

# Women Who Report Having Sex With Women: British National Probability Data on Prevalence, Sexual Behaviors, and Health Outcomes

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Sex between women is thought to be low risk for transmission of sexually transmitted infections (STI) such as chlamydia, gonorrhea, or HIV.<sup>1-3</sup> However, studies from several countries indicate that women who have sex with women (WSW) may in fact be at greater risk than women with exclusively male partners, through behaviors such as risky sex with male sexual partners and activities such as injection drug use (IDU).<sup>4-7</sup>

Most studies of WSW use convenience sampling in clinic or community settings because WSW are a hard-to-reach, “hidden” population.<sup>8</sup> Convenience samples drawn from selected populations are not generalizable to all WSW, and there are few robust data internationally that measure prevalence, characteristics, and health outcomes in WSW from representative, general population samples. We noted a marked increase in the reported prevalence of sexual intercourse between women in Britain in the 10 years between the 2 National Surveys of Sexual Attitudes and Lifestyles (Natsal).<sup>9</sup> The most recent survey, Natsal 2000, provides contemporary data to explore the prevalence of reported same-sex sexual experience and to make comparisons between women who reported sex exclusively with men, women who reported sex with women and men, and women who reported sex exclusively with women in the past 5 years in terms of sociodemographics and sexual, reproductive, and general health risk behaviors and outcomes.

## METHODS

### Data and Measures

Natsal 2000 is a stratified probability sample survey of the general population aged 16 to 44 years who reside in Great Britain. A

**Objectives.** We estimated the prevalence of same-sex experience among women and compared women reporting sex with women and men and women reporting sex exclusively with women with women reporting sex exclusively with men, in terms of sociodemographics and sexual, reproductive, and general health risk behaviors and outcomes.

**Methods.** We used a British probability survey (n = 6399 women, aged 16 to 44 years) conducted from 1999 to 2001 with face-to-face interviewing and computer-assisted self-interviewing.

**Results.** We found that 4.9% of the women reported same-sex partner(s) ever; 2.8% reported sex with women in the past 5 years (n = 178); 85.0% of these women also reported male partner(s) in this time. Compared with women who reported sex exclusively with men, women who reported sex with women and men reported significantly greater male partner numbers, unsafe sex, smoking, alcohol consumption, and intravenous drug use and had an increased likelihood of induced abortion and sexually transmitted infection diagnoses (age-adjusted odds ratios = 3.07 and 4.41, respectively).

**Conclusions.** For women, a history of sex with women may be a marker for increased risk of adverse sexual, reproductive, and general health outcomes compared with women who reported sex exclusively with men. A nonjudgmental review of female patients' sexual history should help practitioners discuss risks that women may face. (*Am J Public Health.* 2007;97:1126-1133. doi:10.2105/AJPH.2006.086439)

total of 11 161 people, of whom 6399 were women, were interviewed between May 1999 and February 2001. Details of the methodology and question wording are published elsewhere.<sup>9,10</sup> Briefly, a sample of 40 523 addresses was selected from the small-user Postcode Address File for Great Britain with a multistage probability cluster design, with oversampling in greater London. Interviewers visited all selected addresses and recorded the number of residents aged 16 to 44 years. One resident from every household was invited by random selection to participate in the study.

Natsal 2000 achieved a response rate of 65.4%, which is in line with other major surveys conducted in Great Britain.<sup>11</sup> Trained interviewers conducted face-to-face interviews in respondents' homes, followed

by computer-assisted self-interview. The face-to-face interview included questions on sociodemographics, health, alcohol consumption, smoking, attitudes (including perceived HIV risk), sexual attraction, and sexual experience. Respondents who reported no sexual experience of any kind in the face-to-face interview and those aged 16 and 17 years with some heterosexual experience but no heterosexual intercourse or same-sex experience reported in screening questions were not given the computer-assisted self-interview.

In the computer-assisted self-interview, eligible women were asked the following question about same-sex sexual experience: “Have you ever had ANY kind of sexual experience or sexual contact with a female? Please say ‘yes’ here, even if it was a long time ago or

did not involve contact with the genital area or vagina. This can include kissing or cuddling, not necessarily leading to genital contact.” Women were then asked the following about same-sex genital contact: “Have you had sex with a woman involving genital/vaginal contact? (That is, oral sex or any other contact involving the genital area.)” The computer-assisted self-interview also asked about sexual practices with women and men, number of partners, sexually transmitted infection clinic attendance, STI diagnosis, HIV testing, abortion, and IDU.

### Statistical Analysis

All analyses were performed with the survey analysis functions of Stata version 7.0 (Stata Corp, College Station, Tex) to account for stratification, clustering, and weighting of the data. The data were weighted to correct for unequal selection probabilities, including oversampling in greater London, and to match Great Britain’s age and gender population profile.<sup>9,10</sup>

We used survival analysis to estimate the median age at first same-sex experience and first same-sex genital contact. This method allows for the fact that younger respondents may not have yet experienced these events, so figures were derived from the estimated cumulative incidence at 44 years, assuming that age of first occasion stays constant across generations.<sup>12,13</sup> Therefore, our estimates were for all women, not just those reporting these events.

We used binary logistic regression to obtain odds ratios (ORs)<sup>9,12,13</sup> to compare estimates for women who reported sex with women and men and women who reported sex exclusively with women relative to women who reported sex exclusively with men. We adjusted for age to control for variation in the age distribution among the 3 groups of women (Table 1). We used linear regression to compare the mean numbers of sexual partners among these groups of interest (Table 2). Tables 3 and 4 show age-adjusted ORs for risk factors and sexual and reproductive outcomes; we discuss additionally adjusting for reported numbers of male partners to control for confounding by this variable. Statistical significance was considered as  $P < .05$  for all analyses.

