Sexually Transmitted Infections Among Women Who Have Sex With Women

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Women who have sex with women (WSW) are a diverse group with variations in sexual identity, sexual behaviors, sexual practices, and risk behaviors. WSW are at risk of acquiring bacterial, viral, and protozoal sexually transmitted infections (STIs) from current and prior partners, both male and female. Bacterial vaginosis is common among women in general and even more so among women with female partners. WSW should not be presumed to be at low or no risk for STIs based on sexual orientation, and reporting of same-sex behavior by women should not deter providers from considering and performing screening for STIs, including chlamydia, in their clients according to current guidelines. Effective delivery of sexual health services to WSW requires a comprehensive and open discussion of sexual and behavioral risks, beyond sexual identity, between care providers and their female clients.

Based on the 2002 National Survey of Family Growth (NSFG), a nationally representative sample of households in the United States, 4.4% of women aged 15–44 years reported having a female sex partner in the past 12 months and 1.3% reported having exclusively female sex partners in the past 12 months. Using measures of both self-reported sexual identity and sexual behavior, it was estimated that 1.3%–1.9% of US women are lesbians and that 3.1%–4.8% are bisexual [1]. Lifetime same-sex behavior is commonly reported by women in large population-based surveys, ranging from 11.2% of women in the 2002 NSFG to 7.1% of women in National Health and Nutrition Examination Survey (NHANES), 2001–2006 [1, 2]. Although extensive data are available regarding sexually transmitted infections (STIs) among men who have sex with men, relatively little has been published about STI prevalence and risks among other sexual and gender minorities, including women who have sex with women (WSW). Health care providers and their female clients would benefit from increased knowledge of STI risks and testing guidance for women who have same-sex partners.

METHODS

In preparation for the 2010 update to the Centers for Disease Control and Prevention’s Sexually Transmitted Diseases (STD) Treatment Guidelines, a systematic search of the literature on sexually transmitted infections in WSW was conducted using PubMed (National Library of Medicine) in October 2008 with subsequent updates through December 2010. MeSH (Medical Subject Heading) terms and key words used included “lesbian,” “women who have sex with women,” “homosexuality, female,” “sexually transmitted disease,” “gonorrhea,” “chlamydia,” “syphilis,” “herpes simplex virus,” “human papillomavirus,” and “human immunodeficiency virus.” Abstracts from major STD–related meetings during the time period 2005–2009 were also searched using the same search terms and were considered for inclusion. Authors of abstracts were contacted for more information if
necessary. Key questions were developed based on review of these sources and in consultation with experts in the fields of infectious disease and gender minority health.

RESULTS

What Is Known About the Current Epidemiology of STIs Among WSW?

*Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections among WSW have been considered uncommon. Earlier studies that included women from STD clinics and sexual health centers reported a prevalence of chlamydial infection among WSW ranging from 0.6% to 3.0% and of gonorrhea from 0.3% to 2.8% [3–6]. However, no data on *C. trachomatis* or *N. gonorrhoeae* infections in WSW from community-based or population-based venues were available. In 2008, Singh et al [7] examined chlamydia positivity among WSW aged 15–24 years tested at family planning clinics participating in the Infertility Prevention Project in the northwestern United States from 1997 to 2005. WSW and women who have sex with both men and women (WSMW) in the 12 months prior to testing were included. Chlamydia positivity was 7.1% among both WSW and WSMW and remained stable over the period of observation in the study. Chlamydia positivity during the same time period for women and remained stable over the period of observation in the study. Chlamydia positivity during the same time period for women reporting only male partners in the 12 months prior to testing was 5.3%. Risks for chlamydial infection among WSW and WSMW were age < 20 years, nonwhite race/ethnicity, new sex partner, symptomatic sex partner, symptoms, exposure to *C. trachomatis* and cervicitis, and did not differ from those traditionally identified among women who report sex only with men.

