

## ORIGINAL ARTICLE

# Correlates of a lifetime history of sexually transmitted infections among women who have sex with women in Toronto, Canada: results from a cross-sectional internet-based survey

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## ABSTRACT

**Objectives** Structural drivers of sexually transmitted infections (STI) among women who have sex with women (WSW) have been underexplored. The study objective was to understand sociodemographic, individual, structural, and sexual health factors associated with a lifetime history of STI among WSW. **Methods** A cross-sectional survey was conducted in 2012 to engage a peer-driven recruitment sample of WSW in Toronto, Canada. Data were collected among a convenience sample of 466 WSW using an online structured interview.

**Results** Approximately one-fifth (n=89, 19.1%) of participants reported an STI diagnosis history. Participants identifying as bisexual were more likely, and lesbians less likely, to report an STI history than those identifying as queer. In multivariate logistic regression analyses adjusted for sociodemographic variables, STI history was associated with intrapersonal (STI knowledge, HIV/STI risk perceptions), interpersonal (male sex partners in past 3 months, number of lifetime sexual partners) and structural (sexual stigma, history of forced sex, belief healthcare provider (HCP) uncomfortable addressing sexual orientation) factors as well as sexual healthcare uptake (ever had STI/HIV test, STI/Pap test in past 2 years). Gender-non-conforming participants were less likely to report an STI history.

**Conclusions** This research is among the first to examine intrapersonal, interpersonal and structural factors correlated with an STI history among WSW. Findings highlight the importance of STI prevention strategies for WSW to be tailored to sexual identity, with particular attention to bisexual women's needs. Interventions should connect to sexual healthcare, address sexual stigma and train HCP to better meet the needs of WSW.

## INTRODUCTION

The sexual health of women who have sex with women (WSW) has been described as understudied, in part, due to assumptions of limited sexually transmitted infection (STI) risk.<sup>1-4</sup> Yet, a growing body of evidence demonstrates that WSW do engage in sexual risk practices, including sex work,<sup>1 5 6</sup> injection<sup>5</sup> and non-injection<sup>1 6</sup> substance use and sex with men,<sup>7-10</sup> with low implementation of safer sex practices.<sup>4 11 12</sup> Research illustrates that WSW are susceptible to STIs from male and

female partners, including chlamydia, human papillomavirus (HPV) and herpes.<sup>1 3-5 10 12-16</sup> In a population-based Canadian study, self-reported STI histories were found among heterosexual women (8%), lesbians (9%) and bisexual women (23%).<sup>8</sup> Cross-sectional studies with WSW in the USA<sup>1 17</sup> and Australia<sup>5</sup> reported lifetime history of STI rates ranging from 21%<sup>1</sup> to 53%.<sup>17</sup> These findings highlight the importance of understanding factors associated with STI vulnerability among WSW.

There is a growing focus on social and structural drivers of sexual health, such as stigma.<sup>18 19</sup> Sexual stigma includes social processes that devalue and limit access to power and opportunities among sexually minority persons, relationships and communities.<sup>20</sup> Sexual stigma dimensions include perceived stigma, awareness of negative social norms and enacted stigma, such as acts of violence and discrimination.<sup>20</sup> Sexual stigma limits access to sexual healthcare and HIV/STI prevention, treatment and care<sup>19</sup> and has been associated with HIV/STI vulnerability among men who have sex with men (MSM).<sup>21 22</sup> There has been less attention to sexual stigma and STI vulnerability among WSW.

Indeed, most studies examining correlates of STI among WSW have focused on sociodemographic and individual level factors, including intrapersonal (eg, substance use) and interpersonal (eg, number of sex partners) dimensions<sup>1 11 15 16</sup> rather than structural dimensions. Several study findings suggest that women with both male and female sexual partners may be at higher risk for STIs than women who have exclusively male or female partners.<sup>7-10 17</sup> A recent study revealed that sexual assault predicted HIV infection among WSW in Southern Africa,<sup>23</sup> underscoring the salience of addressing structural risk contexts.

Our study objective was to understand sociodemographic, individual, structural and sexual health factors associated with a lifetime history of STI among WSW in Toronto, Canada. We also assessed prevalence of self-reported STI among WSW.