**TABLE 1—Sociodemographic Characteristics of Women Who Reported Sex Exclusively With Men (WSEM), Women Who Reported Sex With Women and Men (WSWM), and Women Who Reported Sex Exclusively With Women (WSEW) in Natsal 2000: Great Britain**

Sociodemographic Characteristic	WSEM, %	WSWM, %	WSEW, %	$P^a$
Age, y				< .001
16–24	22.9	42.4	4.9	
25–34	39.6	37.6	51.0	
35–44	37.5	20.0	44.2	
Marital or partnership status				< .001
Married	48.0	14.0	0.0	
Heterosexual cohabitation	19.0	33.8	0.0	
Homosexual cohabitation	0.0	4.2	64.4	
Previously married	7.6	8.2	5.2	
Never married	25.4	39.8	30.4	
Have any natural children	63.2	41.3	9.9	< .001
Race/ethnicity reported as White	92.7	93.5	94.1	.910
Social class <sup>b</sup>				.305
I/II	31.1	30.7	52.2	
IIINM/IIIM	46.4	44.3	32.8	
IV/V	22.5	25.0	15.1	
Highest educational achievement <sup>c</sup>				.0135
Having at least a university degree	18.3	21.3	37.9	
A/AS levels	16.1	25.2	14.6	
0 levels/GCSE	49.8	43.6	35.7	
None	15.7	10.0	11.8	
Resident of greater London	13.7	20.9	21.3	.011
Weighted denominator (unweighted) <sup>d</sup>	4819 (5594)	118 (147)	21 (31)	NA

Notes. Natsal = National Survey of Sexual Attitudes and Lifestyles; NA = not applicable. WSEM are defined as women who reported exclusively male sexual partners in the 5 years prior to the interview for Natsal 2000. WSWM are defined as women who reported female sexual partners and male sexual partners in the 5 years prior to the interview for Natsal 2000. WSEW are defined as women who reported exclusively female sexual partners in the 5 years prior to the interview for Natsal 2000.

<sup>a</sup> $P$  value for overall difference in proportions among WSEM, WSWM, and WSEW.

<sup>b</sup>I/II = professional, managerial, and technical occupations; IIINM/IIIM = skilled nonmanual and skilled manual occupations; IV/V = partly skilled and unskilled occupations.<sup>42</sup>

<sup>c</sup>A/AS levels = passing school exams around age 18; 0 levels/GCSEs = passing school exams around age 16; none = having none of these educational qualifications.

<sup>d</sup>The data were weighted to correct for unequal selection probabilities, including oversampling in greater London, and to match Britain’s age and gender population profile.

## RESULTS

### Prevalence of Same-Sex Attraction, Sexual Experience, and Genital Contact

We found that 0.6% of women reported that they “never felt sexually attracted to anyone at all” (95% confidence interval [CI]=0.4%, 0.9%). Approximately 1 in 10 women reported sexual attraction, at least in part, to women (11.2%; 95% CI=10.3%, 12.1%). And 0.2% of women reported they had only ever felt sexually attracted to women (95% CI=0.1%, 0.4%).

Same-sex sexual experiences were reported by 9.7% of the women (95% CI=8.9%, 10.5%). Using survival analysis, we estimated the median age at first same-sex sexual experience to be 19 years (lower and upper quartiles: 14 and 27 years, respectively). As previously reported, 4.9% of all women reported same-sex genital contact (95% CI=4.3%, 5.5%).<sup>9</sup> We estimated the median age at first same-sex genital contact as 22 years (lower and upper quartiles: 16 and 32 years, respectively). Same-sex genital contact before age 16 years was reported by 1.3% of all women

**TABLE 2—Numbers of Male Sexual Partners Reported by Women Who Reported Sex Exclusively With Men (WSEM), Women Who Reported Sex With Women and Men (WSWM), and Women Who Reported Sex Exclusively With Women (WSEW) in Natsal 2000: Great Britain**

	Ever, %			Past 5 Years, %		Past Year, %		New Partners <sup>a</sup> in the Past Year, %	
	WSEM	WSWM	WSEW	WSEM	WSWM	WSEM	WSWM	WSEM	WSWM
No. of male sexual partners <sup>a</sup>									
0	0.0	0.0	15.0	0.0	0.0	3.8	4.9	78.2	41.0
1	19.6	4.1	29.1	61.0	14.9	82.8	45.7	15.2	26.6
2	11.6	1.1	22.8	14.9	6.7	8.1	18.6	3.7	14.9
3-4	20.9	13.7	21.2	12.7	24.2	3.5	23.9	2.1	8.2
5-9	28.2	18.8	6.2	8.1	25.5	1.4	2.8	0.7	5.7
10+	19.7	62.3	5.6	3.3	28.7	0.4	4.1	0.2	3.6
Mean (SD)	6.5 (8.7)	21.2 (26.8)	3.2 (5.6)	2.3 (3.1)	11.0 (21.9)	1.2 (1.1)	2.7 (4.6)	0.4 (0.9)	1.9 (4.4)
Median	4	15	2	1	5	1	1	0	1
Lower, upper quartiles (range)	2, 8 (1-250)	8, 30 (1-200)	1, 4 (1-31)	1, 3 (1-50)	3, 10 (1-200)	1, 1 (1-12)	1, 3 (1-41)	0, 0 (1-21)	0, 2 (1-40)
Weighted denominator (unweighted) <sup>b</sup>	4810 (5582)	118 (147)	21 (31)	4810 (5582)	118 (147)	4810 (5582)	118 (147)	4810 (5582)	118 (147)

Notes. Natsal = National Survey of Sexual Attitudes and Lifestyles; SD = standard deviation. WSEM are defined as women who reported exclusively male sexual partners in the 5 years prior to interview for Natsal 2000. WSWM are defined as women who reported female sexual partners and male sexual partners in the 5 years prior to interview for Natsal 2000. WSEW are defined as women who reported exclusively female sexual partners in the 5 years prior to interview for Natsal 2000.  $P < .001$  for comparing numbers of male partners reported by WSEM and WSWM for all time frames.  $P$  values from linear regression, adjusting for age, where number of partners is considered as a continuous rather than a categorical variable as presented in Table 2.