Other STIs can be passed between female partners, including trichomoniasis [8], syphilis [9], and hepatitis A [10]. Although it is presumably rare, sexual transmission of human immunodeficiency virus (HIV) may also occur in this manner [11]. Prior data suggesting potential HIV transmission between female partners is based on case reports where presumed female-to-female transmission was based on a lack of other identified risk factors [12–14]. A survey of 960,000 female blood donors failed to identify any HIV-infected women who identified same-sex contact as their sole risk factor [15]. Similar results were seen in a much smaller survey of lesbian and bisexual women [16]. A 2003 case report is unique in identifying a woman with no other reported behavioral risk for HIV acquisition other than sexual contact with her sole female partner; she was found to be recently infected with a similar HIV genotype to her known HIV-infected female partner [11]. More common is the potential for WSW to acquire HIV through other modes, including injection drug use and sexual contact with high-risk male partners [17–19].

Viral STIs including herpes simplex virus type 1 and 2 (HSV-1 and HSV-2) and human papillomavirus (HPV) occur in WSW. Data from the 2002 NSFG were used to examine self-reported viral STIs among women aged 15–44 years. A history of genital herpes or genital warts was reported more frequently by bisexual women (15.0%–17.2%) than by lesbians (2.3%–6.7%) and their heterosexual counterparts (8.7%–10.0%) [20].

A seroprevalence study of HSV in 392 WSW found that 46% had antibodies to HSV-1 and 8% had antibodies to HSV-2. Increasing age was predictive of higher seroprevalence of both HSV-1 and 2, and HSV-2 seropositivity was associated with having a male partner with genital herpes. Of the 78 women in the study reporting never having had a male partner, 3% were HSV-2 seropositive. HSV-1 seroprevalence increased with higher numbers of female partners [21]. In a separate study of HSV-1 prevalence and acquisition among young women, receptive oral sex was associated with HSV-1 acquisition [22]. More recent data from NHANES conducted in 2001–2006 among women aged 18–59 years demonstrated an HSV-2 seroprevalence of 30.3% among women reporting same-sex partners in the past year, 36.2% among women reporting same-sex partners in their lifetime, and 23.8% among women reporting no lifetime same-sex behavior [2]. HSV-2 seroprevalence among women self-identifying as homosexual or lesbian was 8.2%, similar to a previous clinic-based study of WSW [2, 21]. In addition, in a longitudinal study of HSV-2 acquisition among women, the presence of bacterial vaginosis (BV) was associated with an increased risk of acquiring HSV-2 [24]. There are no published studies to date to show if the treatment of BV could reduce acquisition of HSV-2 in women.

Genital HPV infection is common, with certain HPV types associated with cervical cancer. WSW were once presumed to be at low risk for HPV acquisition and cervical cancer. Data now strongly support that HPV infections are common among WSW and that sexual transmission of HPV likely occurs between women [25–27]. Prior case reports highlighted the presence of cervical neoplasia and HPV among women who had no history of sex with men [28, 29]. HPV in WSW has been studied using both HPV serology and DNA detection methods. In a 1995 study, among WSW who reported never having had a male sexual partner, 26% had antibodies to HPV-16 and 42% had antibodies to HPV-6. No difference in the prevalence of HPV-16 and HPV-6 antibodies was found between women with and women without a history of male partners (P = .16). HPV DNA was detected in genital tract specimens in 30% of the women enrolled. The presence of HPV DNA was associated with current
smoking (odds ratio [OR], 3.4 [95% CI, 1.2–9.6]) and a shorter time since last sex with a male partner (\( P = .002 \)). The prevalence of squamous intraepithelial lesions on Pap smear was 4%, similar to that found in heterosexual women [25]. A subsequent larger study again showed the high prevalence of HPV in WSW, with 13% having HPV DNA in genital tract specimens (74% of which were oncogenic types) and 4.4% having either low-grade or high-grade squamous intraepithelial lesions [26].

Despite these findings, WSW, particularly those with a history of having only female partners, are less likely to report having had Pap smear screening and frequently believe they have less need for cervical cancer screening [25–27, 30]. WSW are at risk from acquiring HPV both from their female partners and from current or prior male partners, and thus are at risk for cervical cancer. Studies examining STIs among WSW frequently use differing methods to reflect female-to-female sexual contact. Some identify women based on self-identified sexual orientation (homosexual, lesbian, bisexual, heterosexual) whereas others utilize reported sexual behaviors and partner choices over time (female partner ever in a lifetime, female partner in the past year, history of male partners), alone or in combination with measures of sexual identity, sexual orientation, partner choices, and sexual behaviors are needed to better understand the epidemiology and risks for STIs among WSW and to allow comparability across studies over time.

