



Published in final edited form as:

Prev Med. 2017 February ; 95: 74–81. doi:10.1016/j.ypmed.2016.11.023.

Sexual orientation and sexual health services utilization among women in the United States

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Abstract

Although sexual minority women are at risk of sexually transmitted infections (STIs) and cervical cancer, few nationally representative studies have assessed sexual orientation disparities in sexual health care among women. Using data from the 2011–2013 and 2013–2015 waves of the National Survey of Family Growth, which provide a national probability sample of U.S. women aged 15–44 years (N=11,300), we used multivariable logistic regression to examine the associations between sexual behavior and sexual identity (modeled separately) and STI testing in the past year, Pap test use in the last 3 years, lifetime HIV testing, and lifetime human papillomavirus (HPV) testing. Women with male and female lifetime sexual partners had higher adjusted odds of being tested for STIs ([odds ratio:] 1.61; [95% confidence interval:] 1.37–1.89), HIV (1.66; 1.29–2.14), and HPV (1.79; 1.41–2.25) and similar adjusted odds of obtaining a Pap test (0.98; 0.76–1.27) than women with only male lifetime sexual partners. Self-identified bisexual women had higher adjusted odds of obtaining an STI (1.43; 1.10–1.86) and HIV (1.69; 1.24–2.30) test but lower adjusted odds of obtaining a Pap test in the last 3 years (0.66; 0.47–0.93) than heterosexual-identified women. Women with only female lifetime sexual partners had lower adjusted odds of receiving an STI

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Conflict of interest statement

The authors have no conflicts of interest to disclose.

(0.14; 0.07–0.28) and Pap (0.10; 0.03–0.27) test than women with only male lifetime sexual partners. Results comparing self-identified lesbian and heterosexual women were similar. Health care facilities should monitor and address sexual orientation disparities in women's sexual health care and ensure the provision of high-quality sexual health services to all women.

Keywords

Sexual orientation; Sexual health services; Health care disparities; Women

1. Introduction

Sexually transmitted infections (STIs) – including chlamydia, gonorrhea, syphilis, herpes, and human papillomavirus (HPV) – represent a notable public health problem (Centers for Disease Control and Prevention, 2015a). Each year, 20 million new STI cases are diagnosed in the United States (U.S.), with a substantial burden occurring among women (Centers for Disease Control and Prevention, 2015a). In addition to causing pain and discomfort in the short term, STIs have several longterm consequences among women, including infertility and ectopic pregnancy (Centers for Disease Control and Prevention, 2015a). Moreover, persistent infection with oncogenic HPV strains can cause cervical and other HPV-associated cancers, which affected 23,000 U.S. women between 2008 and 2012 (Viens et al., 2016). STIs can also increase women's risk of acquiring HIV (Ward and Rönn, 2010), with which 8328 U.S. women were newly diagnosed in 2014 (Centers for Disease Control and Prevention, 2016).

Sexual minority women (i.e., women who self-identify as lesbian, bisexual, or queer and/or have same-sex sexual partners or attractions; SMW) are at risk of acquiring STIs and HIV from sexual contact (e.g., penile-vaginal, penile-anal, vaginal-vaginal, oral-vaginal, vaginal-sex toy) with partners of any sex or gender (Diamant et al., 1999; Xu et al., 2010; Kwakwa and Ghobrial, 2003; Muzny et al., 2011, 2015; Gorgos and Marrazzo, 2011; Marrazzo et al., 2000; Campos-Outcalt and Hurwitz, 2002; Diamant et al., 2000a; Singh and Marrazzo, 2009; Bauer and Welles, 2001). For example, studies show that the prevalence of chlamydia was 7.1% among women with only female and both female and male past-year sexual partners, and the prevalence of herpes simplex virus 2 and HPV was 36.2% and 13%, respectively, among women with only female and both female and male lifetime female sexual partners (Gorgos and Marrazzo, 2011). Self-identified bisexual women and women with both male and female sexual partners may be at higher risk of STIs (Everett, 2013; Rosario et al., 2014a; Tao, 2008; Lindley et al., 2008; McNair, 2005) and HIV (Goodenow et al., 2008) than heterosexual women and women with only male sexual partners because of lower levels of social, economic, and health care resources (Kerker et al., 2006; Miller et al., 2007; Badgett et al., 2013; Diamant et al., 2000b), higher levels of sexual violence (Everett, 2013; Goodenow et al., 2008; Rosario et al., 2014b; Austin et al., 2008a, 2008b; Black et al., 2011; McCauley et al., 2015; Saewyc et al., 2006), higher average number of sexual partners (Everett, 2013; Oswalt and Wyatt, 2013), and higher prevalence of sex under the influence of drugs or alcohol (Koh et al., 2005) in these marginalized and stigmatized populations (Miller et al., 2007; Roberts et al., 2015; Friedman et al., 2014). Moreover, lesbians and women with

only female sexual partners who are infected with HPV may be at higher risk of developing cervical cancer than heterosexual women and women with only male sexual partners because of a lower prevalence of cervical cancer screening (Kerker et al., 2006; Diamant et al., 2000b; Agénor et al., 2014; Matthews et al., 2004; Tracy et al., 2010) and higher prevalence of smoking (Boehmer et al., 2012; Cochran et al., 2001a), a notable risk factor for the disease. (Waggoner, 2003)

