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Sexual Orientation and Smoking: Results From a Multisite Women's Health Study

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Abstract

Although lesbians are believed to be at disproportionately high risk for smoking, few published studies have focused on smoking rates in this population. We examined and compared rates and demographic correlates of smoking among 550 lesbians and 279 heterosexual women in Chicago, Minneapolis/St. Paul, and in New York City in 1994–1996 using a self-administered survey questionnaire. African-American lesbians were more likely than African-American heterosexual women or White lesbians to be current smokers. For the sample as a whole, education was the most robust predictor of both current and lifetime smoking. Racial/ethnic minority lesbians with high school education or less were most likely to report both current and lifetime cigarette smoking. The study's limitations are noted.

Keywords

sexual orientation; sexual minority; lesbian; sexual identity; sexual attraction; cigarette smoking

Over the past several decades, cigarette smoking has become recognized as a health risk of major proportions and the single most preventable cause of premature death in the United States. Nearly one in five deaths in the United States result from the use of tobacco—more each year than AIDS, alcohol, cocaine, heroin, homicide, suicide, motor vehicle crashes, and fires combined (United States Department of Health and Human Services [USDHHS], 2000). In addition, smoking is associated with increased risk for health problems specific to women, including cervical cancer, early onset of menopause, infertility, and osteoporosis (USDHHS, 2001). In 1987 lung cancer surpassed breast cancer as the leading cause of cancer mortality in women (Jemal et al., 2003). Given the seriousness of the problem as well as research indicating that smoking rates are declining more slowly for women than for men (Carpenter, Wayne, and Connolly, 2005; Fiore et al., 1989; Molarius et al., 2001), it is important to learn as much as possible about groups of women who may be at heightened risk for smoking.

Smoking rates among women are known to differ by socioeconomic status, education, age, and race/ethnicity (USDHHS, 2001). Women with less than a high school (12 years) education are three times as likely to smoke as those with 16 or more years of education. Racial/ethnic differences in smoking rates among women also vary substantially, with the highest rates among Native Americans and lowest among Hispanics and Asian/Pacific Islanders. Despite

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the fact that African Americans are older when they start smoking, smoking rates of African-American women (21.9%) and White women (23.5%) are similar (USDHHS, 2001). Rates of smoking also appear to vary by sexual orientation (Gay and Lesbian Medical Association [GLMA], 2001; Hughes and Jacobson, 2003; Ryan, Wortley, Easton, Pederson, and Greenwood, 2001; USDHHS, 2000, 2001); several recent studies report substantially higher rates of smoking among lesbians and gay men (Burgard, Cochran, and Mays, 2005; Case et al., 2004; Cochran et al., 2001; Greenwood et al., 2005; Mays, Yancey, Cochran, Weber, and Fielding, 2002; Tang et al., 2004; Valanis et al., 2000) than among their heterosexual counterparts. Nevertheless, an Institute of Medicine (IOM) report on lesbian health notes large gaps in current knowledge about smoking among lesbians (Solarz, 1999). In our review of the literature we found only three studies of sexual-minority women that focused solely on smoking. We found a number of additional studies (summarized in Table 1), however, that included data on rates of smoking among adult lesbians or bisexual women as part of broader health or substance use/abuse¹ surveys.

Reports of current smoking among lesbians and bisexual women in these surveys vary widely—from a low of 7% in a predominately White California sample (Dibble, Roberts, and Nussey, 2004) to a high of 60% in a sample of Black and Hispanic women in the Bronx, New York (Sanchez, Meacher, and Beil, 2005)—but the majority of studies report rates that are substantially higher than those for women in the general population. Such findings are particularly noteworthy given the typical demographic profile of lesbian/bisexual samples. Because research with sexual-minority women most frequently uses nonprobability sampling methods, women in these studies are often more homogeneous (generally the majority are White, middle class, and well educated) than are women in the general population. Given that these demographic characteristics are associated with lower tobacco use (USDHHS, 2001), one might expect to find lower rates of smoking among lesbians than among women in the general population. However, because existing studies generally do not support this expectation, additional research is needed. In particular, there is a need for research that includes appropriate heterosexual comparison groups (Hughes, Wilsnack, and Johnson, 2005).

We report data related to smoking collected in a large multisite health survey of lesbians and heterosexual women. Our objective for the current analyses was to compare smoking rates in demographically similar lesbians and heterosexual women and to determine whether the association between smoking and several key demographic correlates (i.e., age, education, and race/ethnicity) differed by sexual orientation. This information is important for understanding similarities and differences across various subgroups of women and for planning smoking prevention and intervention strategies that target the needs of these groups.