**What Are the Special Issues of BV as It Relates to WSW?**

BV is a common cause of vaginal symptoms and is associated with an increased risk of acquisition of STIs and HIV [23, 31–34]. Prior studies have suggested a higher prevalence of BV among WSW, although these studies had previously been limited to specific populations such as STD clinics or sexual health centers [3–6, 35–37]. Prevalence of BV among WSW in these studies ranged from 8% to 52%. A cross-sectional survey of female community volunteers aged 16–50 years in the United Kingdom conducted from 2001 to 2004 demonstrated a BV prevalence of 25.7% among self-identified lesbians versus 14.4% among heterosexual women (OR, 2.45 [95% CI, 1.25–4.82]; \( P = .009 \)) [38].

In the largest sample to date, the NHANES 2001–2004, a nationally representative sample of the US civilian population, women who reported a history of a female sex partner had a prevalence of BV of 45.2% (95% CI, 35.5%–57.5%) versus 28.8% (95% CI, 26.8–31.0%; \( P = .003 \)) in those not reporting a female sex partner [39].

Many studies have also shown a high level of concordance of BV between a woman and her female sex partner (both partners with BV and without BV) [35, 38, 40]. A systematic review and meta-analysis examining the association between BV and female sexual partners found that having a history of female sex partner(s) conferred a 2-fold increased risk of BV (relative risk [RR], 2.0 [95% CI, 1.7–2.3]) [41]. Exchange of vaginal fluid or other shared behaviors among female partners may contribute to the initiation of BV. Among WSW, prior studies have found an association of BV with a higher lifetime number of female sexual partners, a history of receptive oral-anal sex, not always cleaning an insertive sex toy between uses, and smoking [38, 40]. A recent observational study of community-based WSW aged 16–35 years found that those with BV were more likely to report a partner with BV (RR, 2.55 [95% CI, 1.85–3.49]), sharing vaginal insertive sex toys (RR, 1.53 [95% CI, 1.10–2.12]), and vaginal lubricant use (RR, 1.51 [95% CI, 0.95–2.40]). No association was seen with age, race, smoking, hormone use, douching, vaginal intercourse, receptive oral or anal sex, or number of partners [42]. In a recent study that measured BV acquisition in a prospective cohort study of 199 WSW over 1 year, risks for incident BV included presentation ≤14 days since onset of menses (hazard ratio [HR], 2.3 [95% CI, 1.2–4.7]), report of new sex partner with BV history (HR, 3.63 [95% CI, 1.1–11.9]), change in vaginal discharge (HR, 2.6 [95% CI, 1.3–5.2]), and detection of any of several BV-associated bacteria (BVAB) in vaginal fluid at enrollment, including BVAB1 (HR, 6.3 [95% CI, 1.4–28.1]), BVAB2 (HR, 18.2 [95% CI, 6.4–51.8]), BVAB3 (HR, 12.6 [95% CI, 2.7–58.4]), Gardnerella vaginalis (HR, 3.9 [95% CI, 1.5–10.4]), Atopobium vaginae (HR, 4.2 [95% CI, 1.9–9.3]), Leptotrichia species (HR, 9.3 [95% CI, 3.0–24.4]), and Megasphaera-1 (HR, 11.5 [95% CI, 5.0–26.6]) [43]. Detection of Lactobacillus crispatus at enrollment conferred reduced risk for subsequent BV (HR, 0.18 [95% CI, .08–.4]). Detailed analysis of behavioral data suggested a direct dose-response relationship with increasing number of episodes of receptive oral-vulvovaginal sex (HR, 1.02 [95% CI, 1.00–1.04]) [43]. These studies have thus continued to support, though have not proven, the hypothesis that sexual behaviors that facilitate the transfer of vaginal fluid and possibly exchange of extravaginal microbiota (eg, oral bacterial communities) between partners may be involved in the pathogenesis of BV.

