

The return of syphilis in Canada: A failed plan to eliminate this infection

Ameeta E Singh BMBS, MSc, FRCPC¹, Barbara Romanowski MD, FRCPC¹

KEY WORDS: outbreak, public health, syphilis

MOTS-CLÉS : éclosion, santé publique, syphilis

¹*Division of Infectious Diseases, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada*

Correspondence: Ameeta Singh, 3B20-11111 Jasper Avenue, Edmonton, Alberta T5K 0L4 Canada. Telephone: 780-342-2300. Fax: 780-425-2194. E-mail: ameeta@ualberta.ca

“If I were asked which is the most destructive of all diseases, I should unhesitatingly reply, it is that which for some years has been raging with impunity. . . . What contagion does thus invade the whole body, so much resist medical art, becomes inoculated so readily, and so cruelly tortures the patient?” (Desiderius Erasmus, 1520)

On July 17, 2019, Alberta’s chief medical officer declared a province-wide outbreak of syphilis, announcing that syphilis rates had reached levels not seen since 1948 (1). In 2018, 1,536 infectious syphilis cases were reported, a tenfold increase from 2014, with the highest rates seen in Edmonton (69.98 per 100,000) and Northern Alberta (43.54 per 100,000). National data lag behind provincial data, but in Canada from 2010 to 2015, the rate of infectious syphilis increased by 85.6%, from 5.0 to 9.3 cases per 100,000 population (2). In 2015, 93.7% of reported cases were in males, with a rate of 17.5 cases per 100,000 versus 1.2 per 100,000 in females. The highest rates were seen in Nunavut, British Columbia, and Manitoba among individuals aged 20–39 years. The rate of congenital syphilis decreased from 2010 to 2014 (from 1.6 to 0.3 cases per 100,000 live births) but rose to 1.5 cases per 100,000 live births in 2015.

This increase in syphilis cases parallels the rise seen in other high-income countries, such as the United States and Australia (3,4). The vast majority of infections have been reported among men who have sex with men (5). All regions

have also seen a rise in cases among heterosexual men and women, with a subsequent increase in congenital syphilis.

In 1998, Canada announced a goal to eliminate infectious syphilis by maintaining the rate at no more than 0.5 per 100,000 population (6). However, the following year, an outbreak of infectious syphilis was reported in downtown Vancouver (7). Shortly afterward, Northern Alberta experienced an outbreak of infectious syphilis in heterosexuals, and in 2002, the first case of congenital syphilis in over 10 years was reported in Alberta (8). In Alberta, rates subsequently declined until the recent resurgence (9).

How can we explain this alarming increase in rates? The explanations are likely multifactorial. It is possible that with easier access to testing more people are getting tested, but unpublished data from Alberta suggest that even though testing rates have risen, there has been a real rise in new infections (personal communication Alberta Health Services, 2019). The introduction of reverse sequence algorithm testing for syphilis (2007 in Alberta) was predicted to result in a rise in primary syphilis due to improved test sensitivity, but Alberta data documented a rise in late latent, not primary, cases (10). It could be argued that regardless of what factors are at play, syphilis epidemics will cycle over time, with recurrent peaks and troughs in approximately 10-year cycles (11). A 44-year review of Alberta data confirmed the cycling of syphilis rates, with three outbreaks over this time period and a quiescent period of 2 decades between the mid-1980s and the mid-2000s (9). Almost certainly a major factor



for this observed lull in cases was the emergence of HIV in the early 1980s and the resultant fear of acquisition of infection that at the time was untreatable. With the recognition that safer sex could protect against acquiring HIV (12), there was an overall decline in rates of sexually transmitted infections (STIs) in the following years. With the introduction of combination antiretroviral therapy in the mid-1990s, HIV became a manageable chronic disease, and much of the fear of acquisition receded. This—together with the knowledge that HIV-infected persons with an undetectable viral load cannot transmit to others (13), the introduction of HIV pre-exposure prophylaxis (PrEP) (14), and the availability of mobile dating apps which make it easier to arrange sexual encounters (15,16)—has resulted in an increase in the number of sex partners, condomless sex, and the resurgence of STIs, including syphilis (17).

During the outbreak of syphilis among heterosexual adults in Edmonton in the mid-2000s, we observed neonates with congenital syphilis born to predominantly Indigenous women—many involved in the sex trade—and at least half of these women had not accessed prenatal care (8). Reasons for not accessing prenatal care highlighted the importance of addressing social determinants of health such as poverty, unstable housing, substance use, and trauma (18).