Methods

Survey Questionnaire

The Multisite Women's Health Study (MWSH) was initiated by the Chicago Lesbian Community Cancer Project (LCCP) to assess the general health status and health risks of lesbians. An interdisciplinary team of women from various universities and community groups, including volunteers from LCCP, developed the survey instrument. The 25-page questionnaire covered a broad range of health behaviors and health indicators, including personal health history (e.g., general, menstrual, and gynecological health); health-related practices (e.g., diet, health screening, use of alternative therapies); substance use (alcohol, cigarettes, caffeine, and

¹The journal's style uses *substance abuse* as a diagnostic category. Substances are used or misused; living organisms are and can be *abused*. Chief Editor's note.

illegal drugs), depression, anxiety, and suicide (ideation and attempts); access to and use of physical and psychological health services; relationships and social support; and background demographic information. The broad scope of the survey questionnaire precluded in-depth assessment of specific health behaviors and associated risk factors. However, where feasible, we used questions or abbreviated measures from previous research. Initial drafts of the questionnaire were reviewed in a focus group of lesbians in Chicago. Following pretests with 10 women, data were first collected in Chicago, then in Minneapolis–St. Paul, Minnesota and in New York City. More specific information about the questionnaire (as well as a copy of the survey instrument) is available from the first author. Human subjects review boards at universities in each of the three study sites approved the study. Following is a description of measures used in the current analyses.

Measures

Sexual Orientation—Although the terms sexual orientation and sexual identity are often used interchangeably, sexual orientation is generally understood as a person's predisposition toward sexual attraction to persons of the same gender, the opposite gender, or both genders (Diamond, 2000; Jorm, Korten, Rodgers, Jacomb, and Christensen, 2002). Sexual identity, or the concept that a person forms around this predisposition (Cass, 1984), tends to vary based on social and cultural factors (Kitzinger, 1987; Rust, 1993; Weinberg, Williams, and Pryor, 1994), whereas sexual attraction is presumed to develop early in life and remain relatively stable. Only the Chicago survey had the question about self-identity, so we constructed a sexual orientation variable for the three-site combined sample based on responses to two questions: (a) current sexual attraction, and (b) gender of sexual partners in the year prior to completing the survey questionnaire. Both questions included the response options “only women,” “mostly women,” “equally women and men,” “mostly men,” and “only men.” The question about sexual behavior also included the option “I have not had sex in the past year.” By summarizing the combinations of responses, we classified women as “lesbian,” “bisexual,” or “heterosexual.” Respondents only or mostly attracted to and sexually active with men (or not sexually active) were categorized as heterosexual ($N = 279$, 32%). Similarly, respondents who were only or mostly attracted to and sexually active with women (or equally attracted and not sexually active) were categorized as lesbian ($N = 550$; 62%). Respondents who were equally attracted or sexually active with men and women (or not sexually active) were categorized as bisexual ($N = 33$; 4%); because of their small number bisexual women were not included in our analyses.

We recognize that not all women who are attracted to, or have sex with, other women self-identify as lesbian. However, the high level of agreement between our categorization of participants in the Chicago sample as lesbian, bisexual, or heterosexual and their self-identity suggests that misclassification bias using this method is likely modest (Hughes, Haas, and Avery, 1997). We use the terms lesbian, bisexual, and heterosexual to be consistent with terms and definitions used in previous reports of the MWHs findings (e.g., Hughes, Haas, Razzano, Cassidy, and Matthews, 2000; Matthews, Brandenburg, and Hughes, 2004; Matthews et al., 2002; Matthews and Hughes, 2001; Matthews, Hughes, Osterman, and Kodl, 2005; Owen, Hughes, and Owens-Nicholson, 2003), and for ease of communication.

Smoking—Survey participants were queried on current smoking status and smoking history. Participants were asked to indicate whether they were former smokers, current smokers, or never smokers: (a) former smokers included women who reported that they “*used to smoke, but have stopped*,” (b) current smokers were women who reported currently smoking at least one cigarette per day, and (c) never smokers were those who reported that they had never smoked. Current and former smokers were asked how many cigarettes per day they smoke or smoked. Response options ranged from 1 to 5 *cigarettes a day to two or more packs per day (over 35 cigarettes)*. Duration of smoking (*less than 1 year to 20 years or more*) was assessed

for current smokers; former smokers were asked how long ago they had stopped smoking (*less than 6 months to more than 10 years ago*). *Lifetime smokers* included women who reported ever having smoked (both current and past smokers).

Index of Minority Statuses—Lesbians of color exist as minorities within minorities, with the multiple levels of oppression and discrimination that accompany such statuses (Bowleg, Huang, Brooks, Black, and Burkholder, 2003; Greene, 1994; Stepakoff and Bowleg, 1998). Thus, stressors and lifestyle factors associated with multiple minority statuses may interact to increase the likelihood of smoking. To explore this possibility, a composite measure of minority statuses was constructed by adding the number of such statuses held by each respondent. These included: (a) a lesbian sexual orientation, (b) membership in a minority race/ethnic group, and (c) low educational achievement (high school or less). The index ranged from 0 to 3.

Sample and Data Collection

It is extremely difficult (and generally cost prohibitive) to obtain large probability samples of lesbians. Even in large-scale studies that have assessed sexual orientation, very few women report same-gender identity or behavior (Drabble, Midanik, and Trockie, 2005; Laumann, Gagnon, Michael, and Michaels, 1994). Therefore, the MWHS study used snowball sampling along with recruitment strategies designed to recruit as diverse a sample as possible. In addition to distributing the survey instrument in a broad range of formal and informal lesbian venues (e.g., potluck dinners; discussion groups; bookstores; softball and bowling leagues; coffee houses; college, social, support, therapeutic, musical, and political groups and organizations), we sought participants through informal social networks. To avoid over-sampling “heavy drinkers” and smokers,² bars and clubs were not used as recruitment sites. Efforts to recruit racial/ethnic minority and other hard-to-reach women (e.g., those with lower incomes or education) included paying a small stipend to women from these groups to assist with distribution of survey questionnaires (in NYC) and distributing surveys to organizations and social networks with which these groups were closely affiliated (Chicago). Data were collected using self-administered, paper-and-pencil survey questionnaires that took 30 to 40 minutes to complete.