The U.S. Preventive Services Task Force (USPSTF) (Meyers et al., 2008; LeFevre, 2014) and Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2015b) recommend that all sexually active women under the age of 25 years be tested annually for chlamydia and gonorrhea, regardless of sexual behavior. The USPSTF STI testing guidelines also indicate that women who engage in “high risk” sexual behaviors (e.g., using condoms inconsistently, having multiple current sexual partners, having sex under the influence of drugs or alcohol) receive routine chlamydia, gonorrhea, HIV, and syphilis tests (Meyers et al., 2008; LeFevre, 2014). Moreover, at the time of the survey, the USPSTF and American Cancer Society recommended that women aged 21–29 years obtain a Pap test every 3 years to screen for cervical cancer (U.S. Preventive Services Task Force, 2016; Moyer, 2012; Saslow et al., 2012). Women aged 30–65 years could be screened every 3 years with a Pap test alone or every 5 years with Pap and HPV co-testing, which enables health care providers to not only detect cervical abnormalities (Pap test) but also identify high-risk HPV types in cervical cells (HPV test) (U.S. Preventive Services Task Force, 2016; Moyer, 2012; Saslow et al., 2012).

Although SMW are at risk of acquiring STIs and HIV and developing cervical cancer, research examining access to and utilization of sexual health services in this population is limited (Solarz, 1999; Institute of Medicine, 2011; Coulter et al., 2014). The few studies on this understudied topic have mostly relied on convenience samples composed of predominately white, college or college-educated women, failed to use appropriate comparison groups (e.g., heterosexual women), assessed only one dimension of sexual orientation relevant to sexual health care (i.e., sexual identity or sexual behavior), and/or combined lesbians or women with only female sexual partners and bisexual women or women with both male and female sexual partners – who have different social, economic, and health profiles (Kerker et al., 2006; Miller et al., 2007; Badgett et al., 2013; Diamant et al., 2000b) – into a single group (Bauer and Welles, 2001; Oswald and Wyatt, 2013; Matthews et al., 2004; Tracy et al., 2010; Mullinax et al., 2015; Charlton et al., 2011; Marrasso et al., 2001; Cochran et al., 2001b; Charlton et al., 2013; Diamant et al., 2000c; Kerr et al., 2013; Tracy et al., 2013). Further, with one notable exception (Tornello et al., 2014), studies that have utilized data from probability samples of U.S. women pertained to subnational geographic areas (Kerker et al., 2006; Diamant et al., 2000b) or focused on Pap test use to the exclusion of other sexual health services (Kerker et al., 2006; Diamant et al., 2000b; Agénor et al., 2014). Thus, in order to address these notable gaps in the scientific literature, we examined the association between both sexual behavior and sexual identity – two dimensions of sexual orientation relevant to sexual health care (Sell, 2007) – and the utilization of various sexual health services in a national probability sample of U.S. women aged 15–44 years using appropriate comparison groups.

Research suggests that sexual orientation can influence women's sexual health care by shaping their knowledge of, attitudes toward, and access to sexual health information and services as well as health care providers' communication about and recommendation of sexual health services based on their training (or lack thereof) and beliefs about SMW's health (Muzny et al., 2013; Marrazzo et al., 2005; Marrazzo, 2005; Power et al., 2009; Richardson, 2000; Price et al., 1996; McNair et al., 2009; Lindley et al., 2012; Polek and Hardie, 2010; McNair, 2003a, 2003b; Hutchinson et al., 2006). Moreover, it is possible that health insurance status and access to health care, which differ based on sexual orientation and influence the use of preventive health services, may help explain sexual health care disparities related to sexual behavior and identity among U.S. women (Kerker et al., 2006; Solarz, 1999; Institute of Medicine, 2011; Gonzales and Blewett, 2014; Jerant et al., 2013). Similarly, sexual orientation disparities in sexual health services use may be due to sexual risk factors (e.g., history of STIs), which disproportionately affect self-identified bisexual women and women with both male and female sexual partners and may lead clinicians to provide sexual health care to women in these sexual orientation groups more often than those at lower average sexual risk (Everett, 2013; Rosario et al., 2014b; Austin et al., 2008a; McCauley et al., 2015).

Given the exclusion of SMW from sexual health promotion efforts and misperceptions, among both women and providers, that the risk of female-to-female STI transmission is low (Muzny et al., 2013; Marrazzo et al., 2005; Marrazzo, 2005; Power et al., 2009; Richardson, 2000; Price et al., 1996; McNair et al., 2009; Lindley et al., 2012; Polek and Hardie, 2010; McNair, 2003a, 2003b), it is critically important that researchers ascertain STI and HIV testing and cervical cancer screening disparities among women in relation to both sexual behavior and sexual identity and elucidate the underlying mechanisms of sexual orientation disparities in women's sexual health care. These efforts will in turn help inform evidence-based interventions that facilitate access to and utilization of recommended sexual health services among underserved groups of SMW and help promote the sexual health of all women, regardless of sexual orientation.

2. Methods

2.1. Study participants

We analyzed self-reported data from the 2011–2013 and 2013–2015 waves of the National Survey of Family Growth (NSFG), which provide a national probability sample of 11,300 civilian, non-institutionalized U.S. women aged 15–44 years (female response rates: 73.4% in 2011–2013 and 71.2% in 2013–2015) (National Center for Health Statistics, 2011–2013; Lepkowski et al., 2010; National Center for Health Statistics, 2016). Study participants were randomly selected using a stratified, five-stage cluster sampling design and completed surveys administered by female interviewers. Data on sensitive topics, including sexual orientation, were collected using audio-computer assisted self-interview (ACASI) software in order to promote participant privacy (National Center for Health Statistics, 2011–2013–2016; Lepkowski et al., 2010).

