

Nevertheless, little is known empirically about behavioral risks in this population.[9] Most existing surveys of lesbian health and health care behaviors have relied on relatively small convenience samples drawn from local community settings without heterosexual controls. Methodological barriers to population-based sampling are daunting, given that lesbians represent both a hidden and a small subpopulation, estimated at approximately 3% to 4% of adult women.[24]

Consistent with priority recommendations from a recent Institute of Medicine report,[9] this study combined information from several large data sets collected over the last 15 years to examine cancer-related screening behaviors, risk factors, and self-reported breast cancer histories among lesbians and bisexual women. We use these pooled data to compare estimates of health-related factors with prevalence rates derived from national household probability samples of US women. These data represent the great majority of the health information collected directly via self-administered surveys from lesbians and bisexual women in the United States during this period. Indeed, a search of the MEDLINE database for post-1990 studies revealed that only 5 other large surveys (i.e., those with sample sizes greater

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TABLE 1—Characteristics of the 7 Lesbian Health Surveys: United States, 1987–1996

Study	Principal Investigator(s)	Source Population	Year(s) of Data Collection	Sample Size[a]	Recruitment Methods[b]	Study Label
		National surveys				
National Lesbian and Bisexual Women's Health Survey[31]	Gage	US lesbians, bisexual women	1993	6105	D, M, I	a
Boston Lesbian Health Project[30,32]	Roberts, Sorensen	US lesbians	1987	1618	S, O	b
		Regional surveys				
Michigan Lesbian Health Survey[33]	Bybee, Roeder	Lesbians residing in Michigan	1989	1668	D, M, I, S, O	c
Massachusetts Lesbian Health Needs Assessment	Goldstein	Lesbians in Boston, western Massachusetts	1995–1996	1008	D, M, S, O	d
Houston Lesbian Health Initiative	Robison, Becker	Lesbians, bisexual women in Texas	1994	592	D, M, O	e
North Carolina Women's Health Access Survey[11,18]	Rankow, Rimer, Tessaro	Lesbians, bisexual women in North Carolina	1995	563	D, M, I, O	f
Oregon Lesbian Health Survey[19,34]	White, Dull	Lesbians in Pacific Northwest	1993–1994	322	M, H	g

[a]Includes only those women aged 18 to 75 years who were surveyed.
[b]D = distribution at public lesbian/gay events; M = use of gay/lesbian mailing lists; I = insertion or solicitation in gay/lesbian community newspapers; S = snowball methods through social networks; O = distribution in organizational settings or commercial establishments within the gay/lesbian community; H = women attending lesbian health conference.

than 300)[3,25–28] examining health behaviors in adult lesbians have been reported in the indexed medical literature. Three of these surveys[25,26,28] did not focus on cancer-related factors, and a fourth[3] involved a sample that was recruited exclusively from subscribers to a gay magazine, a recruitment approach unlike the sampling strategies common to the surveys used here.

Methods

Data Sources

Between 1987 and 1996, 7 independently conducted surveys (here labeled studies a–g; see Table 1 for study designations) involving lesbian health issues collected anonymous, self-administered questionnaire data from nearly 12 000 women. Each survey addressed questions related to cancer risk and screening behaviors. All specified their source population as women who have sex with women, and several further limited their samples by geographic region. All recruited participants by means of more than one convenience-based method commonly used for surveying the lesbian/gay population,[9] including recruiting through social networks, mass mailings to potential respondents on community lists, and direct solicitations at lesbian/gay community-related public events, organizational meetings, or commercial settings. Although the limitations of these methods are well known,[29] problems inherent in sampling this particular population render other techniques, including recruitment of similarly sampled heterosexual controls or use of population-based sampling frames, generally impractical.[16]

We combined data from the 7 surveys, restricting the pooled sample to those women aged 18 to 75 years, because few were outside that age range. A complete description of each survey and its sampling method is available from Susan D. Cochran or in previously published studies of individual surveys.[11,18,19,30–34] Pooling of data from independent data sets is an ideal form of meta-analysis, provided that study variables are carefully coded into a common format and that sample membership is treated as a possible effect modifier in relevant analyses.[29] In this instance, we treated sample membership as a random variable,[35] assuming essentially that each survey represented an independent random sample from the same source population of lesbians and bisexual women who could be reached through their participation in the loosely structured lesbian community. For simplicity, we refer to these women as lesbians, although a minority self-identified as bisexual.