Although no explicit eligibility criteria were included in the instructions printed on the survey questionnaire, letters accompanying survey packets (each containing two questionnaires) described the study’s goal as “collecting information about the health of a broad group of lesbians of differing ages, racial/ethnic backgrounds, and occupations.” Recipients of the packets were asked to complete one of the questionnaires and to give the other to a woman whom they presumed to be heterosexual and who had a work-role similar to their own. We distributed additional single copies of the survey to heterosexual women in venues similar to those used to recruit lesbians (i.e., feminist bookstores, women’s cultural events, and social networks). Information printed on the survey instructed participants to complete and return the survey in person (in a sealed return envelope) or by mail in a postage-paid, preaddressed envelope. To ensure anonymity, no code numbers were included on the questionnaires and no identifying information was requested. Although our intent was to encourage participation of lesbians who tend to be underrepresented in research (e.g., racial/ethnic minority and other lesbians who may have been less open about their sexual orientation), this method prohibited accurate calculation of the response rate. In each of the three sites approximately one half of the surveys distributed were returned. Heterosexual women returned fewer questionnaires than lesbians did, but the number of questionnaires actually distributed to heterosexual women is unknown.

²A descriptive categorization often used in the literature whose underpinnings and criteria (e.g., theory-based, empirically-based, stakeholder-based, arbitrary) “promise” much but explain little. Chief Editor’s note.

Data Analyses

Descriptive statistics were used to summarize demographic characteristics of the sample. Univariate statistical techniques were used to generate frequency distributions, measures of central tendency and dispersion. T-tests were used to test for differences between continuous variables. Chi-square analyses were used to examine simple bivariate associations between the measures of smoking and demographic characteristics. Multiple logistic regressions were performed to explore the relative contributions of sexual orientation and other demographic variables to current and lifetime smoking. Because the recruitment procedures varied somewhat among the three sites, covariates reflecting study recruitment sites were included in each logistic regression model. All independent variables included in the regression analyses were coded as binary variables. All significant differences reported here have probabilities of $p < .05$.

Results

Description of the Sample

We received a total of 881 completed surveys. We excluded women who had missing data on either the sexual attraction or sexual behavior questions ($n = 11$), or who provided inconsistent responses to these questions ($n = 8$). We also excluded the 33 women categorized as bisexual because this subgroup was too small to permit reliable comparisons. Thus, the sample consisted of 829 women: 550 lesbian and 279 heterosexual. The largest proportion of the sample was from Chicago (273 lesbians and 134 heterosexual women); 227 (160 and 67) were from Minneapolis/St. Paul, and 195 (117 and 78) were from New York City.

We found no significant differences between lesbians and heterosexual women on any of the key demographic variables. Ages of study participants ranged from 20 to 86 years. The mean ages of lesbian and heterosexual women were similar (42.4 and 42.9, respectively). The majority of the participants were White (76% of lesbians and 72% of heterosexual women); 12% of the lesbians and 14% of the heterosexual women were African American. The remainder of the sample (12% lesbian and 15% heterosexual) was Hispanic, Asian American, Native American, or of another racial/ethnic background. Survey questionnaires were in English only. No acculturation data were collected.

Almost one half (48% of both the lesbian and heterosexual groups) had completed some college and more than one third (37% of lesbians and 36% of heterosexual women) had an advanced degree. Relatively few lesbians (15%) or heterosexual women (17%) reported that they had a high school education or less. African American lesbians were more likely than White lesbians to have a high school education or less (35% compared with 9%), and less likely to have an advanced degree (20% compared with 43%; $X^2(4) = 46.5, p < .001$). We found the same pattern of results in comparisons of White and African-American heterosexual women ($X^2(4) = 15.6, p = .004$).

The majority of women surveyed (75% of lesbian and 72% of the heterosexual women) reported that they worked full time for pay. Relatively few were unemployed or retired, and even fewer reported that they were unable to work because of disability. The median household income for both lesbian and heterosexual women was \$36,000–\$50,999.

Current and Lifetime Smoking

Although rates of *current* smoking for lesbians (19%) and heterosexual women (19%) did not differ, more lesbians (61%) than heterosexual women (54%) reported *lifetime* smoking ($p < .05$). Lesbian and heterosexual current smokers did not differ in number of cigarettes or number of years smoked. The majority of lesbians (59%) and heterosexual women (57%) reported that

they smoked one half pack or less per day; most had smoked for 10 years or more (70% of lesbian and 68% of heterosexual current smokers).

As reflected in Table 2, we found no significant age differences in current smoking in either the lesbian or the heterosexual groups. African-American and other lesbians of color were more likely than their White counterparts to report that they currently smoked ($X^2(2) = 18.5, p < .001$). Among heterosexuals, White and African-American women were less likely than those in the other racial/ethnic group to be current smokers, though this difference was not significant. Level of education was strongly associated with current smoking among both lesbians ($X^2(2) = 26.0, p < .001$) and heterosexual women ($X^2(2) = 28.3, p < .001$). The prevalence of current smoking among participants with a high school education or less was 39% among lesbians and 43% among heterosexual women; among the most highly educated women, only 11% of lesbians and 7% of heterosexual women were current smokers.