2.2. Measures

The primary predictors were two dimensions of sexual orientation relevant to sexual health care: sexual behavior (operationalized as sex of lifetime sexual partners, which we created using data on any lifetime same- and opposite-sex sexual contact and categorized as only male, both male and female, only female, and none) and sexual identity (categorized as heterosexual, bisexual, lesbian). The four outcomes of interest were receiving a test for chlamydia, gonorrhea, herpes, or syphilis (henceforth, STI test) in the past year; obtaining a Pap test in the last 3 years (among women aged 21–44 years, per cervical cancer screening guidelines (Saslow et al., 2012)); ever receiving an HIV test; and ever receiving an HPV test (among women aged 30–44 years, per Pap and HPV co-testing guidelines (Saslow et al., 2012)).

Covariates, which were selected based on the scientific literature and are shown with their categorization in Table 1, included sociodemographic factors (i.e., age, race/ethnicity, nativity, religion in which raised, place of residence, relationship status, educational attainment, household poverty level, and employment status, which we conceptualized as potential confounders), health care access indicators (i.e., health insurance status and usual source of care, which we conceptualized as potential mediators (Kerker et al., 2006; Solarz, 1999; Gonzales and Blewett, 2014; Jerant et al., 2013)), and STI diagnosis history (i.e., ever diagnosed with herpes or syphilis and diagnosed with chlamydia or gonorrhea in the past year, which we conceptualized as potential mediators (Everett, 2013)). Data on sex of lifetime sexual partners and sexual identity were missing for 0.8% (n = 87) and 1.0% (n = 128) of women, respectively. A total of 1.2% (n = 128) of women aged 15–44 years were missing data on receiving an STI test in the past year, and no data were missing for ever obtaining an HIV test. Data on Pap test use in the last 3 years were missing for 0.1% (n = 15) of women aged 21–44 years, and 8.8% (n = 450) of women aged 30–44 years lacked data on whether they ever received an HPV test. Missing data for all covariates (other than nativity, religion in which raised, usual source of care, and sexual history measures, for which the proportion of missing data was <0.6%) were multiply imputed by NSFG staff.

2.3. Statistical analysis

We assessed the percent distribution of U.S. women aged 15–44 years (N = 11,300) in relation to each covariate overall and by sex of lifetime sexual partners and sexual identity. Moreover, we estimated the prevalence of STI testing in the past year, Pap test use in the last 3 years (among women aged 21–44 years, per cervical cancer screening guidelines (Saslow et al., 2012); n=8908), lifetime HPV testing (among women aged 30–44 years, per Pap and HPV co-testing guidelines; n = 5223), and lifetime HIV testing. Further, we used multivariable logistic regression to ascertain the associations between each dimension of sexual orientation (modeled separately) and the odds of utilizing each of the four sexual health services of interest, adjusting for sociodemographic factors (i.e., potential confounders). We then sequentially entered into the models health care access indicators and STI diagnosis history measures (i.e., potential mediators). All analyses were conducted using Stata 13 (College Station, TX) and accounted for the complex survey design. (National Center for Health Statistics, 2011–2013).

3. Results

Table 1 presents data on participants' sociodemographic and health care characteristics overall and in relation to sex of lifetime sexual partners and sexual identity. The majority of U.S. women aged 15–44 years reported having only male lifetime sexual partners (73.4%) or self-identified as heterosexual (92.3%). A notable proportion of women indicated that they had both male and female lifetime sexual partners (16.2%) and self-identified as bisexual (6.1%); 0.8% and 1.6% of women had only female sexual partners in their lifetime and self-identified as lesbian, respectively. Compared to participants with only male lifetime sexual partners and self-identified heterosexual women, women with both male and female lifetime sexual partners and self-identified bisexual women were more likely to be aged 21–29 years and less likely to have received a bachelor's degree or more. They were also more likely to be living below 200% of the federal poverty level (FPL), be enrolled in a public health insurance plan, have been forced by a man to have vaginal sex, have ever been diagnosed with herpes or syphilis, and have been diagnosed with chlamydia or gonorrhea in the past year. Women with only female sexual partners and self-identified lesbians were more likely than women with only male sexual partners and self-identified heterosexual women, respectively, to be aged 15–29 years and uninsured or underinsured and less likely to have obtained a bachelor's degree or more, be living at or above 300% of the FPL, and be employed.

