# Public Health Risk Profile: Infectious Syphilis Outbreaks and Re-Emergence of Congenital Syphilis in Canada

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**Reason for the assessment:** To analyze the public health risk associated with expansion of the infectious syphilis outbreak in Canada.
**Completed by:** Public Health Agency of Canada's (PHAC) – Corporate Data & Surveillance Branch (CDSB) – Center for Integrated Risk Assessment (CIRA) and Infectious Disease and Vaccination Programs Branch (IDVPB) Center for Communicable Diseases & Infection Control (CCDIC) Sexually Transmitted & Blood Borne Infection Surveillance Division (STBBI-SD) and Programs & Partnerships Division (PPD)

## Key Messages

- Canada continues to experience an ongoing crisis due to infectious syphilis with multiple provinces and territories (PTs) having declared outbreaks since 2016, with significant increases in congenital syphilis.
- Elevated rates of infection continue to occur in gay, bisexual and other men who have sex with men (gbMSM) populations, with concerns over increasing rates of infectious syphilis among individuals identified as heterosexual, pregnant individuals & their newborns, and among youth 15-19 years of age.
- The likelihood of acquiring infection is increased by modifiable risk factors as evident by outbreaks disproportionately concentrated among populations experiencing health and social inequities.
- The steady escalation in incidence and contributing risk factors has the potential to increase the overall risk in the general population. An adjustment in interventions is warranted to effectively address all populations at risk.
- The Syphilis Response Steering Committee, a federal, provincial, and territorial (FPT) initiative of the Pan-Canadian Public Health Network, is developing a coordinated multipronged response to the current crisis. Some preliminary recommendations proposed for their action include:
    - working further with Federal/Provincial/Territorial/Indigenous groups (FPTIg) as well as other partners to address the surveillance gaps to understand the burden of the disease including the impact of social determinants of health (SDOH)
    - developing targeted educational and awareness strategies to improve guidance and messaging to health care practitioners in Canada
    - developing targeted educational and awareness messaging for populations at increased risk
    - exploring mechanisms to improve linkages to prevention and care for populations at risk, underserved communities and hard to reach populations
    - considering research opportunities pertaining to the gaps identified through this assessment

## Event Summary

Infectious syphilis is an ongoing crisis in Canada with multiple PTs having declared outbreaks since 2016. There were 11,268 reported cases of infectious syphilis in Canada in 2021. Since 2017, the rate of infections has tripled. There has also been a re-emergence of congenital syphilis not seen since the disease became nationally notifiable in 1993. In 2021, 96 cases of confirmed early congenital syphilis were reported in Canada compared to 7 cases in 2017, representing a 1,271% increase. The PTs most affected by increasing rates of infectious syphilis are Alberta, Manitoba, Saskatchewan, and the Northwest Territories. Further, the redirection of resources to the COVID-19 pandemic has affected the public health response to this crisis.

## Public Health Risk Considerations

Since the early 2000s, the population most affected by infectious syphilis in Canada has been gbMSM. While the gbMSM population continues to be affected, recently a greater proportion of cases are among males and females identifying as heterosexual. This has led to an increasing incidence of congenital syphilis. The likelihood of acquiring infection is increased by several modifiable risk factors and requires a corresponding adjustment in interventions to effectively address all populations at risk.

## Likelihood Considerations

Syphilis outbreaks have been increasing in number and intensity in recent years, concentrated mainly among those experiencing health impacts and inequities related to social determinants of health such as housing instability, poverty, stigma, and discrimination, and those with modifiable risk factors such as multiple and/or anonymous partners. Syphilis outbreaks have been observed among populations disproportionately impacted by overlapping epidemics, including HIV and substance use. National surveillance data do not track co-infections, but Canadian studies have reported the prevalence of syphilis among HIV-positive individuals to be range between 8% to 56%.[1,2,3]