Lifetime smoking rates differed by age for lesbians ($X^2(3) = 12.9, p = .005$) and heterosexual women ($X^2(3) = 10.5, p = .01$). Older age was associated with a greater likelihood of having ever smoked among both lesbians ($r = .17; p < .001$) and heterosexual women ($r = .15; p = .01$). As with current smoking status, higher level of education was associated with a lower prevalence of lifetime smoking in both groups, though this association was significant only among lesbians ($X^2(2) = 10.1, p < .01$).

Multivariate Analyses and Findings

We examined the independent effects of each demographic measure on current and lifetime smoking using multiple logistic regressions. Initial analyses assessed the independent effects of sexual orientation, race/ethnicity, age, and education on each of the smoking measures. In these analyses (not shown), education and age were associated with both current and lifetime smoking. Sexual orientation and race/ethnicity were not statistically related to either of the smoking measures. We then examined the joint effects of sexual orientation and race/ethnicity. In the regression analyses of current and lifetime smoking, a series of binary variables representing age group, educational level, and sample site were entered along with five binary variables representing the various combinations of sexual orientation and race/ethnicity. African-American lesbians served as the contrast group in these analyses, as they reported the highest rates of both current and lifetime smoking. These results are presented in Table 3.

Current Smokers

African-American lesbians were more likely to be current smokers than were African-American heterosexual women ($aOR = 0.34, 95\% CI = 0.12-0.98$) or White lesbians ($aOR = 0.46, 95\% CI = 0.24-0.87$). In addition, a borderline difference between African-American lesbians and White heterosexual women was observed ($aOR = 0.51, 95\% CI = 0.26-1.01$). This model also indicated that the likelihood of current cigarette use was dramatically lower among women with more education, regardless of sexual orientation, age, or race. In contrast to women with a high school education or less, the adjusted odds ratios among women with college and graduate education, respectively, were 0.34 ($95\% CI = 0.21-0.54$) and 0.17 ($95\% CI = 0.09-0.29$). In addition, women ages 41–50 years were more likely to be current smokers than those 30 or younger ($aOR = 2.05, 95\% CI = 1.05-3.99$).

Lifetime Smokers

In analyses of lifetime smoking, we found no differences based on race/ethnicity or sexual orientation. Age and educational level, however, were each independently associated with lifetime cigarette smoking. Older women were more likely to report that they had ever smoked. Using women ages 18–30 as the contrast group, the adjusted odds ratios were 1.88 ($95\% CI =$

1.13–3.13), 2.55 (95% CI = 1.52–4.29), and 4.14 (95% CI = 2.33–7.34) for women ages 31–40, 41–50, and 51+, respectively. Women with higher levels of education were less likely ever to have smoked. Using women with a high school education or less (as the contrast group), the adjusted odds ratios were 0.55 (95% CI = 0.34–0.88) for women with some college and 0.35 (95% CI = 0.21–0.58) for women with graduate degrees. These models were also respecified to include interaction terms between sexual orientation and both age and education. These interaction coefficients were all nonsignificant, suggesting similar effects of age and education on smoking among lesbians and heterosexual women.

Minority Statuses and Smoking

Our final analyses examined relationships between the summary measure of minority statuses (i.e., lesbian sexual orientation, minority racial/ethnic group membership, low educational achievement) and smoking (current and lifetime). As shown in Table 4, the greater the number of minority statuses, the greater the likelihood of being a current and lifetime smoker.

We also examined the effects of minority statuses on smoking behaviors using multiple logistic regressions that adjusted for respondent age and sample site. These models (not shown) confirmed the relationships shown in Table 4. The adjusted odds ratios for our index of minority statuses—representing each incremental increase in the three minority statuses—were 1.91 (95% CI = 1.51–2.42) for current smoking and 1.29 (95% CI = 1.06–1.57) for lifetime smoking. That is, the probability of being a current smoker increases 1.91 times, and the probability of being a lifetime smoker increases 1.29 times, for each incremental increase in the minority status index.

Discussion

In contrast to recent reports that lesbians are more likely than heterosexual women to smoke (e.g., Austin et al., 2004; Burgard, Cochran, and Mays, 2005; Case et al., 2004; Cochran et al., 2001; Mays, Yancey, Cochran, Weber, and Fielding, 2002; Tang et al., 2004), we found no difference in overall rates of current smoking when comparing lesbians with demographically similar heterosexual women. Current smoking rates for both lesbians and heterosexual women in this study were slightly lower than recent estimates of 22% for women in the U.S. general population (USDHHS, 2001), and may be explained in part by the fact that study participants—both lesbian and heterosexual women—had higher levels of education than is typical of women in U.S. national probability samples. In addition, although bivariate relationships indicated that prevalence of lifetime smoking was higher among lesbians than among heterosexual women, in our multivariate analyses controlling for age, education, and race we found no differences in smoking prevalence by sexual orientation. Results of multivariate analyses that examined the interaction effects of sexual orientation on the relationships between other demographic characteristics (age and education) and lifetime smoking were also not significant, suggesting that the relationships between most of the demographic characteristics and smoking were similar for lesbian and heterosexual women overall. However, when we examined smoking rates separately by race/ethnicity, we found that African-American lesbians were more likely than African-American heterosexual women and White lesbians to be current smokers.