Among U.S. women aged 15–44 years, 29.5% had received an STI test in the past year, and 73.5% had obtained an HIV test during their lifetime. Additionally, 88.6% of U.S. women aged 21–44 years had obtained a Pap test in the last 3 years, and 55.5% of those aged 30–44 years reported having ever received an HPV test (Table 2). Compared to women with only male lifetime sexual partners, the prevalence of STI testing in the past year (45.5% vs. 29.6%, $p < 0.0001$), ever receiving an HIV test (84.8% vs. 77.8%, $p < 0.0001$), and ever receiving an HPV test (68.8% vs. 53.9%, $p < 0.0001$) was significantly higher, and the prevalence of Pap test use in the last 3 years (89.6% vs. 90.5%, $p = 0.4$) was similar, among women with both male and female lifetime sexual partners. In contrast, the prevalence of STI testing in the past year (9.0% vs. 29.6%, $p < 0.0001$), Pap test use in the last 3 years (46.6% vs. 90.5%, $p = 0.0004$), and lifetime HIV testing (50.3% vs. 77.8%, $p = 0.002$) was significantly lower among women with only female lifetime sexual partners relative to women with only male lifetime sexual partners (Table 2). Further, relative to self-identified heterosexual women, self-identified bisexual women had a significantly higher prevalence of receiving an STI test in the past year (40.4% vs. 28.9%, $p = 0.0001$), significantly lower prevalence of obtaining a Pap test in the last 3 years (81.6% vs. 89.3%, $p = 0.004$), and similar prevalence of lifetime HIV testing (75.7% vs. 73.6%, $p = 0.4$). Self-identified lesbians had a significantly lower prevalence of Pap test use in the last 3 years (73.8% vs. 89.3%, $p = 0.0002$) and similar prevalence of STI testing in the past year (23.8% vs. 28.9%, $p = 0.1$) and lifetime HIV (67.8% vs. 73.6%, $p = 0.2$) and HPV (56.3% vs. 55.4%, $p = 0.9$) testing relative to self-identified heterosexual women (Table 2).

Table 3 shows that, adjusting for sociodemographic factors, women with both male and female lifetime sexual partners had significantly higher odds of STI testing in the past year ([odds ratio:] 1.61; [95% confidence interval:] 1.37, 1.89), lifetime HIV testing (1.66; 1.29,

2.14), and lifetime HPV testing (1.79; 1.41, 2.25) compared to those with only male lifetime sexual partners (Model 1). The adjusted odds of Pap test use in the last 3 years were similar among women with both male and female lifetime sexual partners and women with only male lifetime sexual partners (0.98; 0.76, 1.27). In contrast, women with only female lifetime sexual partners had significantly lower adjusted odds of receiving an STI test in the past year (0.14; 0.07, 0.28) and Pap test in the last 3 years (0.10; 0.03, 0.27) relative to women with only male lifetime sexual partners. The adjusted odds of lifetime HIV (0.43; 0.17, 1.11) and HPV (0.28; 0.06, 1.23) testing were similar between women with only female and those with only male lifetime sexual partners (Model 1).

Moreover, compared to self-identified heterosexual women, women who self-identified as bisexual had significantly higher adjusted odds of receiving an STI test in the past year (1.43; 1.10, 1.86) and having ever obtained an HIV test (1.69; 1.24, 2.30; Model 1). In contrast, self-identified bisexual women had significantly lower adjusted odds of obtaining a Pap test in the last 3 years (0.66; 0.47, 0.93) and similar adjusted odds of lifetime HPV testing (1.33; 0.94, 1.88) relative to self-identified heterosexual women (Model 1). Lastly, although we observed no difference in the adjusted odds of lifetime HIV (0.83; 0.52, 1.32) or HPV (1.10; 0.59, 2.05) testing between self-identified lesbian and heterosexual women, lesbian-identified women had significantly lower adjusted odds of STI testing in the past year (0.54; 0.35, 0.81) and Pap test use in the last 3 years (0.57; 0.36, 0.89) compared to their heterosexual-identified counterparts (Model 1).

Including health care factors (i.e., health insurance status and having a usual source of care) into the models did not appreciably attenuate any of the statistically significant odds ratios estimating the associations between sex of lifetime sexual partners and sexual identity and sexual health services use among U.S. women aged 15–44 years (Model 2). In contrast, adding STI diagnosis history measures (i.e., having ever been diagnosed with herpes or syphilis and having been diagnosed with chlamydia or gonorrhea in the past year), which were significantly associated with each predictor and outcome, partially attenuated the STI (1.54; 1.31, 1.81), HIV (1.59; 1.23, 2.06), and HPV (1.75; 1.39, 2.20) testing adjusted odds ratios comparing women with both male and female lifetime sexual partners and women with only male lifetime sexual partners, as well as the STI (1.34; 1.02, 1.77) and HIV (1.59; 1.17, 2.17) testing adjusted odds ratio comparing self-identified bisexual and heterosexual women – all of which remained statistically significant (Model 3).

4. Discussion

Our study contributes to the scientific literature on sexual orientation disparities in women's sexual health care in several important ways. First, while most prior studies relied on convenience samples composed of predominately white, college or college-educated women (Bauer and Welles, 2001; Oswalt and Wyatt, 2013; Matthews et al., 2004; Tracy et al., 2010; Mullinax et al., 2015; Charlton et al., 2011; Marrazzo et al., 2001; Cochran et al., 2001b; Charlton et al., 2013; Diamant et al., 2000c; Kerr et al., 2013; Tracy et al., 2013), we used data from the 2011–2013 and 2013–2015 waves of the NSFG, which provide a large national probability sample of civilian, noninstitutionalized U.S. women aged 15–44 years. Second, although the vast majority of research on sexual orientation and women's sexual

health care has mostly focused on cervical cancer screening (Kerker et al., 2006; Diamant et al., 2000b; Agénor et al., 2014), we examined disparities in the utilization of a variety of sexual health services (i.e., STI, Pap, HIV, and HPV testing) using appropriate comparison groups. Lastly, while existing studies have only examined disparities in relation to one dimension of sexual orientation, we assessed sexual orientation disparities in women's sexual health care in relation to sexual behavior and sexual identity, both of which are relevant to sexual health care (Diamant et al., 1999).