Assessment

We recoded health and demographic variables from each study so that they would be comparable across studies. All surveys collected information on women's age, ethnic/racial background, educational attainment, and sexual orientation, and most obtained information about annual income. We also coded geographic region (Northeast, Midwest, South, and West) on the basis of US census divisions.

Patterns of health screening. All but one survey (study b) assessed current health insurance coverage. All asked women how frequently they obtained pelvic examinations or Pap tests, or both (subsumed as obtaining a pelvic examination), and whether they had ever had a mammogram.

Smoking and alcohol use history. Most surveys asked women whether they currently smoked cigarettes (studies a–c and e–g) and, if not, whether they had smoked in the past (studies a, b, c, and f). All asked women whether they currently drank alcohol. Several (studies a, c, d, and f) also inquired whether women were former drinkers. Four studies (a, b, c, and f) asked women specifically whether they had a history of problems with alcohol use or alcoholism. For the other studies, problems with alcohol use were coded as carefully as possible through the use of target definitions of problem drinking derived from surveys conducted by the Substance Abuse and Mental Health Services Administration.[36]

In the North Carolina survey (study f), we coded a history of alcohol problems if women reported daily consumption of 4 or more drinks, reported drinking 6 or more drinks on normal drinking occasions, or reported that alcohol had been a problem in the previous year. In the Massachusetts study (study d), we coded women as having an alcohol problem if they reported consuming 28 or more drinks per week at any time in the past. In the Houston survey (study e), we coded women as having an alcohol problem if they reported currently consuming 3 or more drinks every day, the most extreme category possible.

Pregnancy, birth control, and parity. Four surveys (studies a, b, c, and e) obtained information about previous pregnancies, and 6 (studies a–f) asked women whether they had ever given birth to a live infant. In addition, 3 surveys (studies a, c, and f) asked women whether they had ever used birth control pills.

Obesity. Prevalence of obesity was assessed via 2 methods. In 4 surveys (a, d, e, and f), women reported their height and weight, from which we calculated body mass index (BMI). Using the Third National Health and Nutrition Examination Survey (NHANES III) cutpoint,[37] we coded women with a BMI of 27.3 or above as obese. Two surveys (a and c) asked women whether they believed they had a weight problem. In the 1 survey (study a) in which both BMI and self-reports of obesity were available, the agreement between BMI classification and self-perceived obesity was modest ($\kappa = 0.51$). Women with a high BMI were quite likely to report a weight problem (sensitivity: 0.92), but so too were women of normal weight (specificity: 0.53).

Breast cancer history. Most of the surveys asked women whether they had ever been diagnosed with cancer. In 5 cases (studies a–d and f), we were able to code for reports of a history of breast cancer; for 1 study (study e), we were able to code for breast cancer within the previous year.

Statistical Analyses

We report prevalence rates of health-related behaviors and self-reported breast cancer history. Sample sizes for estimates vary depending on the number of surveys contributing information. For comparison purposes, we also provide population-based estimates of similar measures generated from 2 large, national probability samples of US women aged 18 to 75 years.

The 1994 National Health Interview Survey (NHIS),[38] a national household interview survey of the US noninstitutionalized civilian population conducted by the National Center for Health Statistics, included responses from more than 10 000 women aged 18 to 75 years. NHANES III[39] was also a national population-based study of the US civilian noninstitutionalized population, conducted between 1988 and 1994; similar to the NHIS, it was designed to provide information on the health of the population. In NHANES III, approximately 9000 women aged 18 to 75 years were interviewed.