Studies have consistently found a positive relationship between stress or negative affect and the initiation or continuation of smoking (Carmody, 1989; Cohen, Kamarck, and Mermelstein, 1983; Jarvik, Caskey, Rose, Herskovic, and Sadeghpour, 1989; Mitchell and Perkins, 1998; Perkins and Grobe, 1992; Posner, Leitner, and Lester, 1994; Steward et al., 1996). A small but growing literature suggests that lesbians are at heightened risk for psychological distress and depression (Cochran and Mays, 1994, 2000; DiPlacido, 1998; Fergusson, Horwood, and Beautrais, 1999; Gilman et al., 2001; Hughes, Haas, Razzano, Cassidy, and Matthews, 2000;

Kerr and Emerson, 2003; Matthews, Hughes, Razzano, Johnson, and Cassidy, 2002; Meyer, 2003) and that this risk may be compounded in lesbians who are members of racial/ethnic minority groups. For example, Greene (1994) asserts that African-American lesbians live in a sociocultural context of discrimination that creates a unique set of psychological demands and stressors. These multiple minority statuses—being female, African American, and lesbian—constitute a form of triple jeopardy (Greene, 1994), which may compound the risk for smoking.

Although psychological distress is important, it is clear from the literature that women's smoking is influenced by a variety of interrelated factors. Less educated women are known to be particularly vulnerable to smoking initiation and resistant to smoking cessation interventions (Warnecke et al., 2001; Watson et al., 2003). Consistent with studies of smoking in the general population (Fiore et al., 1989), we found that education was the most robust predictor of smoking for both lesbians and heterosexual women. Level of education was inversely related to both current and lifetime smoking. Low educational level may be a proxy for lifestyle factors and stressful life conditions that are the more direct predictors of smoking. High stress, lack of social and material resources, and poor health habits—including smoking—are interrelated and associated with low socioeconomic status (Manfredi, Lacey, Warnecke, and Buis, 1992; Tang et al., 2004).

In addition to stress, race, age, education, and socioeconomic status, other important influences on smoking include cultural gender-role norms; tobacco advertising; perceptions of risks and benefits of smoking; peer-group norms and behaviors; and other health behaviors, such as alcohol and other substance use (Hughes and Jacobson, 2003; USDHHS, 2001; Watson et al., 2003). Sexual orientation may interact with some or all of these factors in ways that influence risk for smoking. For example, lesbians are less likely than heterosexual women to adhere to traditional female gender-role norms and more likely to drink alcohol (Hughes, 2005; Hughes and Wilsnack, 1997)—factors that may increase risk for smoking. Conversely, lesbians tend to be more highly educated, in part because of fewer family roles and responsibilities (Rothblum and Factor, 2001), and they appear to be less influenced by societal pressures to be thin (Herzog, Newman, Yeh, and Warshaw, 1992; Owen, Hughes, and Owens-Nicholson, 2003; Siever, 1994)—factors associated with lower risk of smoking among women. Although interesting and potentially important, until population-based studies that include large samples of lesbians are more feasible, the above hypotheses will remain untested and the question of whether lesbians are more likely than heterosexual women to smoke will remain unanswered. Clearly, more research is needed to determine whether the relationships among sexual orientation and other potential and/or posited risk factors for smoking, such as race and education, are additive, interactive, both, or neither. Determining the critical necessary conditions (individual and environmental) for smoking behaviors (e.g., initiation, continuation, frequency, attributed meanings, changes in patterns of use) “demands” asking the types of *legitimate* questions posited by von Foerster.³

Although data are limited it appears that lesbians are at least as likely as heterosexual women to smoke. Age, education and racial/ethnic group differences in smoking rates in our study and in others' research (see e.g., Camp, Klesges, and Reylea, 1993) suggest the importance of tailored smoking prevention and cessation strategies. For example, interventions targeting low-income African-American lesbians should not only address potential knowledge deficits and attitudinal beliefs regarding the association between smoking and health risks (Manfredi,

³The cyberneticist Heinz Von Foerster posited that there are two types of questions: *legitimate questions* and *illegitimate questions*. The former are those for which the answer is not known. An illegitimate question is one for which the answer is known. Heinz Von Foerster, Patricia M. Mora, and Lawrence W. Amiot, “Doomsday; Friday, 13 November, A.D. 2026.” *Science*, 132, 1960. pp. 1291–1295. Chief's Editor note.

Lacey, Warnecke, and Buis, 1992; Sanchez, Meacher, and Beil, 2005), but also the perceived benefits of smoking to reduce stress and manage daily pressures (Lacy et al., 1993).

Because most smokers begin smoking in adolescence (USDHHS, 2001), prevention efforts must also target young lesbians. Programs for lesbian and gay youth must, at minimum, address societal stigma and negative stereotypes associated with homosexuality and with race/ethnic minority status, as well as tobacco marketing images that target the lesbian and gay population (Austin et al., 2004; Goebel, 1994; Mathews, 1999; Stevens, Carlson, and Hinman, 2004).