Our findings suggest that having a STI diagnosis history partially explained the higher odds of sexual health services use among women with both male and female lifetime sexual partners and self-identified bisexual women compared to women with only male lifetime sexual partners and self-identified heterosexual women, respectively. Thus, the higher adjusted odds of obtaining an STI, HIV, and HPV test among women with both male and female lifetime sexual partners compared to women with only male lifetime sexual partners and higher adjusted odds of STI and HIV testing among self-identified bisexual women compared to self-identified heterosexual women may be due to health care providers' accurate appraisal of elevated average STI risk among women in these sexual orientation groups. Additionally, these observed disparities may be due to greater agency in seeking sexual health care to treat or test for infection among women who have sex with both women and men and self-identified bisexual women given their higher average likelihood of having been diagnosed with an STI in the past.

It is also possible that pervasive stereotypes that women with both male and female sexual partners and self-identified bisexual women are hypersexual and promiscuous may lead health care providers to offer STI services more frequently to these groups of women, regardless of their individual sexual risk (Gorgos and Marrazzo, 2011; Miller et al., 2007; Friedman et al., 2014). In contrast, self-identified bisexual women may not receive public health messages about or be encouraged to obtain health services pertaining to other aspects of their health, including cervical cancer screening. Additionally, previous studies suggest that the lower adjusted odds of STI and Pap testing among women with only female lifetime sexual partners and self-identified lesbians compared to women with only male lifetime sexual partners and self-identified heterosexual women, respectively, may be due to women's fears and experiences of discrimination in the health care system (Hutchinson et al., 2006; Stevens, 1998; Agénor et al., 2015; Brown and Tracy, 2008), poor patient-provider communication (Hutchinson et al., 2006; Agénor et al., 2015; Brown and Tracy, 2008; Eliason and Schope, 2001; Seaver et al., 2008), lack of health care provider training (McNair, 2003a, 2003b; Hinchliff et al., 2005; Obedin-Maliver et al., 2011; Lim et al., 2015), exclusion from sexual health education and promotion efforts (Marrazzo, 2005; Lindley et al., 2012), and perceptions of low STI and cervical cancer risk among both women and providers (Marrazzo et al., 2005; Marrazzo, 2005; Power et al., 2009; Price et al., 1996; McNair et al., 2009).

To our knowledge, this is the first study to assess sexual orientation disparities in a variety of women's sexual health care indicators in relation to measures of both sexual behavior and sexual identity in a large national probability sample of U.S. women using appropriate comparison groups. Despite these strengths, our findings should be interpreted in light of

some limitations. In particular, our study's cross-sectional design prevented us from establishing clear temporal ordering between sexual orientation, potential mediators, and sexual health care outcomes or assessing how changes in women's sexual partners and sexual identity may influence sexual health services use throughout the life course. Moreover, our analyses were based on self-reported data that were not confirmed using medical records. Therefore, we are not able to assess whether gynecological examinations, which can involve the performance of a Pap test and testing for a range of STIs, were accurately reported as including the specific test (s) received at the time of the exam. Further, because many of the factors potentially underlying the association between sexual orientation and sexual health services use were not assessed in the NSFG, we were unable to assess the role of potential mediators other than health care access indicators and STI diagnosis history – including patient and provider STI and cervical cancer risk perceptions (Marrazzo et al., 2005; Power et al., 2009; Price et al., 1996; McNair et al., 2009), for example. Lastly, large, nationally representative, longitudinal studies that confirm self-reported data with medical records are needed to generate accurate population estimates and identify potential mechanisms of sexual orientation disparities in women's sexual health care over the lifespan.

In the meantime, our findings suggest that health care administrators should routinely collect information on women's sexual partners and sexual identity using non-heteronormative language that is inclusive and respectful of SMW's experiences in order to monitor and address sexual orientation disparities in the recommendation and provision of sexual health services in their facilities (Centers for Disease Control and Prevention, n.d.; Ard and Makadon, 2012). Further, given that women with both male and female lifetime sexual partners and self-identified bisexual women were more likely to receive STI, HIV, and/or HPV tests than women with only male lifetime sexual partners and self-identified heterosexual women, respectively, health care facilities should ensure that the provision of sexual health services is based on unbiased, patient-centered assessments of women's individual sexual risk and sexual health care needs, as opposed to information on average sexual risk or assumptions (Sexuality Information and Education Council of the United States, 2014). Additionally, our findings suggest that clinical and community-based programs are needed to promote access to and utilization of recommended sexual health services among women with only female lifetime sexual partners and self-identified lesbians, who are underserved despite their risk of acquiring STIs and developing cervical cancer (Kwakwa and Ghobrial, 2003; Muzny et al., 2015; Gorgos and Marrazzo, 2011; Campos-Outcalt and Hurwitz, 2002; Diamant et al., 2000a; Singh and Marrazzo, 2009), as well as regular Pap testing among self-identified bisexual women. Lastly, educational programs that raise awareness about the risk of female-to female STI transmission and cervical cancer among SMW are needed for both women and providers, as are tailored initiatives that connect diverse subgroups of SMW to competent, patient-centered, and affirming sexual health care (Bauer and Welles, 2001; McNair, 2003a, 2003b).

Acknowledgments

The authors thank 2011–2013 and 2013–2015 National Survey of Family Growth participants and staff for the data used in this study. Christina A. Muzny, MD is currently supported by grant K23AI106957 from the National Institute of Allergy and Infectious Diseases.

