

The risk of HIV among women after acquiring a sexually transmitted infection (STI) and considerations for their use of PrEP

? Questions

- What is the current evidence among women in high-income countries regarding HIV risk after acquiring a sexually transmitted infection (STI)?
- What does the evidence state regarding the use of pre-exposure prophylaxis (PrEP) to prevent HIV among women who have acquired an STI?

🔑 Key Take-Home Messages

- A recent study in the U.S. found that most women who were diagnosed with HIV did not have a reported STI in the past (1). Another U.S. study found that women with an STI represented a small fraction of women who acquired HIV (2).
- Nevertheless, guidelines in high-income countries have recommendations for the use of PrEP among women, some of which refer to a recent bacterial STI as an indicator for PrEP (3–5).
- There are no clinical trials on the use of PrEP among heterosexual populations in high-income countries (3) and more research is needed in order to estimate accurate HIV risks for various populations, behaviours, and types of STIs (6).

! The Issue and Why it's Important

According to national HIV estimates, in 2018 women represented almost a third (29.3%; n=748) of new HIV infections in Canada (7). This is compared to an estimate of 22.2% (n=436) in 2014 (8, 9). The Canadian Guidelines on Sexually Transmitted Infections state that having an STI (such as syphilis, genital herpes, chlamydia, gonorrhoea, or trichomoniasis) can increase an individual's risk of acquiring HIV (10). However, more research is needed in order to estimate accurate risks for various populations, behaviours, and

References

1. Newman DR, Rahman MM, Brantley A, Peterman TA. Rates of new human immunodeficiency virus (HIV) diagnoses after reported sexually transmitted infection in women in Louisiana, 2000–2015: Implications for HIV prevention. *Clinical Infectious Diseases*. 2019.
2. Peterman TA, Newman DR, Maddox L, Schmitt K, Shiver S. Risk for HIV following a diagnosis of syphilis, gonorrhoea or chlamydia: 328,456 women in Florida, 2000–2011. *International Journal of STD & AIDS*. 2015;26(2):113–9.
3. Brady M, Rodger A, Asboe D, Cambiano V, Clutterbuck D, Desai M, et al. BHIVA/BASHH guidelines on the use of HIV pre-exposure prophylaxis (PrEP) 2018. *HIV Medicine*. 2019;20(S2):S2–S80.
4. Centers for Disease Control and Prevention, US Public Health Service. Pre-exposure prophylaxis for the prevention of HIV infection in the United States — 2017 Update. A clinical practice guideline. 2018. Available from: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf>. Accessed December 3, 2019.
5. Tan DH, Hull MW, Yoong D, Tremblay C, O'Byrne P, Thomas R, et al. Canadian guideline on HIV pre-exposure prophylaxis and nonoccupational postexposure prophylaxis. *Canadian Medical Association Journal*. 2017;189(47):E1448–E58.

types of STIs (6).

Since 2010, there have been six randomized controlled trials (RCTs) focusing on the use of PrEP among different populations, including heterosexual men and women in African countries (11, 12), people who inject drugs in Thailand (13), and men who have sex with men (14–16). Each of these RCTs found PrEP to be effective in reducing the risk of HIV among the populations studied (11–17). Though none of these RCTs have focused on women in high-income countries, studies in the U.S. have prospectively followed women to see how many acquired HIV, with lower than expected transmission rates (2, 18, 19). The use of PrEP has been recommended in a guideline from the CDC for individuals at risk, including heterosexual women with a recent gonorrhea or syphilis infection (4).

This review identifies the extent to which STIs are predictive of HIV risk among women in high-income countries and explores the merit of PrEP among women with an STI.

What We Found

Guidelines for the use of PrEP among women with an STI

Guidelines in high-income countries have recommendations for the use of PrEP among heterosexual women (refer to Table 1) (3–5). Canadian guidelines (updated in 2018) recommend PrEP for men who have sex with men that have been diagnosed with syphilis or a rectal bacterial STI, but does not specify recommendations for PrEP among women who have had a recent STI (5).