Given the well-established association between smoking and drinking alcohol (Little, 2000), and findings that lesbians are more likely than heterosexual women to drink alcohol (Hughes and Wilsnack, 1997), interventions should address these co-occurring health-risk behaviors. Further, because lesbians appear more likely to have higher body mass than heterosexual women (Markovic, Aaron, Danielson, Schmidt, and Janosky, 2000; Owens, Hughes, and Owens-Nicholson, 2003), lesbians of all ages should be made aware of the compounded health risks associated with smoking and excessive alcohol use and smoking and obesity. These combinations of health risks, added to lesbians' lower rates of preventive health care (Hutchinson, Thompson, and Cederbaum, 2006; Rankow, 1998; White and Dull, 1997), may place lesbians at disproportionately high risk for cardiovascular disease and certain cancers.

Study Limitations

These findings must be interpreted in light of the limitations of the data. First, the study was limited by the available data related to smoking and its correlates. Because the MWHS was intended to assess a large and broad range of health behaviors and health indicators, few questions about smoking were included. No information about age of initiation of smoking, or about social networks or social settings (such as bars), that may have influenced smoking, was collected. In addition, questions about religiosity and acculturation, factors known to influence smoking, were limited or absent. Although questions from previous studies were used whenever possible, the survey questionnaire included relatively few standardized scales or batteries of questions. The use of standardized measures of smoking is necessary to permit comparisons of findings across studies. Such comparisons are especially important in research with stigmatized populations because so few studies use probability samples, making it difficult to reliably estimate prevalence.

Our lesbian sample was large and came from several urban geographic regions in the United States—factors that strengthen generalizability. However, study participants classified as lesbian (or heterosexual) cannot be assumed to represent the larger populations of women who self-identify as such. We defined sexual orientation on the basis of participants' responses to questions about same-gender attraction and behavior. Although sexual identity is generally highly correlated with behavior and attraction (Hughes, Haas, and Avery, 1997; Laumann, Gagnon, Michael, and Michaels, 1994), a substantial proportion of women who have sex with other women do not self-identify as lesbian. Further, some evidence suggests that women who engage in same-gender sexual behavior but do not self-identify as lesbian may be more likely to engage in health-risk behaviors, such as substance use and misuse (Cochran and Mays, 2000; Hughes and Boyd, 2004; Markovic, Aaron, Danielson, Schmidt, and Janosky, 1999; McCabe, McCabe, Hughes, Bostwick, and Boyd, 2005), than do women who do identify as such. Thus, using different definitions of sexual orientation may result in different findings regarding smoking and other health-risk behaviors.

As with other volunteer-based studies, and particularly given that we were unable to calculate a reliable response rate, it is possible that our sample may have included healthier and more educated participants. Indeed, the educational level of both the lesbian and the heterosexual groups was substantially higher than that of women in the general population (U.S. Census

Bureau, 2003), which suggests that we likely underestimated the risk of smoking in both groups. Almost without exception, studies of lesbians have included highly educated samples. Lower education and income—the most common markers of lower socioeconomic status—are linked to a number of health-risk behaviors in women (Agency for Healthcare Research and Quality [AHRQ], 2005). The fact that educational level did not differ between lesbians and heterosexual women in this study may help explain the absence of differences in overall rates of smoking based on sexual orientation. Researchers should be aware of demographic differences and their potential impact and build in statistical controls for educational level.

Although our inclusion of a comparison group of demographically similar heterosexual women permitted us to control for many demographic and lifestyle factors—other than sexual orientation—that might have influenced smoking rates differently for lesbians and heterosexual women, our method of recruiting the comparison group may have masked actual sexual-orientation differences in rates of smoking. Studies suggest that one of the strongest risk factors for smoking among women (particularly adolescent and young women) is exposure to peers who smoke (USDHHS, 2001). Thus, having lesbians pass along a duplicate questionnaire to a heterosexual friend or acquaintance may have resulted in a comparison group with smoking and other behavioral risk factors similar to those of the lesbians in the study.

Finally, because of the small number of lesbians in the Hispanic, Asian American, Native American, and other racial/ethnic minority groups included in our sample, we did not have adequate statistical power to test for racial/ethnic differences in these groups. We combined participants who were not African American or White into one “other racial/ethnic group” category. Given that smoking rates are known to vary substantially by race/ethnicity (USDHHS, 2001), interpretations about this group must be made with particular care. Studies such as that of Mays, Yancey, Cochran, Weber, and Fielding (2002) are needed to better understand smoking rates and risk for smoking among racial/ethnic minority lesbians.

Despite these limitations, our study is one of very few to examine smoking among lesbians and of even fewer to include a comparison group of heterosexual women. We suggest that studies with larger groups of racial/ethnic-minority and less-educated lesbians be conducted to more systematically examine the influence of sexual orientation on smoking in these high-risk groups. In addition, studies are needed that examine lesbians’ smoking patterns and predictors of smoking in greater depth.

Summary

As in the general population, variations in smoking prevalence among lesbians can be explained in part by demographic differences of the samples known to influence smoking rates, such as age, race, and educational level. However, sexual orientation may contribute additional risks for smoking. Just as studies of gender differences are important to our understanding of smoking, greater knowledge of how sexual orientation may influence smoking can inform and guide prevention and treatment programs aimed at reducing tobacco use among women.