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Table 1

Percent distribution of sociodemographic factors, health care access indicators, and sexually transmitted infection history in relation to sex of lifetime sexual partners and sexual identity among U.S. women aged 15–44 years – National Survey of Family Growth, 2011–2015 (N= 11,300).

| Variable (%) | Total N = 11,300 | Sex of lifetime sexual partners | | | | Sexual identity | | | |
|---------------------------------|---------------------|---------------------------------|-----------------------------|-----------------------|------------------|----------------------------|---------------------|--------------------|--|
| | | Only male n = 8009 | Male and female n = 1988 | Only female n = 86 | None n = 1130 | Heterosexual n = 10,162 | Bisexual n = 799 | Lesbian n = 211 | |
| Age (years) | | | | | | | | | |
| 15–20 | 18.8 | 12.4 | 13.2 | 40.6 | 78.5 | 18.2 | 28.1 | 20.1 | |
| 21–29 | 31.0 | 30.4 | 40.9 | 41.9 | 16.5 | 30.2 | 39.5 | 40.9 | |
| 30–45 | 50.2 | 57.2 | 45.9 | 17.6 | 5.0 | 51.6 | 32.3 | 39.0 | |
| Sex of lifetime sexual partners | | | | | | | | | |
| Only male | 73.4 | – | – | – | – | 78.9 | 17.4 | 5.4 | |
| Male and female | 16.2 | – | – | – | – | 11.7 | 72.6 | 61.5 | |
| Only female | 0.8 | – | – | – | – | 0.2 | 2.1 | 28.4 | |
| None | 9.1 | – | – | – | – | 9.2 | 7.9 | 4.7 | |
| Sexual identity | | | | | | | | | |
| Heterosexual | 92.3 | 98.5 | 66.5 | 22.1 | 93.8 | – | – | – | |
| Bisexual | 6.1 | 1.4 | 27.3 | 16.8 | 5.3 | – | – | – | |
| Lesbian | 1.6 | 0.1 | 6.2 | 61.1 | 0.8 | – | – | – | |
| Race/ethnicity | | | | | | | | | |
| White | 55.7 | 55.0 | 62.9 | 40.4 | 50.9 | 56.3 | 55.2 | 44.8 | |
| Black | 13.7 | 13.8 | 14.8 | 15.0 | 11.1 | 13.7 | 13.0 | 18.4 | |
| Latina | 20.1 | 21.0 | 14.0 | 30.3 | 22.8 | 20.1 | 17.9 | 20.9 | |
| Another race or multiracial | 10.6 | 10.3 | 8.3 | 14.4 | 15.2 | 10.0 | 13.8 | 15.9 | |
| U.S. born: yes | 84.1 | 81.6 | 94.7 | 93.3 | 87.1 | 84.0 | 92.1 | 91.5 | |
| Place of residence | | | | | | | | | |
| MSA, central city | 34.0 | 33.3 | 37.5 | 38.9 | 33.1 | 33.5 | 38.0 | 33.7 | |
| MSA, other | 50.8 | 51.6 | 46.0 | 51.5 | 52.7 | 51.3 | 46.5 | 51.9 | |
| Non-MSA | 15.2 | 15.1 | 16.6 | 9.6 | 14.2 | 15.2 | 15.6 | 14.4 | |
| Relationship status | | | | | | | | | |
| Never married | 38.8 | 30.5 | 39.3 | 100.0 | 100.0 | 37.1 | 52.7 | 87.0 | |
| Currently married | 38.1 | 45.6 | 27.5 | 0.0 | 0.0 | 39.9 | 19.3 | 5.1 | |

| Variable (%) | Total N = 11,300 | Sex of lifetime sexual partners | | | | Sexual identity | | | |
|---|---------------------|---------------------------------|-----------------------------|-----------------------|------------------|----------------------------|---------------------|--------------------|--|
| | | Only male n = 8009 | Male and female n = 1988 | Only female n = 86 | None n = 1130 | Heterosexual n = 10,162 | Bisexual n = 799 | Lesbian n = 211 | |
| Not married, living with a male partner | 14.8 | 15.4 | 21.0 | 0.0 | 0.0 | 14.8 | 17.7 | 0.2 | |
| Separated, divorced, or widowed | 8.3 | 8.6 | 12.3 | 0.0 | 0.0 | 8.3 | 10.4 | 7.7 | |
| Religion in which raised | | | | | | | | | |
| No religion | 11.2 | 10.1 | 14.6 | 11.8 | 14.1 | 10.8 | 17.2 | 16.1 | |
| Catholic | 31.1 | 32.5 | 26.4 | 28.4 | 30.3 | 31.6 | 26.3 | 21.5 | |
| Fundamentalist Protestant | 5.4 | 5.7 | 4.4 | 13.3 | 4.7 | 5.6 | 3.1 | 5.3 | |
| Another type of Protestant | 43.0 | 42.7 | 45.9 | 40.6 | 40.6 | 43.2 | 42.1 | 49.4 | |
| Another religion | 9.2 | 9.1 | 8.7 | 5.9 | 10.3 | 8.9 | 11.4 | 7.6 | |
| Educational attainment | | | | | | | | | |
| <High school degree | 18.5 | 14.7 | 11.8 | 25.9 | 60.2 | 17.9 | 24.5 | 17.5 | |
| High school diploma or GED | 24.2 | 24.3 | 29.4 | 24.9 | 14.6 | 23.7 | 29.8 | 30.1 | |
| Some college or associate's degree | 29.8 | 29.9 | 37.4 | 29.5 | 16.8 | 29.9 | 30.5 | 32.8 | |
| Bachelor's degree or higher | 27.6 | 31.2 | 21.5 | 19.8 | 8.5 | 28.5 | 15.3 | 19.6 | |
| Household poverty level (%) | | | | | | | | | |
| <100 | 28.3 | 26.8 | 29.5 | 23.1 | 37.4 | 27.5 | 34.3 | 33.2 | |
| 100–199 | 20.8 | 19.5 | 24.2 | 23.6 | 24.7 | 20.4 | 25.1 | 22.2 | |
| 200–299 | 16.0 | 16.3 | 16.0 | 24.6 | 13.5 | 16.2 | 13.5 | 22.1 | |
| >300 | 34.9 | 37.4 | 30.3 | 28.7 | 24.5 | 35.9 | 27.1 | 22.6 | |
| Employment status | | | | | | | | | |
| Working | 65.6 | 68.4 | 69.4 | 54.3 | 38.7 | 66.4 | 59.5 | 55.0 | |
| Not working | 23.0 | 23.7 | 22.1 | 22.9 | 17.5 | 22.6 | 24.6 | 30.6 | |
| Student | 11.4 | 7.9 | 8.5 | 22.7 | 43.8 | 11.0 | 15.9 | 14.4 | |
| Health insurance status | | | | | | | | | |
| Private | 59.4 | 61.2 | 52.0 | 64.3 | 58.3 | 60.6 | 45.9 | 54.3 | |
| Public | 22.9 | 21.1 | 26.8 | 16.4 | 29.2 | 22.2 | 31.1 | 20.2 | |
| Uninsured or underinsured | 17.8 | 17.7 | 21.2 | 19.3 | 12.5 | 17.2 | 23.0 | 25.5 | |
| Usual source of care: yes | 85.1 | 85.5 | 85.0 | 88.5 | 82.3 | 85.3 | 83.9 | 85.3 | |
| Ever forced by a man to have vaginal sex ^a : yes | 14.6 | 11.9 | 30.7 | 5.5 | 1.9 | 13.6 | 29.6 | 18.2 | |
| Ever diagnosed with herpes or syphilis: yes | 3.9 | 3.6 | 7.7 | 0.0 | 0.4 | 3.8 | 6.3 | 3.1 | |