## METHODS

### Definition of WSW

The term 'WSW' is used in sexual health research to be inclusive of women engaging in same sex sexual interactions who may not be identified as gay, lesbian, bisexual or queer, although the term is limited in integrating cultural and identity



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elements.<sup>24</sup> We use WSW to refer to sexually minority women; where we specifically talk about sexual identity, we use identity categories (eg, lesbian, bisexual). A lesbian may be defined as a woman attracted to a woman and to be bisexual may be defined as a person who is attracted to two sexes or two genders. The term queer conveys multiple meanings in relation to sexual identity, including women attracted to people of multiple genders, transgender and gender-fluid persons.<sup>2</sup> For more information on conceptualisations of queer please see Web Appendix.

### Study design

In December 2011–January 2012, we conducted a structured cross-sectional internet-based survey with WSW in Toronto, Canada. Participant inclusion criteria included adults aged >18 years, self-identified WSW and living in the Greater Toronto Area. Ten WSW were hired as peer recruiters (PR) to recruit study participants.

### Participant recruitment and data collection

Modified peer-driven recruitment<sup>25</sup> was conducted by PR; each PR recruited a predetermined number of participants (n=25) using a combination of strategies (in-person, internet, study flyers). PR were WSW purposively selected due to their lesbian, gay, bisexual, transgender and queer (LGBTQ+) community-based connections and included service providers, community organisers and event planners/promoters. By hiring PR reflective of diverse ages, ethnicities and sexual identities and limiting the number each PR could recruit, we aimed to reduce bias in the sample. We also implemented convenience sampling techniques, sending emails with inclusion criteria and the study purpose to LGBTQ+ agencies, community health centres, HIV/STI service organisations and ethnocultural agencies. Participants completed a self-administered 45–60 min online survey in a self-selected location. The anticipated sample size was 425; this size was calculated as sufficient for logistic regression analyses using G\*Power software (OR 1.3,  $p < 0.05$ , power 0.80).

We developed a survey to assess sociodemographic, sexual health, individual and structural correlates of STI. The survey was pilot-tested in a focus group with PR. Focus group feedback was used to modify survey items to enhance survey clarity and appropriateness and to ensure the sociodemographic information collected was inclusive of sexual and gender diversity (eg, queer). No identifying information was collected on the survey and participants could opt in to receive a \$20 gift card honorarium.

### Survey measures

We assessed sociodemographic variables, including age, income, education, ethnicity, sexual identity and relationship status. Lifetime histories of STI were self-reported. Intrapersonal measures included perceived HIV and STI risk, based on single items with a four-point Likert-scale response. The Sexually Transmitted Disease Knowledge Questionnaire (Cronbach's  $\alpha = 0.77$ , range 0–20) assessed STI knowledge.<sup>26</sup> Interpersonal items assessed lifetime number of sexual partners and gender of sex partners in the past 3 months.

We assessed sexual stigma using Homophobia Scale of Diaz *et al.*,<sup>27</sup> this scale includes perceived (Cronbach's  $\alpha = 0.70$ , subscale range 4–16) and enacted (Cronbach's  $\alpha = 0.72$ , subscale range 8–32) stigma subscales. A single dichotomous item assessed history of forced sex. We assessed barriers to accessing healthcare, including time, travel costs, and believing one's healthcare provider (HCP) was uncomfortable with participants'

sexual orientation. We included one item to measure gender non-conformity, being considered masculine in mannerisms/appearance, with a four-point Likert-scale. To assess sexual healthcare access, we asked whether participants received an HIV, STI (not including HIV) or Pap test ever, and in the past 24 months.

### Statistical analyses

Descriptive analyses were conducted to calculate frequencies, mean values and SDs for variables. We assessed scale reliability using Cronbach's  $\alpha$ . We conducted multivariate logistic regression analyses to determine correlates of a lifetime STI diagnosis history, an appropriate analytical method for categorical outcomes. First, unadjusted logistic regression analyses were conducted, and following this we conducted logistic regression analyses controlling for sexual orientation and relationship status. Analyses were conducted on non-missing responses. All analyses were conducted using IBM SPSS V.22.

## RESULTS

### Study population

Study participant characteristics (n=466) are described in table 1.