The possibility for accelerated transmission is particularly relevant for the groups as described below, and has the potential to increase the overall risk in the general population:

1. **gbMSM population**: The gbMSM population has been most affected by infectious syphilis in the last 25 years. Outbreaks continue to occur in this population, influenced by risk factors

such as multiple sexual partners and substance use/chemsex (sexual activity while under the influence of substances).[4]

2. **Population who identifies as heterosexual:** The largest increase in infectious syphilis is occurring among individuals who identify as heterosexual. Infection rates are influenced by multiple, overlapping social determinants of health and risk factors such as: housing insecurity, street involvement, rural or remote residence, lower income, mental health issues, substance use, experiences of violence and lack of access to health care.[4] Other barriers including systemic discrimination, racism, and stigmatization have contributed to mistrust in many populations, serving as a barrier to testing and treatment of syphilis.
3. **Females of reproductive age, pregnant individuals, and newborns born to individuals with untreated syphilis during pregnancy:** The rate of infectious syphilis in females of reproductive age (15-39 years of age) has increased significantly between 2017 and 2021 in Canada, as has the reported rate of confirmed early congenital syphilis. Increases in rates of infectious syphilis in females of reproductive age or pregnant individuals increases the risk of congenital syphilis among newborns because of syphilis transmission during pregnancy or at delivery. In Canadian studies, congenital syphilis has been associated with no or late prenatal care (third trimester or less than 28 days before delivery) and inadequate prenatal treatment.[5,6] In a national study, 4% of the mothers/birthing parents of congenital syphilis cases were co-infected with HIV.[7] Furthermore, a high proportion of birthing parents reported substance use, injection drug use (crystal methamphetamine in particular), and child and family services involvement. Overarching these risk factors are the larger social determinants of health, described above for the population who identifies as heterosexual.
4. **Youth populations:** Rates of infectious syphilis among youth populations are increasing in Canada. Among those 15-19 years of age, rates increased from 2017 to 2021 by 96% in males and 220% in females.

## Impact Considerations

Syphilis is usually transmitted via direct contact with an infectious lesion during sex. In the case of congenital syphilis, infection can occur in utero, or via contact with an active genital lesion at the time of delivery.[8] Syphilis can cause serious health effects and, if untreated, can progress to late-stage syphilis which can lead to severe and potentially fatal complications in many organ systems. Syphilis increases the risk of acquisition and transmission of HIV; additionally, concurrent HIV

infection alters the natural course of syphilis, which may result in a more rapid disease progression and more aggressive and atypical signs of infection, e.g., neurosyphilis.[9]

Congenital syphilis can lead to adverse pregnancy outcomes and severe health effects in neonates and infants. Infants born with congenital syphilis may have lifelong impacts from the disease including significant economical, physical, and mental health impacts at the individual level and for those providing care.

Syphilis has diverse clinical manifestations and stages of disease. The infection may be asymptomatic and there are challenges in diagnosing and staging. Under-diagnosis and under-treatment of syphilis can contribute to increased levels of transmission and hamper the ability of public health to control and mitigate outbreaks. Untreated syphilis can progress to potential complications, including significant cardiac, neurological, and other organ consequences for individuals, and can lead to increases in associated healthcare system costs. Education and awareness for health care professionals are important to build knowledge of the complex clinical presentations and the diagnostic approaches.[10,11] Given syphilis was almost eliminated by the 1990s, the level of knowledge and experience on the disease management among practitioners may be deficient.

## Contextual Factors Affecting Risk & Assumptions

The outbreaks of syphilis in Canada can also be contextualized by the impact of the social and structural determinants of health and health inequities on the key populations affected. Although it is unclear the degree to which specific factors (e.g. substance use, housing insecurity, experiences of violence, transiency, lack of access to culturally appropriate care) drive transmission, there are multiple and overlapping factors impacting the syphilis situation that can create structural barriers to receiving care, including testing and treatment.[4]

Under-diagnosis of infectious syphilis and congenital syphilis leads to under-reporting of cases in Canadian surveillance data.[4] This under-reporting, as well as the limited availability of information on risk factors and social determinants of health, hampers the ability of clinicians, public health professionals, and policy makers to understand the full epidemiological picture, including the true magnitude of the issue, populations affected, and behavioural and social risk factors.