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Glossary

Sexual orientation	This term often is used to define a person's predisposition toward sexual attraction to persons of the same gender, the opposite gender, or both genders. It is believed to include at least three major dimensions or components: a psychological component (such as the direction of an individual's erotic desire), a behavioral component (gender of sexual partner/s), and self-definition or identity. Whereas sexual attraction is presumed to develop early in life and remain relatively stable, sexual identity and sexual behavior tend to vary based on social, temporal and cultural factors.
Sexual minorities	Typically, this is a population group whose sexual orientation (identity, behavior, or attraction) differs from the heterosexual majority of the surrounding society. The term was coined in the late 1960s or early 1970s by analogy to ethnic minority. Initially the term referred primarily to lesbians and gay men, but now includes bisexual and transgender people. These four categories (Lesbian, Gay, Bisexual, and Transgender) are often grouped together under the rubric LGBT.
Stressors	These are events or contexts that activates the body's stress response including, for example, environmental stressors (overcrowding, living in a high-crime neighborhood), daily stress events (e.g., traffic, lost keys), life changes (e.g. loss of significant other, family illness), workplace stressors (e.g., role strain, lack of control).
Triple jeopardy	This phrase often refers to being female, a member of a sexual minority group, and a member of a racial/ethnic minority group. Each of these minority statuses is thought to contribute to marginalization from mainstream society.

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Table 1

Smoking rates among lesbians and bisexual women

Authors/date	Location/Scope	Sampling method	Data collection method	Sample composition/size	Age range	Percentage of current smokers	
						Lesbian/Bisexual women	Comparison group
Sanchez, Meacher, and Beil (2005)	Bronx, NY (lesbian bars/clubs)	Convenience	One-on-one interviews	Black or Hispanic lesbian (n = 106) and bisexual (n = 17) women	17–55 (mean = 32 yrs)	60% (80% ever smoked)	None
Burgard et al. (2005)	California (California Women's Health Survey)	Probability	Self-administered survey	350 homosexually active (female sex partners); 10,854 male sex partners only	18–46+	18–25 yrs 35% 26–35 yrs 31% 36–45 yrs 30% 46+ yrs 20%	18–25 yrs 19% 26–35 yrs 16% 36–45 yrs 19% 46+ yrs 15%
Case et al. (2004)	National (Nurses Study II)	Probability (prospective cohort)	Self-administered survey	694 lesbian; 317 bisexual; 89,812 heterosexual	31–49 yrs	Lesbians 19% Bisexual women 21%	Heterosexual women 11%
Dibble, Roberts, and Nussey (2004)	California	Convenience	Self-administered survey	648 (324 pairs of lesbians and their heterosexual sisters)	Mean ages: lesbians, 50 yrs heterosexual sisters, 49 yrs	Lesbians 7%	Heterosexual sisters 12%
Tang et al. (2004)	California (California Health Interview Study, [CHIS])	Probability	Telephone survey	343 lesbian; 511 bisexual; 24,830 heterosexual	18–65 yrs	Lesbians 18–34 yrs 1% 35–44 yrs 27% 45–65 yrs 27% Bisexual 18–34 yrs 29% 35–44 yrs 40% 45–65 yrs 16%	Heterosexual women from CHIS 18–34 yrs 14% 35–44 yrs 16% 45–65 yrs 15%
McCabe, Hughes, Bostwick, and Boyd (2004)	Midwestern University in United States	Probability	Self-administered survey	49 bisexual and 2,042 heterosexual women	18–22	Bisexual women 47%	Heterosexual women 22%
Mays, Yancey, Cochran, Weber, and Fielding (2002)	California (Los Angeles County Lesbian Health Survey)	Convenience	Self-administered survey and telephone survey	365 African-American, Asian American, and Hispanic lesbian, and bisexual women	18–64	African Am. 28% Asian Am. 20% Hispanic 30%	General population women (Los Angeles County Health Survey [LACHS]) African Am. 16% Asian Am. 9% Hispanic 12%
Aaron et al. (2001)	Pittsburgh, PA	Convenience	Self-administered survey	1,010 lesbians	18–74 yrs	36%	21% of women from the 1998 Behavioral Risk Factor Survey (BRFS)