With the advent of new molecular-based methods, there has been a greater appreciation of the microbial diversity and complex nature of BV [44–46]. Molecular methods also allow more detailed analysis of specific vaginal flora shared between partners. Using both culture methods and strain typing with repetitive element sequence-based polymerase chain reaction (rep-PCR) fingerprinting, Marrazzo et al [47] examined Lactobacillus colonization at vaginal and rectal sites and whether unique Lactobacillus strains are shared by female sex partners. Among 392 women, 25.3% had BV and most (58%) reported only 1 female partner during the prior 6 months. L. crispatus was the most commonly isolated lactobacilli, followed by Lactobacillus gasseri and Lactobacillus jensenii. Relative to L. crispatus,
the rectum was more commonly the sole site of *L. gasseri* colonization (*P < .001*). Detection of *L. gasseri* was associated with recent receptive digital-vaginal sex (*P = .03*) and increased BV risk (OR, 4.3 [95% CI, 1.4–13.4]). Within this study, both members of monogamous partnerships were enrolled. Of 31 couples monogamous for ≥3 months, strains of genital lactobacilli by rep-PCR fingerprinting were identical in both members in 23 couples (74%). No similarities in lactobacilli strains were seen between control partners matched for age and date of enrollment to the study. Couples with identical *Lactobacillus* strains reported fewer female partners in the prior year (*P = .03*). There was a trend toward an association of reported use of shared vaginal sex toys and shared identical lactobacillus strains (OR, 1.6 [95% CI, 0.94–2.7]; *P = .20*). The likelihood of sharing identical lactobacilli was not related to mean age of the couple; number of lifetime male sex partners; or to practice, frequency, or timing of other types of sexual behaviors, including oral or anal sexual practices.

Despite an initial treatment response, BV commonly recurs or persists in both the short term [48–50] and long term [51, 52]. One study found that a past history of BV, a regular sex partner throughout the study, and female sex partners were significantly associated with recurrence of BV and abnormal vaginal flora [51]. A recent study of young WSW with BV treated with vaginal metronidazole gel examined behavioral and microbiologic correlates of persistent BV and abnormal vaginal flora at 1 month after therapy. Vaginal fluid samples at baseline and 1 month after therapy were studied using species-specific 16S recombinant DNA PCR assays targeting 17 bacterial species. Persistent BV was associated with the presence of specific bacteria in vaginal fluid at baseline including BVAB types 1, 2, and 3; *Peptoniphilus lacrimalis*; and *Megasphaera* phylotype 2. After adjustment for treatment adherence, detection of either BVAB3 (RR, 2.6 [95% CI, 1.4–5.45]) or *P. lacrimalis* (risk ratio, 2.8 [95% CI, 1.2–13.3]) at baseline remained associated with the likelihood of BV persistence. Persistence was not related to any specific sexual activity, including male or female partners, use of sex toys, condom use, receptive oral or anal sex, or a sex partner with BV [53].

Several prior clinic-based studies have examined the role of treatment of partners of females with BV in reducing persistent or recurrent BV. These trials enrolled women with male sex partners and involved treating women and their male partners with clindamycin [54], metronidazole [55, 56], or tinidazole [57] with follow-up ranging from 3 to 12 weeks. None of these trials have shown any benefit in reducing persistent or recurrent BV by treating male sex partners. The only proven interventions that have demonstrated an effect in preventing the development or recurrence of BV are chronic suppressive metronidazole therapy [52] and circumcision of male partners [58]. To date there have been no reported trials examining the potential benefits of treating female partners of women with BV, and thus no data on which to base a recommendation for partner therapy in WSW.

Results of a randomized trial utilizing a behavioral intervention to reduce persistent BV among WSW were recently published. Enrolled women were randomized to an intervention designed to reduce sharing of vaginal fluid on hands or sex toys following treatment for BV. Shared vaginal use of sex toys was infrequent among both groups. Despite the fact that women randomized to the intervention were 50% less likely to report receptive digital-vaginal contact without gloves than controls, there was no reduction in persistent BV at 1 month after treatment or incident episodes of recurrent BV among women randomized to the intervention arm versus controls [59].