From these 2 surveys, we report both unstandardized estimates and standardized estimates adjusted to match the age, ethnicity/race (White, non-Hispanic vs other), education level, and geographic region of the pooled lesbian sample available for each individual analysis. We then compare prevalence rates between the pooled sample and the national estimates via tests for the difference between 2 independent proportions evaluated at the $P < .05$ level.[40] We also report 95% confidence intervals (CIs) of prevalence estimates. For the pooled sample, we calculated point estimates and standard errors with the inclusion of a random effect to index sample membership.[35] For the NHIS and NHANES III, we estimated standard errors after taking into account the complex sampling design.[41]

Results

Characteristics of Women Surveyed

Most women surveyed self-identified as lesbian, were aged 18 to 50 years, were of White race/ethnicity, and possessed high levels of education (Table 2). Given the hidden nature of this population, we were not able to determine the extent to which these women were representative of lesbians and bisexual women in the United States. One earlier national probability survey[24] also revealed that high levels of education were common among lesbians, but another[16] did not.

Risk Factors

Obesity. Overall, we estimated that 28% of the lesbians surveyed were obese (Table 3). Comparisons with unstandardized estimates from both the NHIS ($P = .84$) and NHANES III ($P = .06$) suggest that this percentage is within normative expectations for US women aged 18 to 75 years. However, standardizing national estimates from both surveys to take into account the demographic profile of the lesbians sampled indicated that a significantly greater percentage of lesbians were obese than would be expected ($P < .05$ for both comparisons). Despite this finding, lesbians were clearly much less likely than US women in general to report that they considered themselves to be overweight, even after adjustment for demographic differences ($P < .05$ for both comparisons).

Alcohol use. Estimates of alcohol use are provided in Table 3. NHANES III, using a question slightly different from that used in the lesbian surveys, asked women whether they had consumed an alcoholic drink within the previous year. From this question, we estimated that there was a greater prevalence of current alcohol use among lesbians ($P < .05$); after standardization, however, the difference in self-reported use between the lesbian sample and US estimates was greatly attenuated ($P = .23$). In NHANES III, although questions concerning alcoholism were not directly assessed, women were asked whether there had ever been a period in their lives when they drank heavily (5 or more drinks almost every day). Comparisons of these somewhat different definitions of dysfunctional alcohol use suggested that the prevalence of alcohol use problems in the lesbian sample was far greater than either unstandardized or standardized national estimates ($P < .05$ for both comparisons).

Cigarette smoking. In comparison with US women in general, lesbians appeared less likely to report being current smokers than expected from national estimates ($P < .05$) but more likely ($P < .05$) to indicate a history of smoking (Table 3). Notably, however, after standardization, both current and previous smoking prevalence rates among lesbians greatly exceeded national norms for women ($P < .05$ for both comparisons).

Parity. Comparison of data from the lesbian sample and estimates for US women drawn from NHANES III clearly showed the far lower lifetime rate of pregnancy among lesbians, even after standardization ($P < .05$ for both comparisons; Table 3). Similarly, lesbians appeared to be far less likely to have ever given birth to a live infant than national estimates for women, whether unstandardized or standardized ($P < .05$ for both comparisons).

Use of birth control pills. The majority of lesbians surveyed reported a history of heterosexual sexual behavior (estimated lifetime prevalence: 60% [95% CI = 56%, 64%]), indicative of previous contraceptive needs. Of the 7 surveys, 3 asked specifically about use of birth control pills, and estimates of use among lesbians were dramatically lower than estimates from demographically similar women in the US population ($P < .05$ for both comparisons; Table 3).

Health Screening and Cancer Prevention Behaviors

Health insurance status. While unstandardized estimates of health insurance coverage among US women were similar to estimates in the pooled lesbian sample, standardized estimates clearly indicated lower prevalence rates among lesbians in regard to health insurance coverage ($P < .05$; Table 3).

Recency of pelvic examination. Comparisons of both unstandardized and standardized national estimates from the 1994 NHIS of the percentage of women who reported having had a recent gynecologic examination with estimates from the lesbian sample indicated lower prevalence rates among lesbians ($P < .05$ for both comparisons; Table 3). To some extent, however, this may reflect the slightly longer time frame for the NHIS, in which women were asked whether they had had an examination in the previous 3 years. Using information from 5 of the 7 surveys, we estimated that approximately 85% (95% CI = 83.2%, 86.2%) of lesbians had had an examination within the previous 5 years. This percentage was lower ($P < .05$) than the NHIS 3-year estimate for US women (87.3% [95% CI = 85.9%, 88.8%]) after standardization.