<sup>a</sup>The Natsal survey defined sexual partners as people who have had sex together, whether just once or a few times, or as regular or married partners.

<sup>b</sup>The data were weighted to correct for unequal selection probabilities, including oversampling in greater London, and to match Britain's age and gender population profile.

(95% CI=1.1%, 1.7%). Of women reporting same-sex genital contact, 42.9% reported heterosexual intercourse before age 16 (95% CI=37.2%, 48.9%). This is a significantly larger proportion than observed among women who did not report same-sex genital contact (21.2%; 95% CI=19.9%, 22.5%;  $P < .001$ ).

**Comparisons**

When we focused on women who reported at least 1 sexual partner in the 5 years prior to interview for Natsal 2000, we found that 2.8% of these women reported sex with women in the past 5 years ( $n=178$ ; 95% CI=2.4%, 3.3%). (This prevalence estimate is slightly higher than the estimate previously reported,<sup>9</sup> because here the numerator includes women [ $n=7$ ] who reported any female partner in the 5 years prior to interview but did not give a precise number [e.g., “at least one”], rather than just women reporting a specific number of partners [ $n=171$ ].) A large proportion of these women also reported sex with men (85.0%; 95% CI=78.7%, 89.6%) and were labeled as women who reported sex with women and men, and so we consider these women separately from women who reported

sex exclusively with women. Given the relatively small number of women who reported sex exclusively with women ( $n=31$ ), our main focus is on women who reported sex with women and men compared with women who reported sex exclusively with men in terms of sociodemographics and sexual, reproductive, and general health risk behaviors and outcomes.

**Sociodemographic Characteristics**

Table 1 shows that women who reported sex with women and men were significantly younger than were women who reported sex exclusively with men (mean ages=27.3 years and 31.7 years, respectively; standard deviations [SD]=7.2 and 7.7, respectively;  $P < .001$ ). However, women who reported sex exclusively with women were significantly older than were women who reported sex exclusively with men (mean age=33.9 years; SD=6.2 years;  $P < .001$ ). Of the women who reported sex with women and men, 47.8% reported opposite-sex cohabitation or marriage and 4.2% reported living with a woman. In contrast, 67.0% of women who reported sex exclusively with men reported opposite-sex cohabitation or marriage, and 64.4% of

women who reported sex exclusively with women reported same-sex cohabitation. The women who reported sex with women and men were significantly less likely to have any natural children than were women who reported sex exclusively with men, even after control for age (age-adjusted OR=0.63; 95% CI=0.40, 0.97;  $P = .038$ ). There were no statistically significant ethnic or social class differences among the 3 groups of women, but women who reported sex exclusively with women were significantly more likely to be educated at least to university level than were women who reported sex exclusively with men and women who reported sex with women and men. A significantly larger proportion of women who reported sex with women and men and women who reported sex exclusively with men resided in the greater London area than did women who reported sex exclusively with men.

**Sexual Partners**

Approximately half of women who reported sex with women and men (48%; 95% CI=38.8%, 57.3%) reported no female partners in the past year in contrast with 4.8% of women who reported sex exclusively with

women (95% CI=1.4%, 15.6%;  $P<.001$ ). A greater proportion of women who reported sex with women and men than women who reported sex exclusively with women reported 1 female partner only in the past 5 years: 70.7% (95% CI=61.9%, 78.2%) versus 50.8% (95% CI=32.0%, 69.3%);

$P=.060$ ). A small proportion of both groups reported 5 or more female partners in the past 5 years: 6.0% (95% CI=3.1%, 11.5%) and 3.5% (95% CI=0.8%, 14.6%), respectively.

In terms of male partners, women who reported sex with women and men reported

significantly higher male partner numbers than did women who reported sex exclusively with men over all time frames (Table 2). For example, the median number of male partners ever was 4 for women who reported sex exclusively with men and 15 for women who reported sex with women and men, and in the past 5 years, 1 and 5 male partners, respectively. Of women who reported sex with women and men, 49.4% reported multiple male partners in the past year compared with 13.4% of women who reported sex exclusively with men. Three in 5 women who reported sex with women and men reported a new male partner in the past year in contrast to approximately 1 in 5 women who reported sex exclusively with men.

**Sexual Practices**

The women who reported sex with women and men who reported male partner(s) in the past year were as likely to report vaginal intercourse as women who reported sex exclusively with men, but significantly more likely to report anal intercourse, oral sex, or other genital contact not leading to intercourse with men than were women reporting exclusively male partners (age-adjusted ORs=2.89, 2.41, and 3.80, respectively; Table 3). When women who reported sex with women and men were compared with women who reported sex exclusively with women, there were no differences in the reporting of sexual practices with female partners asked about in Natsal 2000, after control for age. Relative to women who reported sex exclusively with men, women who reported sex with women and men and women who reported sex exclusively with women were significantly more likely to report masturbation in the past 4 weeks (age-adjusted ORs=3.91 and 2.50, respectively).