The mean age was 31.4 (SD 8.1) years, the mean annual income was \$31 651 CAD (SD: 13 688) and 34% self-categorised as an ethnoracial minority. Among participants, 46% self-categorised as queer, 29% as lesbian and 16% as bisexual, 5% gay and 4% other. Participants reported a mean of 14.2 (SD 11.7) lifetime sexual partners. Approximately one-fifth (19.1%) of participants reported a lifetime STI history, of these 5% reported currently living with an STI. Histories of STI were highest among bisexual (38%), followed by queer (21%), lesbian (10%) and gay (5%) participants. Participants who reported an STI history could choose to fill in an open-ended question describing the STI they were diagnosed with; 73/89 completed this information. The most common STI reported among participants included HPV and genital warts (n=30, 6%), *Chlamydia* (n=19, 4%), herpes (n=16, 3%; most participants did not differentiate between oral/genital herpes) and HIV (n=6, 1%).

### Correlates of having a lifetime STI history

Results from logistic regression analyses are presented in table 2.

As detailed in table 2, STI history was correlated with sexual orientation and relationship status, with bisexual participants over twice as likely, and lesbians approximately half as likely, to report an STI history than those identifying as queer. Participants who were cohabitating, dating or had no current partners were less likely to report an STI history than those with multiple partners. No other sociodemographic variables were significantly correlated with a history of STI.

In multivariate logistic regression analyses controlling for sociodemographic variables, STI history was associated with intrapersonal factors including higher HIV risk perceptions, STI risk perceptions and STI knowledge scores. Interpersonal factors associated with an STI history included lifetime number of sexual partners. Participants who reported having male sex partners in the past 3 months were 3.5 times more likely to report an STI history than those with no recent male sex partners.

There were several structural variables associated with an STI history. Notably, participants who experienced enacted sexual stigma were 6.5 times more likely, and those who experienced perceived sexual stigma were twice as likely, to report an STI history. Those with a history of forced sex were over twice as

**Table 1** Main characteristics of participants (n=466)

Variables*	Mean (SD)	No of participants (%)†
Age (n=400)	31.38 (8.12); median 29 (range 18–70)	
Annual income	31 651.32 (13 688.56) Median: 29 000	
Sexual orientation (n=417)	Queer	193 (46.3)
	Lesbian	121 (29.0)
	Bisexual	67 (16.1)
	Gay	19 (4.6)
	Other	17 (4.1)
Ethnoracial identity (n=389)	Caucasian	261 (67.1)
	African Caribbean	73 (18.7)
	Asian	16 (4.2)
	South Asian	16 (4.2)
	Indigenous/aboriginal	15 (3.8)
	Multiple ethnicities	8 (2.0)
Education (n=419)	Less than high school	4 (1.0)
	High school or equivalent	29 (6.9)
	Some college/university	61 (14.6)
	College diploma	57 (13.6)
	Bachelor degree	153 (36.5)
	Graduate degree	115 (27.4)
Relationship status	Living together (not married)	140 (30.0)
	Dating (not living together)	111 (23.8)
	No current partners	56 (12.0)
	Polyamorous/multiple partners	44 (9.4)
	Married	43 (9.2)
	Casual dating	43 (9.2)
	Other	29 (6.2)
Number of lifetime sexual partners: mean=14.2 (SD 11.7)	0–5	88 (18.9)
	6–10	101 (21.7)
	11–15	172 (36.9)
	16–20	30 (6.4)
	≥21	75 (16.1)
Gender of sexual partners in past 3 months‡	Male	118 (25.3)
	Female	329 (70.6)
	Trans	67 (14.4)
Lifetime STI history	Yes	89 (19.1)
	No	377 (80.9)
STI reported‡ (n=73)	HPV and genital warts	30 (6.4)
	Chlamydia	19 (4.1)
	Herpes	16 (3.4)
	HIV	6 (1.4)
	Do not know/do not remember	3 (0.6)
	Trichomoniasis	1 (0.2)
	Pubic lice	1 (0.2)
	Gonorrhoea	1 (0.2)
	Hepatitis C	1 (0.2)
	Molluscum contagiosum	1 (0.2)
Currently living with STI	Currently living with STI	24 (5.2)
Received STI test	Ever	312 (67.0)
	Past 24 months	248 (53.2)
Received HIV test	Ever	278 (59.7)
	Past 24 months	212 (45.5)
Received Pap test	Past 24 months	332 (71.2)
History of lifetime sexual assault (n=415)	Yes	173 (41.7)
	No	242 (58.3)
Perceived as gender non-conforming	No	306 (65.7)
	Yes	160 (34.3)
Believe healthcare providers were not comfortable with their sexual orientation		64 (13.7)

\*n=466 unless otherwise specified.