Differences in examination histories may have been due in part to differences in health

TABLE 2—Demographic Characteristics of Lesbians and Bisexual Women in Pooled Sample: United States, 1987–1996

Characteristic	National Surveys, %		Regional Surveys, %					Total, %
	National Lesbian and Bisexual Women's Health Survey (n=6105)	Boston Lesbian Health Project (n=1618)	Michigan Lesbian Health Survey (n=1668)	Massachusetts Lesbian Health Needs Assessment (n=1008)	Houston Lesbian Health Initiative (n=592)	North Carolina Women's Health Access Survey (n=563)	Oregon Lesbian Health Survey (n=322)	
Sexual orientation								
Lesbian	87.3	85.5	86.3	93.8	88.3	79.1	88.8	87.2
Bisexual	12.3	14.5	13.7	6.1	11.0	20.9	4.7	12.4
Other/heterosexual	0.4	0.0	0.1	0.1	0.7	0.0	6.5	0.4
Age, y								
<30	29.3	39.6	30.8	18.4	19.1	30.0	9.0	28.4
30–39	39.6	42.2	40.7	41.3	37.8	34.2	33.2	39.7
40–49	24.1	15.1	22.2	29.7	25.0	24.0	43.5	23.7
≥50	8.0	3.2	6.2	10.6	18.1	11.7	14.3	8.1
Ethnic/racial background								
White, non-Hispanic	87.9	78.6	91.5	86.4	81.3	72.2	87.3	85.9
Other	12.1	21.4	8.5	13.6	18.7	27.8	12.7	14.1
Education								
High school or less	6.7	6.4	9.5	7.5	12.4	10.7	1.9	7.4
Some college	23.9	22.5	27.1	5.6	54.8[a]	25.8	18.6	24.6
College degree	29.4	33.6	22.7	7.9	. . .	25.9	18.9	25.8
Graduate school	40.1	37.6	40.7	79.1	32.9	37.7	60.6	42.2
Geographic region								
Northeast	21.6	30.8	0.0	100.0	0.0	1.6	0.0	23.8
Midwest	13.3	18.6	100.0	0.0	0.0	0.2	0.0	23.4
South	24.3	25.2	0.0	0.0	100.0	96.1	0.0	25.5
West	40.8	25.3	0.0	0.0	0.0	2.1	100.0	27.2

Note. Percentages are based on nonmissing data. Percentages sum to 100% except for rounding error.
[a]Includes women who attended college and completed college.

insurance coverage. After sample membership effects were taken into account, lesbians who indicated that they currently had health insurance were significantly more likely to report having had a pelvic examination within the previous 2 years (79.3% [95% CI=74.6%, 83.3%]) than those who were uninsured (61.6% [95% CI=58.0%, 64.9%]). Standardized population estimates of 3-year prevalence rates from the NHIS suggested that approximately 89% (95% CI=87.9%, 90.7%) of demographically similar insured women and 75% (95% CI=70.5%, 79.0%) of similar uninsured women had had a gynecologic examination. In both instances, the percentages were greater than estimates from the pooled lesbian sample ($P<.05$ for both comparisons). However, 5-year gynecologic examination prevalence rates among insured (91.6% [95% CI=89.0%, 93.7%]) and uninsured (78.8% [95% CI=76.5%, 80.9%]) lesbians did not differ significantly from standardized US estimates of 3-year rates.

Mammography experience. Although recommendations for routine mammography over the last few years have varied, all women older than 50 years have been encouraged to obtain yearly mammograms for the past 20 years.[42,43] In contrast, routine mammography among women younger than 40 years is not consistently recommended. Reflecting this situation, reports of ever having had a mammogram were highly age related (Table 3).

The 1994 NHIS asked women 30 years and older whether they had ever had a mammogram. Comparing estimated age-related prevalence rates among lesbians aged 30 to 75 years with unstandardized estimates derived from the NHIS, we found no statistically significant differences among women in their 30s or women 50 years or older. Among women in their 40s, lesbians evidenced a lower rate of previous mammograms ($P<.05$). After standardization, comparisons indicated consistently lower lifetime prevalence rates among lesbians than expected from population-based norms across all 3 age groups ($P<.05$ for all comparisons).