Authors/date	Location/Scope	Sampling method	Data collection method	Sample composition/size	Age range	Percentage of current smokers		
						Lesbian/Bisexual women	Comparison group	
Gruskin, Hart, Gordon, and Ackerson (2001)	Northern California Kaiser Permanente HMO members	Stratified random	Self-administered survey	120 lesbian or bisexual; 7,993 heterosexual women	Mean ages: lesbians, 43 yrs heterosexual women, 51 yrs	20-34 yrs 33% 35-49 yrs 29% 50+ yrs 12%	20-34 yrs 13% 35-49 yrs 14% 50+ yrs 11%	
Cochran et al. (2001) ^a	National (data from 7 studies conducted in various U.S. locations)	Convenience	Self-administered survey	11,876 lesbian and bisexual women	majority were 18-50 yrs	21% (34% past smokers)	Data from the NHANES III and 1994 NHIS used for comparison: 16% (20% past smokers)	
Diamant, Schuster, and Lever (2000)	Los Angeles County, CA	Probability	Telephone survey	51 lesbians 36 bisexual 4,610 heterosexual	Mean ages: lesbians, 39 yrs bisexual, 33 yrs heterosexual, 42 yrs	Lesbians 37% Bisexual women 50%	Heterosexual women 14%	
Valanis et al. (2000)	National (Women's Health Initiative)	Convenience, cluster	3 randomized clinical trials; longitudinal observation study, self-administered survey	No adult sex 1420 Heterosexual 90,578 Bisexual 740 Lifetime lesbian 264 Adult lesbian 309	Mean ages, 57-62 yrs (all participants were post-menopausal)	Life lesbian 10% Adult lesbian 14% Bisexual 12%	No adult sex 5% Heterosexual women 7%	
Burnett, Steakley, Slack, Roth, and Lerman (1999)	National	Convenience	Telephone survey	139 lesbians	35 yrs or older	12%	None reported	
Roberts and Sorenson (1999)	National	Convenience	Self-administered survey	1,633 lesbians	17-55+	20%	None reported	
Rankow and Tessaro (1998)	North Carolina	Convenience	Self-administered survey	576 lesbians	17-77 yrs	28%	Authors cite 1994 report that 25% of women in North Carolina smoked	
White and Dull (1997)	Portland, OR	Convenience	Self-administered survey	324 lesbians	18-71 (mean = 41 yrs)	11%	None reported	
Skinner and Otis (1996)	Kentucky	Convenience	Self-administered survey	500 lesbians	18-79 (mean = 34 yrs)	43%	None	
Bradford, Ryan, and Rothblum (1994)	National	Convenience	Self-administered survey	1,925 (majority were lesbian)	17-80; 80% 25-44 yrs	41%	None reported	

Table 2

Smoking rates by demographic group

	Lesbians			Heterosexual Women		
	Full lesbian sample N	Lifetime smoker N (%)	Current smoker N (%)	Full heterosexual sample N	Lifetime smoker N (%)	Current smoker N (%)
Total	550	334 (61)	105 (19)	279	147 (54)	52 (19)
Age		$p < .001$			$p < .001$	
<30	53	24 (45)	12 (23)	44	17 (39)	6 (14)
31–40	187	107 (58)	37 (20)	89	41 (47)	18 (21)
41–50	186	114 (62)	36 (20)	82	48 (60)	20 (25)
>50	119	86 (72)	20 (19)	61	39 (66)	7 (12)
Race/Ethnicity			$p < .001$			
African American	67	44 (67)	23 (35)	37	17 (49)	6 (17)
White	413	245 (60)	63 (15)	197	111 (58)	33 (17)
Other Race/ethnicity	57	36 (63)	17 (30)	34	14 (41)	9 (27)
Education		$p < .001$	$p < .001$			$p < .001$
High School /less	79	60 (76)	31 (39)	46	30 (65)	20 (43)
Some college/BA	263	159 (61)	51 (20)	132	69 (54)	25 (19)
Advanced/Prof. degree	204	112 (55)	23 (11)	98	48 (51)	7 (7)

Note: Lifetime smokers include both current and former smokers. N's within each demographic category vary due to missing data; p values based on within group chi-square comparisons.

Table 3

Multiple logistic regression results for current and lifetime smoking: adjusted odds ratios (95% confidence intervals)^a

	Current smokers	Lifetime smokers
African-American lesbians	1.00	1.00
African-American heterosexuals	0.34 (0.12–0.98) [*]	0.46 (0.19–1.13)
White lesbians	0.46 (0.24–0.87) ^{**}	0.87 (0.48–1.57)
White heterosexuals	0.51 (0.26–1.01)	0.83 (0.44–1.55)
Other race/ethnic lesbians	0.80 (0.36–1.79)	0.98 (0.45–2.12)
Other race/ethnic heterosexuals	0.77 (0.29–2.04)	0.46 (0.19–1.12)
Age 18–30	1.00	1.00
Age 31–40	1.75 (0.90–3.39)	1.88 (1.13–3.13) ^{**}
Age 41–50	2.05 (1.05–3.98) [*]	2.55 (1.52–4.29) ^{***}
Age 51+	1.57 (0.75–3.26)	4.14 (2.33–7.34) ^{***}
High school grad or less	1.00	1.00
Some college or BA/BS	0.34 (0.21–0.54) ^{***}	0.55 (0.34–0.88) ^{**}
Advanced/Professional degree	0.17 (0.09–0.29) ^{***}	0.35 (0.21–0.58) ^{***}
Minneapolis site ^b	1.00	1.00
Chicago site	1.05 (0.68–1.61)	1.18 (0.85–1.65)
New York site	1.06 (0.61–1.84)	0.91 (0.59–1.42)
Model X^2	62.84 ^{***}	48.09 ^{***}
(df)	(12)	(12)
R ² (Nagelkerke)	0.12	0.08
(n)	(782)	(782)

^{*}
 $p < .05$;

^{**}
 $p < .01$;

^{***}
 $p < .001$.

^aThe contrast group in these analyses is African-American lesbians.

^bThe contrast group in analyses that include the sample site variable is Minneapolis/St. Paul.

Table 4

Current and lifetime smoking rates by number of minority statuses

	Current smoker	Lifetime smoker
Number of minority statuses	%	%
None	11.4	56.3
One	17.2	57.3
Two	26.2	61.0
Three	50.0	78.9
	$p < .001$	$p < .05$