†Percentages calculated from non-missing responses for each variable.

‡Participants could select more than 1 response.

STI, sexually transmitted infection.

likely to have had an STI. Participants who reported being gender non-conforming were almost half as likely to report an STI history.

Healthcare experiences were also significant correlates of a lifetime STI history. Having had an STI was associated with the belief that one's HCP was not comfortable with one's sexual

**Table 2** Univariate and multivariate logistic modelling of factors associated with a lifetime history of STI (n=466)

Variables	Unadjusted univariate logistic regression analyses, OR (95% CI)	p Value	Adjusted multivariate logistic regression analyses,* OR (95% CI)	p Value
Sociodemographic variables				
Age	1.03 (0.99 to 1.09)	0.09		
Education	1.08 (0.46 to 2.53)	0.87		
Income	1.00 (1.00 to 1.00)	0.22		
Ethnicity (person of colour vs white)	0.80 (0.47 to 1.36)	0.41		
Sexual orientation				
Queer (ref)	1			
Bisexual	2.42 (1.37 to 4.27)	0.002		
Lesbian	0.43 (0.22 to 0.84)	0.01		
Gay	0.21 (0.03 to 1.62)	0.14		
Transgender or gender queer	0.39 (0.15 to 1.01)	0.05		
Relationship status				
Multiple partners (ref)				
Other	0.56 (0.19 to 1.59)	0.27		
Married	0.60 (0.24 to 1.51)	0.28		
Cohabiting	0.31 (0.14 to 0.67)	0.001		
Dating	0.32 (0.14 to 0.74)	0.002		
Casual dating	0.68 (0.27 to 1.67)	0.40		
No current partners	0.29 (0.11 to 0.77)	0.01		
Intrapersonal factors				
Perception of HIV risk	2.20 (1.42 to 3.41)	0.0004	2.28 (1.42 to 3.66)	0.007
Perception of STI risk	1.86 (1.32 to 2.61)	0.0003	1.88 (1.28 to 2.76)	0.006
STI knowledge	1.10 (1.02 to 1.19)	0.01	1.08 (1.00 to 1.17)	0.04
Interpersonal factors				
Male sex partners in past 3 months	4.00 (2.46 to 6.52)	0.00002	3.52 (2.06 to 6.02)	0.004
Number of lifetime sexual partners	1.03 (1.01 to 1.04)	0.01	1.03 (1.01 to 1.04)	0.01
Structural factors				
Enacted sexual stigma	5.64 (1.08 to 29.43)	0.04	6.50 (1.10 to 38.31)	0.04
History of forced sex	2.18 (1.35 to 3.53)	0.002	2.38 (1.44 to 3.93)	0.003
Perceived sexual stigma	2.08 (1.12 to 3.87)	0.02	2.09 (1.08 to 4.03)	0.03
Barrier: belief HCP not comfortable with sexual orientation	2.00 (1.10 to 3.63)	0.02	1.97 (1.06 to 3.67)	0.03
Perceived as gender non-conforming (eg, butch/stud/masculine)	0.59 (0.46 to 0.76)	0.00007	0.58 (0.45 to 0.76)	0.001
Barrier: do not have the time	1.71 (1.03 to 2.84)	0.04	1.48 (0.88 to 2.49)	0.14
Sexual healthcare access				
Ever had an STI test	4.27 (1.66 to 10.99)	0.002	3.89 (1.49 to 10.14)	0.01
Ever had an HIV test	2.95 (1.49 to 5.82)	0.003	2.76 (1.38 to 5.52)	0.004
Pap test in past 2 years	2.76 (1.48 to 5.17)	0.001	2.38 (1.24 to 4.56)	0.01
Had STI test in past 2 years	2.36 (1.44 to 3.87)	0.001	2.02 (1.20 to 3.39)	0.01
Had HIV test in past 2 years	1.61 (1.01 to 2.56)	0.04	1.33 (0.82 to 2.16)	0.24

Note: 83.1% correct classification of cases; Hosmer–Lemeshow ( $\chi^2=7.90$ ,  $p=0.44$ ),  $R^2=0.17$  (Cox and Snell) and  $R^2=0.28$  (Nagelkerke).