As with reports of recent gynecologic examinations, current health insurance coverage was associated with a positive mammogram history among lesbians 30 years and older. But this difference achieved statistical significance only among those in their 40s; in this age group, we estimated that 77% (95% CI=71.7%, 81.1%) of insured lesbians and 64% (95% CI=51.8%, 74.7%) of uninsured lesbians had undergone at least 1 mammogram ($P<.05$). In contrast, nonsignificant differences were observed among lesbians in their 30s (approximately 34% [95% CI=31.4%, 36.4%] of insured women vs 28% [95% CI=22.8%, 33.6%] of uninsured women) as well as those aged 50 to 75 years (82% [95% CI=74.6%, 87.5%] of insured women vs 78% [95% CI=58.2%, 90.5%] of uninsured women).

Comparisons with standardized national estimates suggested that the benefits of health insurance do not increase mammography rates for lesbians as much as they do for other women. Among uninsured lesbians, we estimated that only those in their 40s evidenced lower prevalence rates of previous mammograms than standardized population estimates for similar women ($P<.05$). Among lesbians who had health insurance, however, a positive mammogram history was significantly less common in all 3 age groups than standardized estimates for US women ($P<.05$ for all comparisons). From the 1994 NHIS, we estimated that among insured women of demographic backgrounds similar to those of the lesbian sample, 41% (95% CI=36.8%, 44.3%) of those in their 30s, 87% (95% CI=84.1%, 90.8%) of those in their 40s, and 90% (95% CI=88.2%, 92.4%) of those aged 50 to 75 years would report having had at least 1 previous mammogram.

Breast Cancer Rates

Approximately 0.9% (95% CI=0.8%, 1.1%) of lesbians aged 18 to 75 years reported

TABLE 3—Comparisons of Health Risk Indicators Among Lesbians With Standardized and Unstandardized Estimates for US Women From NHANES III and the 1994 NHIS

Health Risk Indicator	Lesbian/Bisexual Sample			Estimates for US Women			
				Standardized,[a] %		Unstandardized, %	
	No.	%	(95% Confidence Interval)	%	(95% Confidence Interval)	%	(95% Confidence Interval)
Obesity							
Self-reported body mass index above normal weight	8115	27.7	(25.6, 29.9)	. . .	. . .	. . .	. . .
NHIS estimate	. . .	. . .	. . .	18.3	(17.5, 19.1)	27.9	(27.3, 28.5)
NHANES III estimate	. . .	. . .	. . .	19.0	(16.8, 21.1)	30.5	(28.4, 34.4)
Self-reported obesity/weight problem[b]	7764	43.9	(40.8, 47.1)	55.8	(52.9, 58.7)	62.4	(60.6, 64.1)
Alcohol use							
Current user (in past year for US women)[b]	11638	69.6	(67.0, 72.1)	66.9	(63.5, 70.4)	55.2	(51.3, 57.8)
Alcohol problem history	11638	12.4	(10.8, 14.2)				
Ever consumed 5+ drinks almost every day[b]				4.0	(2.6, 5.4)	6.8	(5.8, 7.7)
Tobacco use[c]							
Current smoker	10752	21.2	(19.0, 23.6)	16.1	(14.8, 17.4)	24.3	(23.3, 25.3)
Past smoker	9843	34.0	(30.1, 38.1)	20.1	(18.5, 21.8)	19.9	(19.0, 20.8)
Parity							
Ever pregnant[b]	9962	28.1	(24.8, 31.6)	66.7	(63.1, 70.3)	81.5	(79.9, 83.2)
Ever gave birth to live infant[b]	11547	16.0	(14.6, 17.5)	56.9	(52.6, 61.2)	74.5	(72.6, 76.4)
Ever used birth control pills[b]	8329	36.2	(32.5, 40.1)	79.7	(76.6, 82.8)	65.1	(63.0, 67.2)
Has health insurance[b]	10171	86.4	(84.4, 88.1)	92.6	(91.2, 94.1)	85.0	(83.4, 86.5)
Pelvic exam within past 2 years (past 3 years for US women)[c]	10811	72.9	(68.9, 76.7)	87.4	(86.0, 88.7)	79.0	(77.9, 80.2)
Ever had mammogram, by age, y[c]							
30 to 39	4686	32.2	(28.5, 36.1)	39.6	(36.2, 42.9)	33.8	(31.6, 35.9)
40 to 49	2808	73.1	(70.0, 76.0)	86.7	(83.4, 89.9)	78.8	(76.0, 81.6)
50 to 75	960	82.9	(80.2, 85.4)	90.2	(88.2, 92.2)	81.2	(79.4, 83.0)