In summary, BV is common among women in general and even more so among women with female partners. Current data show that women can share strain-specific genital bacteria with their female partners and that specific bacterial species are associated with treatment failure in BV. Sexual behaviors that facilitate the transfer of vaginal fluid and/or bacteria between partners may be involved in the pathogenesis of BV, but more research needs to be done to understand the relationships between the transmission of BV-associated bacteria, BV pathogenesis, outcomes, and potential behavioral and medical interventions to reduce the occurrence, persistence, and recurrence of BV among WSW. In the interim, encouraging awareness of signs and symptoms of BV in women and encouraging healthy sexual practices such as cleaning shared sex toys between uses may be helpful to women and their partners.

**What Are the Risk and Protective Factors Related to STIs Among WSW?**

WSW are a diverse group with variations in sexual identity, sexual behaviors, sexual practices, and risk behaviors. Sexual identity is not necessarily in concordance with sexual behaviors and gender of sexual partners. Past and current studies affirm that the majority of women (up to 87%) who report same-sex behavior have had male partners in the past and may continue to do so in the present (6%–23%) [20, 60–62]. It cannot be presumed that women who self-identify as lesbian do not or have not had male partners.

Some women who have both female and male partners may also evidence increased risk-taking behaviors compared with their heterosexual or exclusively same-sex-partner peers. Surveys in an STD clinic in 1988–1992 found that women who reported same-sex contact (93% of whom also had male partners) were more likely to report high-risk behaviors, including exchanging sex for money or drugs and having partners who were injection drug users (IDUs), bisexual men, or HIV positive [19]. A population-based survey conducted in northern California reported on the prevalence of sexual and drug use behaviors...
among WSMW ages 18–29. Compared with women who reported exclusively male partners, WSMW were more likely to report having ever had prior sex with MSM (30% vs 3%; $P < .001$), sex with an IDU (38% vs 8%; $P < .001$), and both past and current injection drug use [63].

More recently, surveys of risk behavior among WSW have been extended to community settings, including a survey among self-identified lesbian, bisexual, and heterosexual women attending primary care clinics across 33 sites in the United States. Lesbians and bisexual women were more likely to report sex with MSM in the past year (36% and 22%, respectively) than heterosexual women (3%; $P < .001$) and to report sex with a male IDU (6% and 4% vs 2%, respectively; $P < .02$). Of interest, lesbians were more likely to use condoms with male partners in the past year (94%) than both their bisexual (74%) and heterosexual (46%) peers ($P < .001$). The bisexual women were more likely to perceive themselves as at risk for HIV, to have ever had an HIV test (77%), and to have had STD testing in the past 2 years (66%). While reporting having “riskier” male partners, the lesbian and bisexual women were more likely to engage in protective behaviors such as condom use and to recognize their risk of STDs and HIV with subsequent care seeking for testing [61].

A stratified probability sample of the British general population in 2000 examined behavioral and health-related factors among WSW. Nearly 10% of women reported any sexual experience(s) with women and 2.8% reported ≥1 female sexual partners in the past 5 years (median, 1 partner). WSW (including those with exclusively female and both male and female partners) were more likely than other women to report STD clinic attendance (23.5% vs 6.2%), HIV testing (21.6% vs 8.2%), and STI diagnosis (14.7% vs 3.7%) in the past 5 years. These associations remained significant even after adjusting for numbers of sexual partners. WSW in this population also reported a higher prevalence of smoking, high alcohol intake, and injecting nonprescribed drugs [64, 65].

Issues of sexual identity and behavioral risks also extend to adolescents and young adults. The inconsistency between sexual identity and choice of sexual behaviors and sexual partners was demonstrated in adolescent women in grades 9 through 12 who were surveyed as part of the Massachusetts Youth Risk Behavior Survey from 1995 to 2001. Among women who reported having only female sexual partners, 82% identified as heterosexual, 14% as lesbian or bisexual, and 4% as “not sure.” Young women in this study who identified as other than heterosexual (lesbian, bisexual, or unsure of their sexual identity) and those who reported same-sex partners (either exclusively or in addition to male partners) were more likely than heterosexual participants to report multiple lifetime and recent sexual partners, illegal drug use, having been pregnant, having had any STD, and having been coerced into sexual contact [62].