\*Adjusted for sexual orientation and relationship status.

HCP, healthcare provider; STI, sexually transmitted infection.

orientation. STI history was correlated with sexual healthcare uptake: participants who reported ever having had an STI test were over three times as likely, and those who had ever had an HIV test over twice as likely, to report having had an STI. STI histories were over twice as frequently reported among participants who had received a Pap test or STI test in the past 2 years.

## DISCUSSION

Our study is among the first to investigate individual, structural and sexual health correlates of a history of STI among WSW. Results indicate that almost one-fifth of participants have a lifetime STI history. Participants with a bisexual identity were more likely, and lesbians less likely, to report an STI history than those

identifying as queer. Controlling for sociodemographics, STI history was associated with intrapersonal (STI knowledge, HIV/STI risk perceptions), interpersonal (male sex partners in past 3 months, number of lifetime sexual partners) and structural (perceived/enacted sexual stigma, history of forced sex, belief HCP was uncomfortable addressing sexual orientation) factors as well as sexual healthcare uptake (ever had STI/HIV test, receiving STI/Pap tests in past 2 years). Gender-non-conforming participants were less likely to report an STI history. Our study identifies an important set of social–ecological factors associated with a lifetime history of STI among WSW. Social–ecological frameworks highlight multi-level (intra/interpersonal, social and structural) contexts of population health.<sup>19</sup>

Our finding of a 20% lifetime history of STI among WSW corroborates lifetime rates of STI in previous cross-sectional work with targeted WSW samples in the USA.<sup>1</sup> Similar to prior research, we found that having male sexual partners in the past 3 months was associated with an STI history.<sup>7–10 15</sup> Our findings are similar to Canadian population-based study findings of Steele *et al*<sup>8</sup> in two ways: we also found higher self-reported STI rates among bisexuals than lesbians, and similar self-reported STI history rates (~10%) among lesbians. However, self-reported STI rates among bisexuals were higher in our sample (38%) than in the study of Steele *et al*<sup>8</sup> (21%); this could be due to our non-random sample. Steele *et al*<sup>8</sup> recognised that the categories of homosexual/bisexual were not inclusive of all WSW and there was likely under-reporting of STI among WSW. We found similar prevalence of chlamydia (4%),<sup>5</sup> gonorrhoea (0.2%)<sup>11</sup> and genital herpes/HSV-2 (3%) among WSW as previous studies.<sup>5 9–11 15</sup> Our HPV prevalence (6%) was lower than reported rates (13%) based on HPV DNA testing in US studies with WSW.<sup>14</sup> This difference in self-reported versus DNA tested HPV prevalence highlights the possibility of low HPV testing rates among WSW in Toronto.

We did not locate other studies that measured associations between STI knowledge, HIV/STI risk perceptions and STI history among WSW. Having experienced an STI could enhance one's awareness about HIV/STI risk and could increase STI knowledge. The cross-sectional, quantitative study design precludes understanding of the nature of this association. Our finding that interpersonal factors, including lifetime sexual partners and male partners, were associated with a history of STI corroborates prior research.<sup>1 11 15 16</sup> We found that gender non-conforming women are less likely to have a history of STI, suggesting the need to better understand sexual practices among WSW with more masculine gender presentation. While one-quarter of participants reported recent sex with a male partner, only 16% identified as bisexual, corroborating research that highlights discrepancies between sexual identity and practices.<sup>24</sup>

One of the most unique findings of this study is the association between sexual stigma (enacted, perceived) and STI history. To our knowledge, no studies have measured this association among WSW, although sexual stigma has been identified as a structural risk factor for STI with MSM.<sup>21 22</sup> Our finding that forced sex was associated with STI history corroborates prior research among WSW in Southern Africa,<sup>23</sup> suggesting the importance of assessing sexual violence as a structural risk factor. Associations between accessing sexual healthcare access and a history of STI point to the salience of integrating sexual health services into general medical treatment.