A significant proportion of syphilis cases occurring in heterosexual persons is due to engaging in illicit drug use (19). Drug use, particularly use of methamphetamine and injection drugs, is associated with having multiple sex partners or concurrent sexual partnerships, inconsistent condom use, and exchanging sex for drugs or money—all sexual behaviours that increase the risk for acquiring syphilis and other STIs (20–22). Even in Canada, with theoretical universal access to health services, the stigma and mistrust of the health care system, along with other social determinants of health among persons who use illicit drugs, contributes to a reluctance to access traditional health services (23). This poses significant challenges for syphilis prevention and control efforts.

Addressing these challenges will be difficult, but from the public health perspective, it is essential for surveillance to be timely and for proposed interventions to be targeted based on the local epidemiology while simultaneously making efforts to address social determinants of health. Lack of health care resources and sustained funding for STI programs have been cited as reasons for the resurgence of STIs (24). Therefore, dedicated and sustained resources for STI prevention and control will be critical to any successful strategy to control syphilis. As well, efforts supporting non-traditional ways of reaching at-risk populations for health care must be put in place. Some examples include expanded access to online STI testing in British Columbia (25) and delivering testing and treatment through outreach teams (26).

For primary care providers as well as infectious diseases specialists, a heightened awareness of syphilis—and considering it as part of a differential diagnosis given its protean

manifestations—is critical. Concern about the risk of decompensation due to PrEP should not discourage the use of this highly effective HIV prevention measure; instead, it should be viewed as an opportunity to engage and educate at-risk persons in regular screening for STIs. It will take our combined efforts to reach Canada's 1998 goal of syphilis elimination.

COMPETING INTERESTS: The authors have nothing to disclose.

CONTRIBUTORS: Writing – Original Draft, AES; Writing – Review & Editing, AES, BR.

ETHICS APPROVAL: N/A

INFORMED CONSENT: N/A

REGISTRY AND THE REGISTRATION NO. OF THE STUDY/TRIAL: N/A

ANIMAL STUDIES: N/A

FUNDING: No funding was received for this work.

PEER REVIEW: This article has been peer reviewed.

REFERENCES

- Giovannetti J. Alberta declares provincewide syphilis outbreak amid surge across Canada. *Globe and Mail* (Calgary Ed.) [Internet]. 2019 Jul 17 [cited 2019 Jul 21]. Available from: <https://www.theglobeandmail.com/canada/alberta/article-alberta-declares-provincewide-syphilis-outbreak-amid-surge-across/>.
- Choudhri Y, Miller J, Sandhu J, Leon A, Aho J. Infectious and congenital syphilis in Canada, 2010–2015. *Can Commun Dis Rep*. 2018;44(2):43–8. <https://doi.org/10.14745/ccdr.v44i02a02>. *Medline*:29770098
- Centers for Disease Control and Prevention (CDC). Sexually transmitted disease surveillance 2017 [Internet]. c2017 [updated 2018 Jul 24; cited 2019 Aug 8]. <https://www.cdc.gov/std/stats17/syphilis.htm>.
- Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report. Sydney: Kirby Institute; 2017. Available from: <https://data.kirby.unsw.edu.au/STIs>. (Accessed August 28, 2019).
- Kitayama K, Segura ER, Lake JE, et al. Syphilis in the Americas: a protocol for a systematic review of syphilis prevalence and incidence in four high-risk groups, 1980–2016. *Syst Rev*. 2017;6(1):195. <https://doi.org/10.1186/s13643-017-0595-3>. *Medline*:29017552
- Health Canada. Proceedings of the national STD consensus meeting. *Canada Communicable Disease Report (CCDR)*.