Note. Prevalence rates among lesbian/bisexual women were estimated in a random effects model. NHIS = National Health Interview Survey; NHANES III = Third National Health and Nutrition Examination Survey.
[a]Individually standardized to the age, race/ethnicity (White, non-Hispanic vs other), education level, and geographic region of the lesbian sample for each measured health variable.
[b]Estimated from the 1994 NHIS.
[c]Estimated from NHANES III.

TABLE 4—Comparisons of Self-Reported Previous Diagnosis of Breast Cancer Among Lesbians and Bisexual Women With Standardized and Unstandardized Estimates for US Women From NHANES III, by Current Age

Current Age, y	Lesbian/Bisexual Sample			Estimates for US Women			
				Standardized, %		Unstandardized, %	
	No.	%	(95% Confidence Interval)	%	(95% Confidence Interval)	%	(95% Confidence Interval)
Under 40	7962	0.2	(0.1, 0.4)	0.2	(0.0, 0.4)	0.1	(0.0-0.2)
40 to 49	2671	1.5	(0.1, 2.5)	1.0	(0.4, 1.9)	1.5	(0.3-2.7)
50 to 59	739	3.6	(2.5, 5.3)	3.6	(0.1, 7.0)	1.9	(0.8-3.0)
60 to 75	182	8.8	(5.4, 13.9)	10.0	(3.0, 16.9)	4.5	(3.3-5.7)

Note. Prevalence rates among lesbian/bisexual women were estimated in a random effects model. Rates were standardized to the race/ethnicity (White, non-Hispanic vs other), education level, and geographic region of the lesbian sample. NHANES III = Third National Health and Nutrition Examination Survey.

a positive history of breast cancer (Table 4). These women represent survivors of the disease, and therefore this prevalence clearly underestimates the risk of incident breast cancer. Nevertheless, in a highly similar manner, NHANES III asked women whether they had ever had cancer and, if so, at what site it was first diagnosed. Unstandardized estimates for women aged 18 to 75 years indicated that approximately 1.4% (95% CI = 1.0%, 1.7%) would be expected to report a positive breast cancer history. After standardization, the estimated prevalence rate would be 0.9% (95% CI=0.4%, 1.3%), consistent with that observed in the lesbian sample. Even when estimates were stratified by age, there was no statistically significant difference in self-reported prevalence of breast cancer between the lesbian sample and US estimates for women. Furthermore, restricting analyses to the 5 lesbian samples in which lifetime prevalence rates of breast cancer were ascertained did not alter the findings.

Discussion

These results document a greater prevalence of several behavioral risk factors for breast[44,45] and gynecologic[46,47] cancers among

lesbians and bisexual women than among women in general. Lesbians and bisexual women apparently are more likely to be obese than population estimates would suggest for women of similar demographic characteristics. They are also far less likely to have given birth or to have used oral contraceptives,[48] both of which have been shown to be protective against endometrial and ovarian cancer.[47] In addition, lesbians and bisexual women appear less likely to undergo routine screening procedures, such as mammograms and gynecologic examinations, that would lead to early detection of disease. Whereas many women experience well-known barriers to mammography screening, lesbians face, in addition, unique issues of access and use, including negative experiences with health care practitioners and mistrust of the health care community.[49]

Furthermore, lesbians and bisexual women may be more likely to consume alcohol and evidence higher rates of problematic use than other women. Previous work has shown that lesbians tend to have drinking patterns more typical of men than of women[14,15] and that women who report same-sex sex partners in the previous year are more likely than heterosexually active women to meet diagnostic criteria for probable alcohol dependency.[16] Even moderate consumption of alcohol has been associated with modestly higher rates of breast cancer[50] and other negative health outcomes for women.[51]

Our results confirm and extend earlier findings from small studies,[1–3,8,11,18,19,22,23,30,32,48,49] underscoring current concerns that behavioral risk factors for breast or gynecologic cancers are more common in the lesbian population. Despite these results, we failed to observe higher rates of self-reported positive breast cancer histories after adjusting for demographic confounders.