Relative to women who reported sex exclusively with men, women who reported sex with women and men were significantly more likely to report first sexual intercourse with their most recent partner within 24 hours of meeting and to describe this partner as “not regular” (age-adjusted ORs=2.44 and 1.76, respectively; no significant differences were detected for women who reported sex exclusively with women). However, after additionally adjusting for partner numbers in the past

**TABLE 3—Prevalence of Selected Sexual Practices and Sexual Risk Behaviors in Women Who Reported Sex Exclusively With Men (WSEM), Women Who Reported Sex With Women and Men (WSWM), and Women Who Reported Sex Exclusively With Women (WSEW), in Natsal 2000: Great Britain**

	WSEM, %	WSWM, %	WSEW, %	WSWM, Age-Adjusted OR <sup>a</sup> (95% CI)	WSEW, Age-Adjusted OR <sup>a</sup> (95% CI)
<b>Sexual practices, past year</b>					
<b>Sexual practices with men<sup>b</sup></b>					
Vaginal intercourse	98.3	96.2	NA	0.47 (0.13, 1.70)	NA
Oral intercourse	85.4	94.8	NA	2.89 (1.24, 6.71)	NA
Anal intercourse	12.1	26.9	NA	2.41 (1.52, 3.81)	NA
Other genital contact <sup>c</sup>	81.5	95.2	NA	3.80 (1.73, 8.31)	NA
<b>Sexual practices with women<sup>a,d</sup></b>					
Receptive oral intercourse	NA	48.3	71.7	1.00	0.70 (0.23, 2.07)
Active oral intercourse	NA	51.8	80.3	1.00	0.56 (0.16, 1.93)
Any oral intercourse <sup>e</sup>	NA	53.5	80.3	1.00	0.58 (0.17, 2.01)
Other genital contact <sup>c</sup>	NA	60.9	92.7	1.00	0.18 (0.04, 0.86)
Masturbation, past 4 weeks	36.6	68.9	59.7	3.91 (2.55, 6.00)	2.50 (1.12, 5.58)
<b>Sexual risk behaviors</b>					
Most recent sexual partner was a new partner <sup>f</sup>	7.2	11.8	8.6	1.35 (0.72, 2.54)	1.70 (0.36, 8.14)
Sexual intercourse with most recent partner occurred within 24 h of meeting for the first time <sup>f</sup>	4.8	12.0	11.2	2.44 (1.39, 4.28)	2.71 (0.78, 9.40)
Most recent sexual partner described as “not regular” <sup>f</sup>	8.9	17.9	10.3	1.76 (1.04, 2.97)	1.59 (0.51, 4.95)
“Unsafe sex” <sup>g,h</sup>	1.5	9.8	NA	7.17 (3.25, 15.8)	NA
Weighted denominator (unweighted) <sup>i</sup>	4819 (5594)	139 (178)	21 (31)	NA	NA

Notes. Natsal = National Survey of Sexual Attitudes and Lifestyles; OR = odds ratio; CI = confidence interval; NA = not applicable. WSEM are defined as women who reported exclusively male sexual partners in the 5 years prior to interview for Natsal 2000. WSWM are defined as women who reported female sexual partners and male sexual partners in the 5 years prior to interview for Natsal 2000. WSEW are defined as women who reported exclusively female sexual partners in the 5 years prior to interview for Natsal 2000.

<sup>a</sup>Age-adjusted OR of reporting outcome relative to WSEM, except for sexual practices with women where the reference category is WSWM.

<sup>b</sup>Among women reporting at least 1 male sexual partner in the past year.

<sup>c</sup>Defined as contact with the genital area not leading to intercourse but intending to achieve orgasm, for example, stimulation by hand.

<sup>d</sup>Among women reporting at least 1 female sexual partner in the past year.

<sup>e</sup>Refers to total number of women reporting active or receptive oral intercourse.

<sup>f</sup>The Natsal survey defined sexual partners as people who have had sex together, whether just once or a few times, or as regular or married partners.

<sup>g</sup>Among women reporting at least 1 male sexual partner in the past 4 weeks.

<sup>h</sup>“Unsafe sex” is proxied as reporting at least 2 male sexual partners in the past 4 weeks and as inconsistent condom use in the past 4 weeks.<sup>9</sup>

<sup>i</sup>The data were weighted to correct for unequal selection probabilities, including oversampling in greater London, and to match Britain’s age and gender population profile.



year, these ORs were no longer statistically significant (1.56 [95% CI=0.79, 3.08;  $P=.201$ ] and 0.86 [95% CI=0.45, 1.63;  $P=.637$ ], respectively). Among women reporting male partners in the past 4 weeks, women who reported sex with women and men were significantly more likely to have had unsafe heterosexual sex (defined as reporting 2 or more male partners and inconsistent condom use in this time frame)<sup>9</sup> than women who reported sex exclusively with men (age-adjusted OR=7.17). This association remained highly significant after additionally adjusting for numbers of male partners in the past 4 weeks (adjusted OR=6.97; 95% CI=3.12, 15.6;  $P<.001$ ).

### Sexual, Reproductive, and General Health Risks and Outcomes

Relative to women who reported sex exclusively with men, women who reported sex with women and men were significantly less likely to describe their health as “good” or “very good,” were more likely to report illnesses lasting at least 3 months in the past 5 years, and to have been to the hospital as an outpatient in the past year (excluding for ante- or postnatal reasons; Table 4). The women who reported sex with women and men were more likely to have ever smoked, to smoke heavily, to drink more than recommended alcohol limits per week,<sup>14</sup> and to have injected nonprescribed drugs than were women who reported sex exclusively with men. There were no statistically significant differences between women who reported sex exclusively with men and women who reported sex exclusively with women, but numbers of the latter were small.