Among the 14 000 US college students enrolled in the 1997 College Alcohol Study, women who had sex with both men and women reported ≥2 sexual partners (11.1%) more frequently than their peers with opposite-sex (4.9%) or same-sex-only partners (5.4%; $P < .01$) [66]. Among the nearly 30 000 female students surveyed in the Spring 2006 National College Health Assessment, female students who reported having both male and female sex partners during the past year were 3.64 (95% CI, 2.28–5.83) times more likely to report being diagnosed with an STD during the past school year than students who had only male partners and 4.04 (95% CI, 2.57–6.35) times more likely than students who had only female partners [67]. An urban household–based survey of women ages 18–24 years found that women describing themselves as “mostly heterosexual” (attracted to both sexes, but mostly to persons of the opposite sex) were more likely to report an earlier age of first sexual intercourse and a higher number of lifetime sexual partners than women who described themselves as “100% heterosexual” [68].

In summary, many early studies of risk behaviors among WSW were based on convenience samples or on women attending STD clinics and are not necessarily generalizable to all WSW. However, it does appear that some WSW, particularly adolescents and young women as well as WSMW, may be at increased risk for STIs and HIV based on reported risk behaviors. Health care providers assessing any woman for her risk of STIs must incorporate an open discussion of all aspects of sexuality, and not just those limited to preconceptions or stereotypes on the part of providers. Sexual and reproductive health services that are sensitive to gender-minority women across a wide range of ages and populations are needed, including adolescents and college-aged women.

**What Recommendations Should Be Made Regarding Testing for STIs Among WSW?**

WSW are at risk of acquiring bacterial, viral, and protozoal STIs from both female and male partners. WSW should not be presumed to be at low or no risk for STIs based on stated sexual orientation. Effective screening requires a comprehensive and open discussion of sexual and behavioral risks, beyond sexual identity, between health care providers and their female clients.

Report of same-sex behavior in women should not deter providers from considering and performing screening for STIs, including C. trachomatis, in their clients according to current guidelines. Sexual transmission of HSV-1 and HSV-2 can occur between female sex partners, and this information should be included in the counseling and evaluation of women’s sexual health. Routine cervical cancer screening should be offered to all women, regardless of sexual orientation or partner choice, and women should be offered HPV vaccine according to current guidelines. Although BV is common among WSW,
routine screening for BV is not currently recommended, nor is the treatment of partners of women with BV. Encouraging awareness of signs and symptoms of BV in women and encouraging healthy sexual practices such as cleaning shared sex toys between uses may be helpful to women and their partners. The evaluation of WSW who present with symptoms concerning for STIs is no different than that for women with male-only partners.

Future Research
Much remains to be understood about sexual health and STIs among WSW. More accurate information from future research on population health and STIs among women could be obtained by routinely examining measures of sexual orientation including sexual behaviors, sexual attraction, and sexual identity, particularly as they relate to participation in sexual networks [69]. Larger population-based studies are needed to more clearly define the epidemiology and transmission risks for STIs among the diverse group of WSW, including adolescents and young women. Specifically, further research is needed to identify risks that may predispose to the acquisition and transmission of C. trachomatis in this group and to better quantify the epidemiology of chlamydial infection among WSW in the United States. WSW have a higher prevalence of BV, and more research needs to be done to understand the relationships between the transmission of BV-associated bacteria, the pathogenesis of BV, and treatment outcomes. In addition, future research is needed to identify behavioral and medical interventions that can reduce the occurrence, persistence, and recurrence of BV among WSW.

An improved understanding of the dynamics of the health care interaction between WSW patients and providers would be extremely useful. Little is known about the knowledge, attitudes, and behaviors that contribute to STI screening and health care access among WSW, either from the perspective of women themselves or from the providers who serve them. Valuable research could provide information on women’s perceptions of STI risk, reproductive health needs, and patterns of seeking preventive sexual health care. These data are essential to inform both women and their health care providers about STI risks and prevention and to foster a dialogue that could support sexual health in general.

Notes

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