There are several possible study-related reasons for the lack of excess cancers observed. For example, the lesbian sample as a whole was relatively young (mean age: 36 years), and breast cancer is primarily a disease of older women.[51] Furthermore, several alternative interpretations cannot be ruled out, including perhaps higher mortality rates among lesbians and bisexual women, healthy-volunteer bias, and residual confounding, all of which might have led to underestimation.[29] In this regard, only future research, possibly within large cohort studies of women's health assessing sexual orientation, can determine the true excess risk for breast and gynecologic cancers in this population.

At the same time, the health risks engendered by the behavioral patterns that we observed are not limited to breast and gynecologic cancers alone.[52] Unexpectedly, we also found that lesbians and bisexual women are more likely to be current or former tobacco smokers than are women in general. Little research[25,30] has been published on this issue, and the findings have been contradictory. Negative effects of cigarette smoking on health are broad[53] and, in conjunction with the greater prevalence of other behavioral risk factors (e.g., obesity and problematic alcohol use), raise new concerns about the health needs of lesbians and bisexual women. To date, most research on use of health services with this population has focused on gynecologic issues,[1] but our observation dictates broadening that focus to include other major health threats, especially those linked to tobacco use.

The health risk patterns documented here have multiple determinants, many of which are poorly understood. We know, for example, that lesbians have different attitudes about body image and weight than heterosexual women, feeling more positive toward their bodies.[17] Indeed, we observed in this study that lesbians and bisexual women, as a whole, are less likely to consider themselves to have a weight problem despite higher levels of obesity than national estimates for similar women. However, the determinants of greater rates of tobacco and alcohol use are not well known. Various theories for patterns of alcohol use among lesbians have been proffered,[13] including permissive community norms arising from the traditional role of gay bars as a safe environment for socializing, less adherence to female sex role behavioral proscriptions, and higher levels of social stress.

We wish to underscore that none of the studies included in our investigation were population based, even though these studies represented responses from nearly 12 000 women. The samples were large and drawn from diverse geographic regions, but the participants do not represent the total population of women who have sex with women. As with other volunteer-based surveys,[29] we expect that sampling bias toward recruiting healthier individuals underestimated to some extent the prevalence of both risk factors and disease.

Despite the extensive public health efforts in the United States promoting weight loss, smoking cessation, reduced alcohol consumption, and use of preventive screening, lesbians and bisexual women, an apparently logical target group given our findings here, have not been a particular focus of public health interventions. Developing effective methods to reach these women raises issues in regard to providing a health care environment in which lesbians and bisexual women are comfortable seeking care and revealing their sexual orientation.[54] At present, many of these women are not.[1] Instead, research has repeatedly documented that lesbians report frequent negative encounters in health care settings, including inappropriate interventions, hostility from providers, and violation of confidentiality.[1]

Providers themselves may lack accurate information about relevant health risks in this population, in part because of the paucity of research.[54] For example, it has only recently been documented that lesbians are at risk for human papillomavirus even if they have never had heterosexual intercourse.[55] If public health is truly for everyone, the results of the current study call for developing culturally competent interventions targeted to the differential risk patterns evidenced by lesbians and bisexual women. □

Contributors

S. D. Cochran and V. M. Mays conceived the study. S. D. Cochran, V. M. Mays, and D. Bowen cowrote the manuscript. S. D. Cochran conducted the data analyses, and S. Gage, D. Bybee, S. J. Roberts, R. S. Goldstein, A. Robison, E. J. Rankow, and J. White, in collaboration with their individual study teams, initiated and designed the original studies, collected the data, and contributed to the interpretation of the study findings.

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