In addition, the COVID-19 pandemic has affected the provision of health care in terms of access, testing, timely diagnosis, and treatment of other diseases including syphilis [due to decreased sexually transmitted and blood-borne infections (STBBI) testing and access to health care]. From 2020 to 2021, the Canadian national rates of infectious and congenital syphilis increased by 27% and 90%, respectively. Delays in diagnosis, especially in the context of barriers to accessing care, such as in rural and remote settings, contribute to delayed interventions thus allowing for sustained transmission.

### Interventions

The Canadian Guidelines on Sexually Transmitted Infections: Syphilis currently recommends screening for anyone with risk factors for syphilis and repeated screening during pregnancy.[12] Treatment guidelines for infectious syphilis indicate a regimen of Benzathine penicillin, though treatment may be more complex for maternal and congenital syphilis, neurosyphilis and for individuals co-infected with HIV. PT guidelines for testing and treatment may vary based on local epidemiology or context. Adherence to guidelines is unknown and may vary across the country. There are also resources for the general public on preventing, managing and treating sexually transmitted infections, including syphilis.[13]

## Next Steps for Public Health Authorities

Syphilis is a preventable and treatable disease. As public health systems recover from the COVID-19 pandemic, a multipronged approach (public health surveillance, guidance for health professionals, targeted education and awareness of the populations affected) is required to address the increasing rates of infectious and congenital syphilis across multiple jurisdictions. The creation of a FPT committee on STBBI, the Syphilis Response Steering Committee, within the Pan-Canadian Public Health Network, has provided an opportunity to develop a coordinated syphilis response. The preliminary next steps are proposed below for action. Furthermore, federal actions taken to date are listed in Appendix A.

- Collaborate with FPTIg partners to address surveillance gaps to assess the burden of infectious and congenital syphilis, and to better understand the social and structural determinants of health, health inequities, and risk factors contributing to the epidemiology of infectious and congenital syphilis in Canada.

- Facilitate the development of educational and awareness strategies to improve guidance and messaging to Canadian health care practitioners in order to improve early detection, treatment and care of infectious and congenital syphilis.
- Facilitate the development of targeted educational and awareness messaging for populations at increased risk through the identification of approaches (e.g., using behavioural sciences; supporting community-led solutions etc.).
- Explore mechanisms to improve linkages with populations at risk, underserved communities and hard-to-reach populations for prevention, early detection, enhanced access to testing and treatment (e.g., rural/remote, northern communities, populations who are marginalized or racialized).
- Discuss and explore research opportunities pertaining to the areas identified in Appendix B: Gaps & Uncertainties in Knowledge. This may require broader engagement with FPTIg partners and Public Health Agency of Canada (PHAC) programs to assess their needs and prioritize research as necessary.

**Disclaimer:** The risk profile was primarily informed by professional knowledge on syphilis and the impact therein. Where appropriate, some references have been provided but this is not intended as a literature review.

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During the preparation of this risk profile experts from the following areas in PHAC were consulted: Infectious Disease and Vaccination Programs Branch, Centre for Communicable Diseases and Infection Control, Sexually Transmitted and Blood Borne Infection Surveillance Division, Programs and Partnerships Division, and the National Microbiology Laboratory.