The women who reported sex with women and men were significantly more likely to perceive themselves as “greatly” or “quite a lot” at risk of HIV relative to women who reported sex exclusively with men and women who reported sex exclusively with women (11.1%, 2.4%, and 0.0%, respectively;  $P<.001$ ). In contrast, women who reported sex with women and men were significantly less likely to perceive female homosexuals as “greatly” or “quite a lot” at risk of HIV than were women who reported sex exclusively with men (26.6% vs 50.9%, respectively;  $P<.001$ ). Table 4 may reflect the greater

self-perceived HIV risk reported by women who reported sex with women and men, because these women were significantly more likely than were women who reported sex exclusively with men to report visiting an STI clinic and testing for HIV in the past 5 years. The women who reported sex with women and men were also significantly more likely to report STI diagnoses, specifically diagnoses of chlamydia, pelvic inflammatory disease, or genital warts, as well as induced abortion, in this time frame. These associations remain after additionally adjusting for the reported number of male partners in the past 5 years. Although relatively small in number, none of the women who reported sex exclusively with women reported any STI diagnoses in the past 5 years.

## DISCUSSION

### Principal Findings

Data from this large national probability sample show that women who reported sex with women and men were significantly more likely to report adverse sexual, reproductive, and general health risk behaviors and outcomes than were women who reported sex exclusively with men. Among all WSW, few female partners were reported on average, but the majority reported male partners. The women who reported sex with women and men reported significantly larger average numbers of male partners than women who reported sex exclusively with men and were significantly more likely to report HIV risk behaviors including IDU, unsafe sex,<sup>9</sup> describing their most recent partner as “not regular,” and reporting first sexual intercourse with this partner within 24 hours of meeting. The women who reported sex with women and men reported poorer general health and significantly greater smoking and alcohol consumption, induced abortion, and STI diagnoses than women who reported sex exclusively with men.

Around 10% of women in Natsal 2000 reported sexual attraction to women, with a much smaller percentage reporting same-sex genital contact within the past 5 years (2.8%). However, first same-sex sexual experience tends to occur at older ages than first heterosexual experience, and these unadjusted

prevalences do not take into account the cumulative increase in same-sex sexual experience with age. Only 4 of the 178 WSW in Natsal 2000 reported no male sexual partners ever.

### Comparison With Other Studies

Studies of WSW have generally used convenience samples and study designs that differ in sampling strategies, inclusion criteria and place of recruitment, which makes comparison difficult. Sexual attraction, sexual behavior, and sexual identity are not equivalent;<sup>15</sup> convenience samples tend to capture those who identify as lesbian or bisexual.<sup>16</sup> Our results included a large proportion of women who reported sex with women and men who reported current heterosexual cohabitation or marriage and those who had felt sexually attracted only to males, never to females. Therefore, an important strength of our study is that it utilizes probability survey data that samples all WSW, not just visible communities.<sup>17</sup>

The majority of WSW in Natsal 2000 reported fewer than 5 female partners ever, similar to findings in an Australian probability sample.<sup>5</sup> The majority of WSW in Natsal 2000 also reported male partners within the past year. These findings are in marked contrast to the findings in some UK studies that used convenience sampling, in which most WSW reported sexual activity only with women in the past year,<sup>18</sup> and fewer lifetime male partners but more female partners ever<sup>18</sup> and in the past year,<sup>19</sup> than in this probability survey.

In comparisons with women who reported sex exclusively with men, others have also found that women who reported sex with women and men report greater numbers of male partners ever<sup>6</sup> and in the past year.<sup>20</sup> The women who reported sex with women and men also appear more likely to choose sexual partners who are at a higher risk of STI and blood-borne infection such as bisexual men or injection drug users.<sup>6,7,20–22</sup> Natsal 2000 did not include questions about the risk behaviors of respondents' partners because of the potential inaccuracy of responses. The women who reported sex with women and men in our data reported earlier onset of heterosexual activity, more unsafe

**TABLE 4—Prevalence of Health-Related Factors and Sexual and Reproductive Health Care Experiences of Women Who Reported Sex Exclusively With Men (WSEM), Women Who Reported Sex With Women and Men (WSWM), and Women Who Reported Sex Exclusively With Women (WSEW), in Natsal 2000: Great Britain**