| Variable (%) | Total N = 11,300 | Sex of lifetime sexual partners | | | | Sexual identity | | |
|---|---------------------|---------------------------------|-----------------------------|-----------------------|------------------|----------------------------|---------------------|--------------------|
| | | Only male n = 8009 | Male and female n = 1988 | Only female n = 86 | None n = 1130 | Heterosexual n = 10,162 | Bisexual n = 799 | Lesbian n = 211 |
| Diagnosed with chlamydia or gonorrhea in past year: yes | 1.8 | 1.5 | 3.5 | 0.3 | 0.5 | 1.6 | 4.0 | 1.4 |

Note. MSA: Metropolitan Statistical Area; GED: General Education Development. All prevalence estimates (%) account for the complex survey design. Percentages may not add to 100% due to rounding error. The proportion of missing data for covariates was small and ranged from 0.02% to 0.6%.

–:denotes not applicable.

^aOnly applicable to women aged 18 years and above (n = 10,069).

Table 2
Prevalence of sexual health services utilization by sex of lifetime sexual partners and sexual identity among U.S. women aged 15–44 years – National Survey of Family Growth, 2011–2015 (N= 11,300).

| Variable | Received STI test in past year ^a | | | Received pap test in last 3 years ^b | | | Ever received HIV test | | | Ever received HPV test ^c | | | |
|---------------------------------|---|------|------|--|------|------|------------------------|------|------|-------------------------------------|------|------|---------|
| | Total | n | % | p-value | n | % | p-value | n | % | p-value | n | % | p-value |
| Total | 11,300 | 3747 | 29.5 | | 7900 | 88.6 | | 8407 | 73.5 | | 2634 | 55.5 | |
| Sex of lifetime sexual partners | | | | | | | | | | | | | |
| Only male (reference) | 8009 | 2725 | 29.6 | – | 6218 | 90.5 | – | 6337 | 77.8 | – | 2081 | 53.9 | – |
| Male and female | 1988 | 973 | 45.5 | <0.0001 | 1523 | 89.6 | 0.4 | 1729 | 84.8 | <0.0001 | 533 | 68.8 | <0.0001 |
| Only female | 86 | 13 | 9.0 | <0.0001 | 22 | 46.6 | 0.0004 | 42 | 50.3 | 0.002 | 4 | 28.6 | 0.09 |
| None | 1130 | 29 | 2.3 | <0.0001 | 81 | 29.1 | <0.0001 | 247 | 22.1 | <0.0001 | 6 | 19.3 | 0.002 |
| Sexual identity | | | | | | | | | | | | | |
| Heterosexual (reference) | 10,162 | 3317 | 28.9 | – | 7224 | 89.3 | – | 7564 | 73.6 | – | 2417 | 55.4 | – |
| Bisexual | 799 | 355 | 40.4 | 0.0001 | 474 | 81.6 | 0.004 | 617 | 75.7 | 0.4 | 154 | 63.1 | 0.05 |
| Lesbian | 211 | 65 | 23.8 | 0.1 | 120 | 73.8 | 0.0002 | 150 | 67.8 | 0.2 | 45 | 56.3 | 0.9 |

Note. STI: sexually transmitted infection; HIV: human immunodeficiency virus; HPV: human papillomavirus. All prevalence estimates (%) and 95% confidence intervals (CI) account for the complex survey design. p-Values were estimated using adjusted Wald tests; bolded p-values are statistically significant at the 0.05 level.