The 2018 guidelines from the British HIV Association suggest that PrEP may be offered on a case-by-case basis to HIV-negative individuals considered at increased risk of HIV acquisition, which may include clinical indicators such as a rectal or vaginal bacterial STI or a diagnosis of hepatitis C in the previous year (3). The 2017 updated PrEP guidelines from the CDC includes more detailed recommended indications for PrEP use by heterosexually active men and women (4). The recommended indications state (among others) that adult heterosexual men and women should consider using PrEP if they are HIV negative, not in a monogamous partnership with a recently tested HIV-negative partner, and have been diagnosed with or reported a bacterial STI (syphilis or gonorrhea) in the past six months (4). One study suggests that the recommended indications from the CDC guidelines could disqualify many women from PrEP (20). In a sample of 679 HIV-negative women recently engaged in care at Connecticut Planned Parenthood, authors found that only ten (1.5%) would be eligible for PrEP based on the CDC's recommended indications criteria (20).

6. Centers for Disease Control and Prevention. Factors increasing the risk of acquiring or transmitting HIV. 2019. Available from: [https://www.cdc.gov/hiv/risk/estimates/riskfactors.html#:~:targetText=Indirect%20evidence%20of%20STDs%20increasing,fluid%20\(Galvin%2C%202004](https://www.cdc.gov/hiv/risk/estimates/riskfactors.html#:~:targetText=Indirect%20evidence%20of%20STDs%20increasing,fluid%20(Galvin%2C%202004). Accessed December 3, 2019.

7. Haddad N, Robert A, Weeks A, Popovic N, Siu W, Archibald C. HIV in Canada — Surveillance Report, 2018. *Canada Communicable Disease Report*. 2019;45(12):304–12.

8. Canadian AIDS Treatment Information Exchange. The epidemiology of HIV in females. 2019. Available from <https://www.catie.ca/sites/default/files/epi%20females%20EN%202019%2008%2028.pdf>. Accessed December 4, 2019.

9. Public Health Agency of Canada. Summary: Estimates of HIV incidence, prevalence and Canada's progress on meeting the 90-90-90 HIV targets, 2016. 2018. Available from: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/summary-estimates-hiv-incidence-prevalence-canadas-progress-90-90-90.html>. Accessed December 4, 2019.

10. Government of Canada. Section 2: Canadian guidelines on sexually transmitted infections — primary care and sexually transmitted infections. 2013. Available from: <https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/sexually-transmitted-infections/canadian-guidelines-sexually-transmitted-infections-17.html#a10>. Accessed December 3, 2019.

11. Baeten JM, Donnell D, Ndase P, Mugo NR, Campbell JD, Wangisi J, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *New England Journal of Medicine*. 2012;367(5):399–410.

Table 1

Guideline	Recommendations for PrEP use (related to heterosexual women)
<p>Canadian guideline on HIV pre-exposure prophylaxis and non-occupational post-exposure prophylaxis (5)</p>	<p>Heterosexual exposure</p> <ul style="list-style-type: none"> ❗ PrEP is recommended for the HIV-negative partner in heterosexual serodiscordant relationships reporting condomless vaginal or anal sex where the HIV-positive partner has a substantial risk of having transmissible HIV. ❗ PrEP may be considered for the HIV-negative partner in heterosexual serodiscordant relationships reporting condomless vaginal or anal sex, where the HIV-positive partner has a low but non-negligible risk of having transmissible HIV.
<p>Pre-exposure prophylaxis for the prevention of HIV infection in the U.S. – 2017 update: A clinical practice guideline (4)</p>	<p>Detecting substantial risk of acquiring HIV infection</p> <ul style="list-style-type: none"> ❗ Having an HIV-positive sexual partner, a recent bacterial STI (gonorrhea or syphilis), a high number of sex partners, a history of inconsistent or no condom use, participating in commercial sex work, or being in high HIV prevalence area or network. <p>Recommended indications for PrEP use by heterosexually active women (and men)</p> <ul style="list-style-type: none"> ❗ An adult person, without acute or established HIV infection, having any sex with opposite sex partners in past 6 months, and not in a monogamous partnership with a recently tested HIV-negative partner. ❗ And at least one of the following: <ul style="list-style-type: none"> > Infrequently uses condoms during sex with one or more partners of unknown HIV status who are known to be at substantial risk of HIV infection (people who inject drugs or bisexual male partner). > In an ongoing sexual relationship with an HIV-positive partner. > A bacterial STI (syphilis, gonorrhea) diagnosed or reported in past 6 months.
<p>BHIVA/BASHH guidelines on the use of HIV pre-exposure prophylaxis (PrEP) 2018 (3)</p>	<p>Prescribing PrEP: Recommendations</p> <ul style="list-style-type: none"> ❗ Tenofovir/emtricitabine (TD-FTC) fixed-dose combination, dosed appropriately, is used for PrEP for heterosexual women who are at high risk (i.e. recent bacterial STI or HCV in the previous year) of HIV acquisition. ❗ For heterosexual men and women only, tenofovir alone may be considered.