	WSEM, %	WSWM, %	WSEW, %	WSWM, Age-Adjusted OR <sup>a</sup> (95% CI)	WSEW, Age-Adjusted OR <sup>a</sup> (95% CI)
<b>Health-related factors</b>					
Self-perceived health <sup>b</sup>				0.48 (0.32, 0.73)	0.96 (0.43, 2.11)
Very good	43.6	26.7	43.7		
Good	42.6	55.0	44.1		
Fair	11.9	14.9	12.2		
Bad	1.4	1.9	0.0		
Very bad	0.5	1.5	0.0		
Reported having an illness lasting ≥3 months in the past 5 years	14.9	24.2	31.0	2.01 (1.30, 3.09)	2.42 (1.0, 5.87)
Reported hospital outpatient visit in the past year <sup>c</sup>	26.5	35.0	40.8	1.53 (1.03, 2.27)	1.87 (0.83, 4.20)
Reported hospital inpatient visit in the past year <sup>d</sup>	8.2	13.0	4.0	1.69 (0.94, 3.01)	0.47 (0.10, 2.18)
Smoking status <sup>e</sup>				2.60 (1.73, 3.92)	1.23 (0.55, 2.77)
Never smoked	45.0	24.4	48.2		
Former smoker	17.1	11.8	11.0		
Light smoker <sup>f</sup>	21.4	40.2	24.7		
Heavy smoker <sup>g</sup>	16.6	23.7	16.1		
Alcohol consumption <sup>h</sup>				1.98 (1.21, 3.25)	1.61 (0.51, 5.13)
None	18.2	8.8	25.2		
Not more than recommended limit	72.0	71.9	61.1		
More than recommended limit	9.9	19.3	13.4		
Has injected nonprescribed drugs or other substances					
Ever	0.5	4.4	0.0	9.97 (4.13, 24.0)	NA
Past 5 years	0.3	3.6	0.0	11.3 (4.05, 31.5)	NA
Past year	0.01	2.0	0.0	24.6 (6.79, 88.9)	NA
<b>Sexual and reproductive health care experiences</b>					
Reported STI clinic attendance in the past 5 years	6.2	29.3	8.1	6.31 (4.21, 9.47)	1.35 (0.29, 6.33)
Has been tested for HIV in the past 5 years	8.3	23.1	14.2	3.09 (1.96, 4.89)	1.84 (0.58, 5.81)
Has had any STI diagnosis in the past 5 years <sup>i</sup>	3.8	17.8	0.0	4.41 (2.63, 7.40)	NA
Has had any bacterial STI <sup>j</sup>	2.3	11.7	0.0	4.52 (2.51, 8.14)	NA
Chlamydia	1.3	10.3	0.0	6.17 (3.13, 12.2)	NA
Gonorrhea	0.01	0.4	0.0	5.33 (0.64, 44.1)	NA
Trichomonas	0.1	0.0	0.0	NA	NA
Syphilis	0.0	0.0	0.0	NA	NA
Pelvic inflammatory disease	0.8	2.9	0.0	3.36 (1.10, 10.2)	NA
Has had any viral STI <sup>k</sup>	1.7	6.4	0.0	3.14 (1.42, 6.95)	NA
Genital warts	1.3	4.9	0.0	3.05 (1.17, 7.98)	NA
Genital herpes	0.5	1.6	0.0	2.82 (0.88, 9.02)	NA
Had an induced abortion in the past 5 years	6.0	18.8	NA	3.07 (1.88, 5.00)	NA
Weighted denominator (unweighted) <sup>l</sup>	4819 (5594)	139 (178)	21 (31)	NA	NA

Notes. Natsal = National Survey of Sexual Attitudes and Lifestyles; OR = odds ratio; STI = sexually transmitted infection; NA = not applicable. WSEM are defined as women who reported exclusively male sexual partners in the 5 years prior to interview for Natsal 2000. WSWM are defined as women who reported female sexual partners and male sexual partners in the 5 years prior to interview for Natsal 2000. WSEW are defined as women who reported exclusively female sexual partners in the 5 years prior to interview for Natsal 2000.

<sup>a</sup>Age-adjusted OR of reporting outcome relative to WSEM.

<sup>b</sup>Age-adjusted OR of reporting health as “fair,” “bad,” or “very bad,” rather than “very good” or “good.”

<sup>c</sup>Excluding for ante- or postnatal care.

<sup>d</sup>Excluding for pregnancy visit.

<sup>e</sup>Age-adjusted OR of being a light or heavy smoker, rather than a non- or former smoker.

<sup>f</sup>Defined as reporting smoking less than 15 cigarettes a day.

<sup>g</sup>Defined as reporting smoking at least 15 cigarettes a day.

<sup>h</sup>Age-adjusted OR of reporting consumption of more than the recommended limit (15 or more units of alcohol per week).<sup>14</sup>

<sup>i</sup>STIs included chlamydia, gonorrhea, trichomonas, syphilis, pelvic inflammatory disease, genital warts, and genital herpes.

<sup>j</sup>Bacterial STIs included chlamydia, gonorrhea, trichomonas, syphilis, and pelvic inflammatory disease.

<sup>k</sup>Viral STIs included genital warts and genital herpes.

<sup>l</sup>The data were weighted to correct for unequal selection probabilities, including oversampling in greater London, and to match Britain's age and gender population profile.

sex, sex with a partner described as not regular, and greater sexual repertoire (i.e. a larger range of sexual practices experienced) compared with women who reported sex exclusively with men. Consistent with these sexual health risks, 19% of women who reported sex with women and men in Natsal 2000 reported termination of pregnancy, and 18% reported a history of STI, predominantly chlamydia. These findings highlight the need for access to contraceptive advice and STI screening and treatment among women who reported sex with women and men. In contrast, there were no STIs reported by the small number of women who reported sex exclusively with women in the study.

Population-based studies from the United States concur with our findings that women who reported sex with women and men smoke more frequently,<sup>23,24</sup> drink more alcohol,<sup>24,25</sup> and report IDU<sup>21</sup> and dependency upon illicit drugs<sup>26</sup> more frequently compared with women who reported sex exclusively with men. Other studies describe high proportions of women who reported sex with women and men engaged in sex work,<sup>6,7,21</sup> associations between IDU and sex work in women who reported sex with women and men,<sup>27</sup> and greater prevalence of hepatitis B and C (but not HIV) in women who reported sex with women and men.<sup>21</sup> Natsal 2000 did not include questions about sex work.

Half of women who reported sex with women and men in Natsal 2000 reported current heterosexual cohabitation or marriage. More than two thirds of women who reported sex with women and men reported only 1 female partner in the past 5 years, in contrast to a median of 5 male sexual partners in the same time frame. A third of women who reported sex with women and men who reported only 1 female partner said that they had felt sexually attracted only to males, never to females. These proportions were surprising; Natsal 2000 used random sampling techniques and behavioral inclusion criteria and therefore included WSW who did not identify as lesbians or bisexual women. Qualitative investigation would help to explore the relationships among sexual attraction, sexual behavior, and sexual identity<sup>16</sup> and help in understanding the sexual networks of WSW.