## Appendix A:

**Public Health Agency of Canada actions to date:**

- Establishing the FPTIg Syphilis Outbreak Investigation Coordination Committee (SOICC) in 2019 to facilitate multilateral information sharing and conduct enhanced public health surveillance of infectious and congenital syphilis.
- Supporting the study of congenital syphilis cases identified through the Canadian Pediatric Surveillance Program (CPSP).
- Providing surge capacity support to regions affected by syphilis outbreaks.
- Funding community-based organizations to support syphilis response through grants and contributions programming.
- Reviewing the national congenital syphilis case definition to support comprehensive understanding of the burden of congenital syphilis in Canada.
- Reviewing syphilis screening recommendations for adults and adolescents.
- Contributing to reviewing Canadian Paediatric Society guidance on the diagnosis and treatment of congenital syphilis.
- Developing and launching a free and accredited online course for health professionals on barriers to STBBI screening in collaboration with the University of British Columbia, with emphasis on syphilis screening and prevention.
- Co-chairing the FPT Syphilis Response Steering Committee, an FPT table that is developing recommendations on national and PT policies, guidelines, and best practices for reducing the burden of infectious and congenital syphilis.
- Launching a small-scale social media campaign to raise awareness of congenital syphilis in March 2023.
- Leading laboratory collaboration on innovative testing methods for syphilis, e.g., point of care and dried blood spot tests.
- Supporting community-based testing in northern, remote, and isolated communities.

## Appendix B: Gaps & Uncertainties in Knowledge

Table 1. Gaps & Uncertainties in Knowledge

| Categories | Gaps & Uncertainties |
|---|---|
| Human exposure in Canada (incidence, prevalence) | • Identification of at-risk populations, risk factors (e.g., substance use, mental health), extent to which sociodemographic characteristics impact risk, including geographic and regional differences<br>• Uncertainties in true burden of congenital syphilis in Canada<br>• Limited characterization of outcomes for infectious and congenital syphilis cases in Canada |
| Population Susceptibility | • Understanding the link between social determinants of health and exposure to, or development of, infectious syphilis<br>• Risk/likelihood of tertiary syphilis in untreated cases<br>• Understanding drivers of repeat syphilis infections<br>• At-risk population's access to medical care, diagnostics, treatment and care, and support in a timely manner |
| Spread (Transmissibility) e.g., potential for exposure in novel populations, new at-risk groups | • Behaviour change related to modifiable risk factors. There are gaps related to guidance, communication resources & services on behaviour change and sex–positive and inclusive services<br>• Documenting the impact of syphilis on youth populations<br>• Understanding the changes in drivers of, and potential for, expansion into the broader population |
| National and PT policy (including guidance for health professionals and communities, and health system organization) | • A coordinated and adequately resourced pan-Canadian control strategy<br>• Communication strategies to support public awareness of infectious and congenital syphilis risk and prevention<br>• Awareness and support for health professionals to implement screening and treatment guidelines for all affected populations |
| Impact (direct and indirect) | • Better understanding of the scale and impact of congenital syphilis and untreated cases progressing to tertiary or other late-stage syphilis<br>• Individual- and population-level impacts of syphilis and congenital syphilis diagnosis are unknown (e.g., stigma, mental health) |
| Medical countermeasures (availability and effectiveness) | • Understand accuracy, acceptability, and feasibility of point of care tests (POCT) or dried blood spot (DBS) tests in identification of new syphilis cases among at-risk populations<br>• Consolidation of POCT and DBS findings from ongoing studies in Canada<br>• Understand how POCT can support timely access to testing and treatment for hardly reached populations in community and clinical settings and in particularly time-sensitive contexts (e.g., pregnancy)<br>• Research and development of POCT that can distinguish between active and past infection will have benefits over existing technology in the context of possible reinfections<br>• Lack of guidelines on how to deploy POCT or rapid diagnostic tests |

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| Surveillance Activities | • Public health surveillance data have limited information on risk factors and other sociodemographic variables which may help characterize the populations most affected by infectious and congenital syphilis<br>• Additional data elements to consider are sexual behaviour and activity, substance use and type, race/ethnicity (including Indigenous identity), barriers to health care and testing, housing insecurity, coinfections and prenatal care |

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