There are several limitations to our study. Generalisability is limited due to the non-probability sample. Our sample includes one-third ethnoraacial participants, lower than 47% in Toronto's population.<sup>28</sup> We oversampled persons with bachelor degrees: 65% in the study in comparison with 33% in Toronto's general population.<sup>29</sup> This may be due to the online survey design biased to include persons with internet access.<sup>30</sup> We could not assess chronicity or causality due to the cross-sectional study design. Self-reported STI could result in under-reporting. Clarifying STI diagnoses timeframes would strengthen findings. Associations between healthcare and STI could be confounders of the relationship between healthcare use and STI testing. Finally, social desirability bias could influence sexual risk responses. These limitations point to the need for future studies to use more representative samples of WSW, biological STI outcomes and longitudinal designs to assess the trajectory of STI and social-ecological factors. Despite these limitations, this is

the first study to assess associations between sexual stigma and other structural factors and STI history among WSW. Understanding the role of sexual stigma and sexual healthcare in STI prevention among WSW is an important area for future research.

Study findings suggest that STI prevention strategies for WSW should be multi-level and tailored to address the diversity of sexual practices among WSW.<sup>12</sup> It is important to enhance STI knowledge and access to sexual healthcare. Interventions to challenge sexual stigma must be implemented at community and institutional levels. Training HCP about WSW is essential to enhancing sexual health among WSW. Effective STI prevention strategies with WSW can benefit from a social-ecological approach<sup>19</sup> that conceptualises social and structural contexts of women's sexual health.

### Key messages

- ▶ There is a need to understand structural factors, such as stigma and discrimination, associated with sexually transmitted infection (STI) vulnerability among women who have sex with women (WSW).
- ▶ STI prevention interventions for WSW should be tailored for women's different sexual practices, paying particular attention to the sexual health needs of bisexual women.
- ▶ STI prevention strategies for WSW can be integrated into sexual healthcare and should involve training healthcare providers to better meet the needs of WSW.

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### REFERENCES

- 1 Bauer GR, Welles S. Beyond assumptions of negligible risk: sexually transmitted diseases and women who have sex with women. *Am J Public Health* 2001;91:1282–6.
- 2 Logie C. (Where) do queer women belong? Theorizing intersectional and compulsory heterosexism in HIV research. *Critical Public Health* Published Online First: Jul 2014.
- 3 Marrazzo JM. Sexually transmitted infections in women who have sex with women: who cares? *Sex Transm Infect* 2000;76:330–2.
- 4 Pinto V, Tancredi M, Neto A, *et al*. Sexually transmitted disease/HIV risk behaviour among women who have sex with women. *AIDS* 2005;19:S64–9.
- 5 Fethers K, Marks C, Mindel A, *et al*. Sexually transmitted infections and risk behaviours in women who have sex with women. *Sex Transm Inf* 2000;76:345–9.
- 6 Lyons T, Kerr T, Duff P, *et al*. Youth, violence and non-injection drug use: nexus of vulnerabilities among lesbian and bisexual sex workers. *AIDS Care* 2014;26:1090–4.
- 7 Bauer GR, Jairam JA, Baidoobonso SM. Sexual health, risk behaviors, and substance use in heterosexual-identified women with female sex partners: 2002 US National Survey of Family Growth. *Sex Transm Dis* 2010;37:531–7.
- 8 Steele LS, Ross LE, Dobinson C, *et al*. Women's Sexual Orientation and Health: Results from a Canadian Population-Based Survey. *Women Health* 2009;49:353–67.