### Limitations

Sensitive sexual behavior such as homosexuality may be underreported in sexual health surveys.<sup>28</sup> However, the CASI that was developed for Natsal 2000 was more reliable than face-to-face data collection techniques or pen-and-paper methods.<sup>29–31</sup>

Although Natsal 2000 was a large national survey, the sample included relatively few WSW (178 women) because of the low reported prevalence of same-sex sexual behavior. Although convenience samples may include larger numbers of WSW, this national probability sample allowed for the estimation of the size of the population of WSW. Census data estimated the number of women aged 16 to 44 years resident in Great Britain in mid-1999 as 11.5 million,<sup>11</sup> so using our prevalence estimate, that suggests that approximately 322 000 of these women are WSW. Our data also allowed for the quantification of risks and outcomes that are generalizable to the British population. Inclusion of data about sexual behavior and partnerships in national statistics such as STI diagnoses and cancer incidence data would help to address gaps in knowledge about health outcomes in WSW.<sup>32,33</sup>

Natsal 2000 surveyed those aged 16 to 44 years, so findings are not generalizable to other age groups, although other studies indicate that health risks may also be prevalent in WSW (specifically women who reported sex with women and men) at older and younger ages.<sup>4,34,35</sup> As a general survey of sexual behavior, Natsal 2000 did not have the scope to ask women detailed questions about specific sexual practices with women.<sup>18</sup> However this study and others show that the greatest sexual and reproductive health risks for WSW (again, specifically women who reported sex with women and men) seem to be from heterosexual sexual activity<sup>6,7,21</sup> and behaviors such as smoking,<sup>23,24</sup> alcohol use,<sup>24,25</sup> and IDU.<sup>21</sup>

### Possible Explanations and Implications for Clinicians and Policymakers

In these data, a history of sex with a woman is, for a woman, a marker for increased risk of adverse sexual, reproductive, and general health outcomes, in particular more risky heterosexual practice and greater

substance misuse than women who reported sex exclusively with men. Many WSW fear disclosing sexual identity to health professionals<sup>36,37</sup> and may avoid seeking medical care.<sup>19,38</sup> Nearly one third of women who reported sex with women and men in this survey had utilized sexual health services in the past 5 years, but only 11.1% perceived their own HIV risk as “great” or “quite a lot” despite reporting a range of risk behaviors. In addition to health promotion among WSW, there is a need for practitioners to develop skills and attitudes that allow nonjudgmental sexual history-taking from female patients, without making assumptions about sexuality or sexual behavior, to facilitate discussion of risks that WSW may face.<sup>36,39–41</sup> ■

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### Contributors

C.H. Mercer and A.M. Johnson originated the study. C.H. Mercer led the writing of the article and carried out all analyses with assistance from A.J. Copas. J.V. Bailey led the literature review and contributed extensively to the interpretation of the data and the article's writing. A.M. Johnson, B. Erens, K. Wellings, and K.A. Fenton were co-investigators and participated in the design and management of the main study. All authors contributed to the preparation of the article.

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The study was approved by the University College Hospital and North Thames Multi-Centre Research Ethics Committee and all the Local Research Ethics Committees in Britain.