12. Thigpen MC, Kebaabetswe PM, Paxton LA, Smith DK, Rose CE, Segolodi TM, et al. Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana. *New England Journal of Medicine*. 2012;367(5):423–34.

13. Choopanya K, Martin M, Suntharasa- mai P, Sangkum U, Mock PA, Leethochawalit M, et al. Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok tenofovir study): A randomised, double-blind, placebo-controlled phase 3 trial. *The Lancet*. 2013;381(9883):2083–90.

14. McCormack S, Dunn DT, Desai M, Dolling DI, Gafos M, Gilson R, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): Effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *The Lancet*. 2016;387(10013):53–60.

15. Molina J-M, Capitant C, Spire B, Pialoux G, Cotte L, Charreau I, et al. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. *New England Journal of Medicine*. 2015;373(23):2237–46.

16. Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*. 2010;363(27):2587–99.

17. BC Centre for Excellence in HIV/ AIDS. Guidance for the use of pre-exposure prophylaxis (PrEP) for the prevention of HIV acquisition in British Columbia. 2019. Available from: http://cfenet.ubc.ca/sites/default/files/uploads/publications/centredocs/prep_guidelines-14-aug-2019.pdf. Accessed November 3, 2019.

The risk of HIV following an STI diagnosis and the use of PrEP

One study investigated data from 328,456 women in Florida, where 2,118 women who acquired an STI were diagnosed with HIV between the years of 2000–2011 (2). The authors found that women who had an STI were diagnosed with HIV at a higher rate than women who did not have an STI, but those with an STI represented a small percentage of the women who acquired HIV (2). This was supported by the fact that only 0.67% of the women who were diagnosed with HIV from 2000–2011 were women who had reported syphilis prior to their HIV diagnosis (2).

A retrospective study investigated data from 211,603 women in Louisiana from 2000–2015 with a total of 969 HIV diagnoses (1). This study found that women with an STI were 2.3 times more likely to acquire HIV; however, those with an STI only made up 15.7% of new HIV diagnoses, indicating that most women who were diagnosed with HIV did not have a reported STI in the past (1). The rates of HIV acquisition were high for women with multiple risk factors, such as Black women living in high-risk areas who were diagnosed with syphilis at age 20–29 (n=17), but these women only comprised a small portion of all new HIV diagnoses (1). The study concluded that the rates of HIV among women who had an STI were not high enough for PrEP to be cost-effective (1).

Another study based on 27,814 syphilis cases reported in 2016 across the U.S. (of which 11.0% were among women) concluded that a syphilis diagnosis may be considered as an opportunity to initiate PrEP among women who are at high-risk for HIV (21). On the other hand, authors of a study examining total of 1,638,863 gonorrhea infections among both men and women in the U.S. from 2010–2014 found a correlation between gonorrhea and HIV but they could not determine the direction of the association; they recommended further analysis to determine more details regarding administering PrEP to this group (22).

Low awareness among women

Various studies in the U.S. found that many women were not familiar with PrEP (23–26). A 2017 study in New York among 118 women who inject drugs found that risk factors for HIV infection were high and that a relatively low number of women (31%) were aware of PrEP (24). A qualitative study conducted across six cities in the U.S. in 2014 reported that less than 10% of the 144 women who participated stated that they have heard of PrEP before (23, 26). Another study conducted in 2013 comprised of Black and Latina women in New York (n=23) found that the majority of these women (74%, n=17) did not know about PrEP before the focus groups started (23, 25).

18. Chirgwin KD, Feldman J, Dehovitz JA, Minkoff H, Landesman SH. Incidence and risk factors for heterosexually acquired HIV in an inner-city cohort of women: Temporal association with pregnancy. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*. 1999;20(3):295–9.

19. Padian NS, Shiboski SC, Glass SO, Vittinghoff E. Heterosexual transmission of human immunodeficiency virus (HIV) in northern California: Results from a ten-year study. *American Journal of Epidemiology*. 1997;146(4):350–7.

20. Calabrese SK, Willie TC, Galvao RW, Tekeste M, Dovidio JF, Safon CB, et al. Current US guidelines for prescribing HIV pre-exposure prophylaxis (PrEP) disqualify many women who are at risk and motivated to use PrEP. *Journal of Acquired Immune Deficiency Syndromes*. 2019;81(4):395–405.