- 9 Tao G. Sexual orientation and related viral sexually transmitted disease rates among US women aged 15 to 44 years. *Am J Public Health* 2008;98:1007–9.
- 10 Xu F, Sternberg MR, Markowitz LE. Women who have sex with women in the United States: prevalence, sexual behavior and prevalence of herpes simplex virus type 2 infection—results from national health and nutrition examination survey 2001–2006. *Sex Transm Dis* 2010;37:407–13.
- 11 Bailey JV, Farquhar C, Owen C, *et al.* Sexually transmitted infections in women who have sex with women. *Sex Transm Infect* 2004;80:244–6.
- 12 Schick V, Rosenberger JG, Herbenick D, *et al.* Sexual behaviour and risk reduction strategies among a multinational sample of women who have sex with women. *Sex Transm Infect* 2012;88:407–12.
- 13 Bailey JV, Kavanagh J, Owen C, *et al.* Lesbians and cervical screening. *Br J Gen Pract* 2000;50:481–2.
- 14 Marrazzo JM, Koutsky LA, Kiviat NB, *et al.* Papanicolaou test screening and prevalence of genital human papillomavirus among women who have sex with women. *Am J Public Health* 2001;91:947–52.
- 15 Marrazzo JM, Stine K, Wald A. Prevalence and risk factors for infection with herpes simplex virus type-1 and -2 among lesbians. *Sex Transm Dis* 2003;30:890–5.
- 16 Singh D, Fine DN, Marrazzo JM. Chlamydia trachomatis Infection Among Women Reporting Sexual Activity With Women Screened in Family Planning Clinics in the Pacific Northwest, 1997 to 2005. *Am J Public Health* 2011;101:1284–90.
- 17 Muzny CA, Sunesara IR, Martin DH, *et al.* Sexually transmitted infections and risk behaviors among African American women who have sex with women: does sex with men make a difference? *Sex Transm Dis* 2011;38:1118–25.
- 18 Auerbach JD, Parkhurst JO, Caceres CF. Addressing social drivers of HIV/AIDS for the long-term response: conceptual and methodological considerations. *Glob Public Health* 2011;6:S293–309.
- 19 Baral S, Logie C, Grosso A, *et al.* Modified social ecological model: a tool to visually represent the risks and risk contexts of HIV epidemics. *BMC Public Health* 2013;13:482.
- 20 Herek GM. Confronting sexual stigma and prejudice: Theory and practice. *J Soc Issues* 2007;63:905–25.
- 21 Bruce D, Ramirez-Valles J, Campbell RT. Stigmatization, substance use and sexual risk behavior among Latino Gay and Bisexual Men and Transgender Persons. *J Drug Issues* 2008;38:235–60.
- 22 Yi H, Sandfort TGM, Shidlo A. Effects of disengagement coping with HIV risk on unprotected sex among HIV-negative gay men in New York City. *Health Psychol* 2010;29:205–14.
- 23 Sandfort TGM, Baumann LRM, Matebeni Z, *et al.* Forced sexual experiences as risk factor for self-reported HIV infection among southern African lesbian and bisexual women. *PLoS ONE* 2013;8:e53552.
- 24 Young RM, Meyer IH. The trouble with “MSM” and “WSW”: erasure of the sexual-minority person in public health discourse. *Am J Public Health* 2005;95:1144–9.
- 25 Magnani R, Sabin K, Saidel T, *et al.* Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS* 2005;19:S67–72.
- 26 Jaworski BC, Carey MP. Development and psychometric evaluation of a self-administered questionnaire to measure knowledge of sexually transmitted disease. *AIDS Behav* 2007;11:557–4.
- 27 Diaz RM, Ayala G, Bein E, *et al.* The impact of homophobia, poverty and racism on the mental health of gay and bisexual Latino men: findings from 3 US cities. *Am J Public Health* 2001;91:927–32.
- 28 City of Toronto. Toronto’s Racial Diversity. 2013. [http://www.toronto.ca/toronto\\_facts/diversity.htm](http://www.toronto.ca/toronto_facts/diversity.htm) (accessed 1 Sep 2013).
- 29 City of Toronto. 2011 National Household Survey: Labour Force, Education, Place of Work, Commuting and Mobility. [http://www.toronto.ca/demographics/pdf/nhs\\_backgrounder.pdf](http://www.toronto.ca/demographics/pdf/nhs_backgrounder.pdf) (accessed 1 Sep 2013).
- 30 Meyer IH, Wilson PA. Sampling lesbian, gay and bisexual populations. *J Couns Psychol* 2009;56:23–31.

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## **Correlates of a lifetime history of sexually transmitted infections among women who have sex with women in Toronto, Canada: results from a cross-sectional internet-based survey**

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