### References

- Petersen LR, Doll L, White C, Chu S. No evidence for female-to-female HIV transmission among 960,000 female blood donors. The HIV Blood Donor Study Group. *J Acquir Immune Defic Syndr*. 1992;5:853–855.
- Bailey JV, Farquhar C, Owen C, Mangtani P. Sexually transmitted infections in women who have sex with women. *Sex Transm Infect*. 2004;80:244–246.
- Skinner CJ, Stokes J, Kirlew Y, Kavanagh J, Forster GE. A case-controlled study of the sexual health needs of lesbians. *Genitourin Med*. 1996;72:277–280.
- van Griensven F, Kilmarx PH, Jeeypant S, et al. The prevalence of bisexual and homosexual orientation and related health risks among adolescents in northern Thailand. *Arch Sex Behav*. 2004;33:137–147.
- Grulich AE, de Visser RO, Smith AM, Rissel CE, Richters J. Sex in Australia: homosexual experience and recent homosexual encounters. *Aust N Z J Public Health*. 2003;27:155–163.
- Fethers K, Marks C, Mindel A, Estcourt CS. Sexually transmitted infections and risk behaviours in women who have sex with women. *Sex Transm Infect*. 2000;76:345–349.
- Marrazzo JM, Koutsky LA, Handsfield HH. Characteristics of female sexually transmitted disease clinic clients who report same-sex behaviour. *Int J STD AIDS*. 2001;12:41–46.
- Aaron DJ, Chang YF, Markovic N, LaPorte RE. Estimating the lesbian population: a capture-recapture approach. *J Epidemiol Community Health*. 2003;57:207–209.
- Johnson AM, Mercer CH, Erens B, et al. Sexual behaviour in Britain: partnerships, practices, and HIV risk behaviours. *Lancet*. 2001;358:1835–1842.
- Erens B, McManus S, Field J, et al. *National Survey of Sexual Attitudes and Lifestyles II: Technical Report*. London, England: National Centre for Social Research; 2001.
- Walker A, O'Brien M, Traynor J, Fox K, Goddard E, Foster K. National Statistics. Living in Britain. Results From the 2001 General Household Survey. London, England: Her Majesty's Stationery Office; 2002. Available at: <http://www.statistics.gov.uk/lib2001/resources/fileAttachments/GHS2001.pdf>. Accessed February 7, 2007.
- Wellings K, Nanchahal K, Macdowall W, et al. Sexual behaviour in Britain: early heterosexual experience. *Lancet*. 2001;358:1843–1850.
- Fenton KA, Mercer CH, McManus S, et al. Ethnic variations in sexual behaviour in Great Britain and risk of sexually transmitted infections: a probability survey. *Lancet*. 2005;365:1246–1255.
- Alcohol and the Heart in Perspective: Sensible Limits Reaffirmed*. London, England: Royal College of Physicians, Psychiatrists and General Practitioners; 1995.
- Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: sexual identity, sexual attraction and sexual experience among a representative sample of adults. *Aust N Z J Public Health*. 2003;27:138–145.
- Brogan D, Frank E, Elon L, O'Hanlan KA. Methodologic concerns in defining lesbian for health research. *Epidemiology*. 2001;12:109–113.
- Malterud K. Health needs of women who have sex with women: methodological assumptions underlying conclusions should have been questioned. *BMJ*. 2004;328:463–464.
- Bailey JV, Farquhar C, Owen C, Whittaker D. Sexual behaviour of lesbians and bisexual women. *Sex Transm Infect*. 2003;79:147–150.
- Henderson L, Reid D, Hickson F, McLean S, Cross J, Weatherburn P. *First, Service. Relationships, Sex and Health Among Lesbian and Bisexual Women*. London, England: Sigma Research; 2002.
- Koh AS, Gomez CA, Shade S, Rowley E. Sexual risk factors among self-identified lesbians, bisexual women, and heterosexual women accessing primary care settings. *Sex Transm Dis*. 2005;32:563–569.
- Scheer S, Peterson I, Page-Shafer K, et al. Sexual and drug use behavior among women who have sex with both women and men: results of a population-based survey. *Am J Public Health*. 2002;92:1110–1112.
- Lemp GF, Jones M, Kellogg TA, et al. HIV seroprevalence and risk behaviors among lesbians and bisexual women in San Francisco and Berkeley, California. *Am J Public Health*. 1995;85:1549–1552.
- Tang H, Greenwood GL, Cowling DW, Lloyd JC, Roeseler AG, Bal DG. Cigarette smoking among lesbians, gays, and bisexuals: how serious a problem? (United States). *Cancer Causes Control*. 2004;15:797–803.
- Case P, Austin SB, Hunter DJ, et al. Sexual orientation, health risk factors, and physical functioning in the Nurses' Health Study II. *J Womens Health (Larchmt)*. 2004;13:1033–1047.
- Cochran SD, Keenan C, Schober C, Mays VM. Estimates of alcohol use and clinical treatment needs among homosexually active men and women in the US population. *J Consult Clin Psychol*. 2000;68:1062–1071.
- Cochran SD, Mays VM. Relation between psychiatric syndromes and behaviorally defined sexual orientation in a sample of the US population. *Am J Epidemiology*. 2000;151:516–523.
- Richters J, Bergin S, Lubowitz S, Prestage G. Women in contact with Sydney's gay and lesbian community: sexual identity, practice and HIV risks. *AIDS Care*. 2002;14:193–202.
- Copas AJ, Wellings K, Erens B, et al. The accuracy of reported sensitive sexual behaviour in Britain: exploring the extent of change 1990–2000. *Sex Transm Infect*. 2002;78:26–30.
- Johnson AM, Wadsworth J, Wellings K, Bradshaw S, Field J. Sexual lifestyles and HIV risk. *Nature*. 1992;360:410–412.
- Johnson AM, Wadsworth J, Wellings K, Field J. *Sexual Attitudes and Lifestyles*. Oxford, England: Blackwell Scientific Press; 1994.
- Johnson AM, Copas AJ, Erens B, et al. Effect of computer-assisted self-interviews on reporting of sexual HIV risk behaviours in a general population sample: a methodological experiment. *AIDS*. 2001;15:111–115.
- Ford C, Clarke K. Sexually transmitted infections in women who have sex with women. Surveillance data should include this category of women. *BMJ*. 1998;316:556–557.
- Frisch M, Smith E, Grulich A, Johansen C. Cancer in a population-based cohort of men and women in registered homosexual partnerships. *Am J Epidemiol*. 2003;157:966–972.
- Valanis BG, Bowen DJ, Bassford T, Whitlock E, Charney P, Carter RA. Sexual orientation and health: comparisons in the women's health initiative sample. *Arch Fam Med*. 2000;9:843–853.
- Smith AM, Lindsay J, Rosenthal DA. Same-sex attraction, drug injection and binge drinking among Australian adolescents. *Aust N Z J Public Health*. 1999;23:643–646.
- Mathieson CM. Lesbian and bisexual health care. Straight talk about experiences with physicians. *Can Fam Physician*. 1998;44:1634–1640.
- Wilton T, Kaufmann T. Lesbian mothers' experiences of maternity care in the UK. *Midwifery*. 2001;17:203–211.
- Marrazzo JM, Stine K, Koutsky LA. Genital human papillomavirus infection in women who have sex with women: a review. *Am J Obstet Gynecol*. 2000;183:770–774.
- McNair R. Lesbian sexuality. Do GPs contribute to lesbian invisibility and ill health? *Aust Fam Physician*. 2000;29:514–516.
- O'Hanlan KA, Crum C. Lesbian health and homophobia: perspectives for the treating obstetrician/gynecologist. *Curr Probl Obstet Gynecol Fertil*. 1995;18:94–133.
- Diamant AL, Schuster MA, McGuigan K, Lever J. Lesbians' sexual history with men: implications for taking a sexual history. *Arch Intern Med*. 1999;159:2730–2736.
- The National Statistics Socio-economic Classification. Available at: [http://www.statistics.gov.uk/methods\\_quality/ns\\_sec/continuity.asp](http://www.statistics.gov.uk/methods_quality/ns_sec/continuity.asp). Accessed February 7, 2007.