- Ottawa: Health and Welfare Canada; 1997 Nov, Vol. 23, S6, p. 2–9. Available from: http://publications.gc.ca/collections/collection_2016/aspc-phac/HP3-1-23-S6-eng.pdf.
7. Rekart M, Patrick D, Jolly A, et al. Mass treatment/prophylaxis during an outbreak of infectious syphilis in Vancouver, British Columbia. *Can Commun Dis Rep*. 2000;26(12):101–5. [Medline:10932390](#). English, French.
 8. Singh, AE, Sutherland K, Lee B, Robinson JL, Wong, T. Resurgence of early congenital syphilis in Alberta. *CMAJ*. 2007;177(1):33–6. <https://doi.org/10.1503/cmaj.070495>. [Medline:17606936](#)
 9. Landry T, Smyczek P, Cooper R, et al. Retrospective review of tertiary and neurosyphilis cases in Alberta, 1973–2017. *BMJ Open*. 2019;9(6):e025995. <https://doi.org/10.1136/bmjopen-2018-025995>. [Medline:31230001](#).
 10. Gratrix J, Plitt S, Lee BE, et al. Impact of reverse sequence syphilis screening on new diagnoses of late latent syphilis in Edmonton, Canada. *Sex Transm Dis*. 2012;39(7):528–30. <https://doi.org/10.1097/OLQ.0b013e31824e53f7>. [Medline:22706214](#)
 11. Nakashima AK, Rolfs RT, Flock ML, et al. Epidemiology of syphilis in the United States, 1941–1993. *Sex Transm Dis*. 1996;23(1):16–23. <https://doi.org/10.1097/00007435-199601000-00006>. [Medline:8801638](#)
 12. Berkowitz R, Callen M. How to have sex in an epidemic: one approach. New York: Tower Press; 1983.
 13. Rodger AJ, Cambiano V, Bruun T, et al. Sexual activity without condoms and risk of HIV transmission in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy. *JAMA*. 2016;316(2):171–81. <https://doi.org/10.1001/jama.2016.5148>. [Medline:27404185](#)
 14. Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med*. 2010;363(27):2587–99. <https://doi.org/10.1056/NEJMoa1011205>. [Medline:21091279](#)
 15. Tsai J, Sussman S, Pickering T, Rohrbach LA. Is online partner-seeking associated with increased risk of condomless sex and sexually transmitted infections among individuals who engage in heterosexual sex? A systematic narrative review. *Arch Sex Behav*. 2019;48(2):533–55. <https://doi.org/10.1007/s10508-018-1235-2>. [Medline:30155796](#)
 16. Wang H, Zhang L, Zhou Y, et al. The use of geosocial networking smartphone applications and the risk of sexually transmitted infections among men who have sex with men: a systematic review and meta-analysis. *BMC Public Health*. 2018;18(1):1178. <https://doi.org/10.1186/s12889-018-6092-3>. [Medline:30326887](#)
 17. Traeger MW, Cornelisse VJ, Asselin J, et al. Association of HIV preexposure prophylaxis with incidence of sexually transmitted infections among individuals at high risk of HIV infection. *JAMA*. 2019;321(14):1380–90. <https://doi.org/10.1001/jama.2019.2947>. [Medline:30964528](#)
 18. Mill, J, Singh AE, Taylor M. Women in the shadows: prenatal care for street-involved women. *Can J Urban Res*. 2012;21(2):68–89.
 19. Kidd SE, Grey JA, Torrone WA, Weinstock MD. Increased methamphetamine, injection drug and heroin use among women and heterosexual men with primary and secondary syphilis – United States, 2013–2017. *MMWR Morb Mortal Wkly Rep*. 2019;68(6):144–8. <https://doi.org/10.15585/mmwr.mm6806a4>. [Medline:30763294](#)
 20. Centers for Disease Control and Prevention (CDC). Methamphetamine use and HIV risk behaviors among heterosexual men—preliminary results from five northern California counties, December 2001–November 2003. *MMWR Morb Mortal Wkly Rep*. 2006;55(10):273–7. [Medline:16543881](#)
 21. Zule WA, Costenbader EC, Meyer WJ, Wechsberg WM. Methamphetamine use and risky sexual behaviors during heterosexual encounters. *Sex Transm Dis*. 2007;34(9):689–94. <https://doi.org/10.1097/01.olq.0000260949.35304.22>. [Medline:17471112](#)
 22. Flom PL, Friedman SR, Kottiri BJ, et al. Stigmatized drug use, sexual partner concurrency, and other sex risk network and behavior characteristics of 18- to 24-year-old youth in a high-risk neighborhood. *Sex Transm Dis*. 2001;28(10):598–607. <https://doi.org/10.1097/00007435-200110000-00006>. [Medline:11689758](#)
 23. Benoit C, Carroll D, Chaudhry M. In search of a healing place: Aboriginal women in Vancouver's Downtown Eastside. *Soc Sci Med*. 2003;56(4):821–33. [https://doi.org/10.1016/S0277-9536\(02\)00081-3](https://doi.org/10.1016/S0277-9536(02)00081-3).
 24. Weber L. U.S. has highest STD rates in industrialized world. Experts blame a lack of resources. *HuffPost US* [Internet]. 2018 Aug 28 [cited 2019 Aug 15]. Available from https://www.huffingtonpost.ca/entry/highest-std-rates-sexually-transmitted-diseases_n_5b85856de4b0162f471cf805.
 25. BC Centre for Disease Control. Expanded online STI testing program reduces barriers, reaches more people [Internet]. 2018 Mar 29 [cited 2019 Aug 8]. Available from <http://www.bccdc.ca/about/news-stories/news-releases/2017/gco-expansion>.
 26. Bergman J, Gratrix J, Plitt S, et al. Feasibility and field performance of a simultaneous syphilis and HIV point-of-care test based screening strategy in at risk populations in Edmonton, Canada. *AIDS Res Treat*. 2013:Article ID 819593. <https://doi.org/10.1155/2013/819593>. [Medline:24527210](#)