21. Kidd S, Torrone E, Su J, Weinstock H. Reported primary and secondary syphilis cases in the United States: Implications for HIV infection. *Sexually Transmitted Diseases*. 2018;45(9S Suppl 1):S42–S7.

22. Andreatos N, Grigoras C, Shehadeh E, Pliakos EE, Stoukides G, Port J, et al. The impact of HIV infection and socio-economic factors on the incidence of gonorrhea: A county-level, US-wide analysis. *PLoS ONE [Electronic Resource]*. 2017;12(9):e0183938.

23. Sales JM, Steiner RJ, Brown JL, Swartzendruber A, Patel AS, Sheth AN. PrEP eligibility and interest among clinic- and community-recruited young black women in Atlanta, Georgia, USA. *Current HIV Research*. 2018;16(3):250–5.

HIV risk and PrEP among female sex workers

Data for HIV incidence among sex workers in Canada is limited; as a result, Canadian PrEP guidelines suggest that guidelines should be applied to sex workers based on other risk factors (5). The number of reported HIV diagnoses among sex workers is low: an Australian study found that from 2009 to 2015 there were only seven HIV infections among a sample of 18,465 women who reported sex work in that time frame (17, 27). The PrEP guideline from the British Columbia Centre for Excellence in HIV/AIDS states that only five percent of individuals in the province who acquired HIV through heterosexual exposure from 2008–2015 reported participating in sex work (17). Furthermore, the guideline notes that sex work alone does not justify the use of PrEP to prevent heterosexual HIV transmission in the province (17). A 2016 study in Vancouver among women who inject drugs found that when adjusting for other risk factors, sex work alone was not associated with HIV incidence among the sample of women (17, 28).

Factors That May Impact Local Applicability

PrEP guidelines from the UK states that while there is rigorous evidence regarding PrEP use among men who have sex with men, there are no clinical trials on PrEP use among heterosexual populations in high income countries (3). Studies on the efficacy of PrEP have been conducted on heterosexuals in sub-Saharan Africa (11, 12) where the prevalence of HIV is high therefore limiting the ability to generalize findings to the UK (3) and other similar high-income countries. Although the biological efficacy of PrEP would likely be the same, other factors such as different cultural beliefs and socio-demographic circumstances may impact PrEP adherence and efficacy (3) across populations.

What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations) using a combination of text term HIV AND (text term women or MeSH term exp Women/) AND text terms (Syphilis or Gonorrhea or Gonorrhoea or Chlamydia or Sexually Transmitted Disease* or Sexually Transmitted Infection* or STD* or STIs). Searches were conducted on November 22, 2019, and results limited to English articles published since 2015. Reference lists of identified articles were also searched. The search yielded 1,343 references from which 28 were included.

24. Walters SM, Reilly KH, Neaigus A, Braunstein S. Awareness of pre-exposure prophylaxis (PrEP) among women who inject drugs in NYC: The importance of networks and syringe exchange programs for HIV prevention. *Harm Reduction Journal*. 2017;14(1):40.

25. Collier KL, Colarossi LG, Sanders K. Raising awareness of pre-exposure prophylaxis (PrEP) among women in New York City: Community and Provider Perspectives. *Journal of Health Communication*. 2017;22(3):183–9.

26. Auerbach JD, Kinsky S, Brown G, Charles V. Knowledge, attitudes, and likelihood of pre-exposure prophylaxis (PrEP) use among US women at risk of acquiring HIV. *AIDS Patient Care and STDs*. 2015;29(2):102–10.

27. Callander D, McManus H, Guy R, Hellard M, O'Connor CC, Fairley CK, et al. Rising chlamydia and gonorrhoea incidence and associated risk factors among female sex workers in Australia: A retrospective cohort study. *Sexually Transmitted Diseases*. 2018;45(3):199–206.

28. Kerr T, Shannon K, Ti L, Strathdee S, Hayashi K, Nguyen P, et al. Sex work and HIV incidence among people who inject drugs. *AIDS (London, England)*. 2016;30(4):627.

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The OHTN Rapid Response Service offers quick access to research evidence to help inform decision making, service delivery and advocacy. In response to a question from the field, the Rapid Response Team reviews the scientific and grey literature, consults with experts, and prepares a review summarizing the current evidence and its implications for policy and practice.

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