--denotes not applicable.

^aPertains to testing for chlamydia, gonorrhea, herpes, or syphilis.

^bRestricted to women aged 21–44 years (n = 8908) per guidelines at the time of the survey.

^cRestricted to women aged 30–44 years (n = 5223) per guidelines at the time of the survey.

Table 3

Multivariable logistic regression models for the adjusted odds of sexual health services utilization in relation to sex of lifetime sexual partners and sexual identity among U.S. women aged 15–44 years – National Survey of Family Growth, 2011–2015 (N = 11,300).

| | Model 1 OR (95% CI) | Model 2 OR (95% CI) | Model 3 OR (95% CI) |
|--|--------------------------------|--------------------------------|--------------------------------|
| Received STI test in past year ^a | | | |
| Sex of lifetime sexual partners | | | |
| Only male (reference) | 1.00 | 1.00 | 1.00 |
| Male and female | 1.61(1.37, 1.89) | 1.63(1.39, 1.91) | 1.54(1.31, 1.81) |
| Only female | 0.14(0.07, 0.28) | 0.14(0.07, 0.29) | 0.15(0.07, 0.31) |
| None | 0.04(0.02, 0.09) | 0.04(0.03, 0.06) | 0.04(0.03, 0.06) |
| Sexual identity | | | |
| Heterosexual (reference) | 1.00 | 1.00 | 1.00 |
| Bisexual | 1.43(1.10, 1.86) | 1.44(1.10, 1.87) | 1.34(1.02, 1.77) |
| Lesbian | 0.54(0.35, 0.81) | 0.56(0.37, 0.84) | 0.56(0.38, 0.84) |
| Received Pap test in last 3 years ^b | | | |
| Sex of lifetime sexual partners | | | |
| Only male (reference) | 1.00 | 1.00 | 1.00 |
| Male and female | 0.98(0.76, 1.27) | 1.02(0.79, 1.32) | 1.00(0.77, 1.29) |
| Only female | 0.10(0.03, 0.27) | 0.09(0.03, 0.27) | 0.09(0.03, 0.28) |
| None | 0.06(0.04, 0.10) | 0.06(0.04, 0.09) | 0.06(0.04, 0.10) |
| Sexual identity | | | |
| Heterosexual (reference) | 1.00 | 1.00 | 1.00 |
| Bisexual | 0.66(0.47, 0.93) | 0.69(0.48, 0.98) | 0.67(0.47, 0.96) |
| Lesbian | 0.57(0.36, 0.89) | 0.58(0.36, 0.96) | 0.60(0.36, 0.98) |
| Ever received HIV test | | | |
| Sex of lifetime sexual partners | | | |
| Only male (reference) | 1.00 | 1.00 | 1.00 |
| Male and female | 1.66(1.29, 2.14) | 1.65(1.28, 2.13) | 1.59(1.23, 2.06) |
| Only female | 0.43(0.17, 1.11) | 0.43(0.17, 1.13) | 0.44(0.17, 1.15) |
| None | 0.26(0.19, 0.35) | 0.26(0.20, 0.35) | 0.27(0.20, 0.36) |
| Sexual identity | | | |
| Heterosexual (reference) | 1.00 | 1.00 | 1.00 |
| Bisexual | 1.69(1.24, 2.30) | 1.66(1.22, 2.26) | 1.59(1.17, 2.17) |
| Lesbian | 0.83(0.52, 1.32) | 0.85(0.53, 1.34) | 0.85(0.54, 1.35) |
| Ever received HPV test ^c | | | |
| Sex of lifetime sexual partners | | | |
| Only male (reference) | 1.00 | 1.00 | 1.00 |
| Male and female | 1.79(1.41, 2.25) | 1.79(1.42, 2.26) | 1.75(1.39, 2.20) |
| Only female | 0.28(0.06, 1.23) | 0.28(0.06, 1.22) | 0.29(0.07, 1.26) |
| None | 0.15(0.04, 0.61) | 0.16(0.04, 0.63) | 0.16(0.04, 0.65) |

| | Model 1 OR (95% CI) | Model 2 OR (95% CI) | Model 3 OR (95% CI) |
|--------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Sexual identity | | | |
| Heterosexual (reference) | 1.00 | 1.00 | 1.00 |
| Bisexual | 1.33(0.94, 1.88) | 1.35(0.95, 1.90) | 1.34(0.95, 1.89) |
| Lesbian | 1.10(0.59, 2.05) | 1.10(0.59, 2.06) | 1.05(0.58, 1.92) |

Note. STI: sexually transmitted infection; HIV: human immunodeficiency virus; HPV: human papillomavirus. Model 1 is adjusted for age, race/ethnicity, nativity, religion in which raised, place of residence, relationship status, educational attainment, household poverty level, and employment status. Model 2 also includes health insurance status and having a usual source of care. Model 3 also includes ever diagnosed with herpes or syphilis and diagnosed with chlamydia or gonorrhea in past year. Bolded values refer to odds ratios (OR) with 95% confidence intervals (CI) that exclude 1. All odds ratios and confidence intervals account for the complex survey design. The proportion of missing data for covariates was small and ranged from 0.002% to 0.51%.

^aPertains to testing for chlamydia, gonorrhea, herpes, or syphilis.

^bRestricted to women aged 21–44 years (n = 8908) per guidelines at the time of the survey.

^cRestricted to women aged 30–44 years (n = 5223) per guidelines at the time of the survey.