



Public Health
Agency of Canada

Agence de la santé
publique du Canada

Canada 

Epidemiological trends in syphilis in Canada: Then and Now (2009-2022)

20 November, 2023

STBBI Surveillance Division

Centre for Communicable Diseases and Infection Control,
Infectious Diseases and Vaccination Programs Branch, PHAC

Land Acknowledgement

I would like to take this time to acknowledge that the land on which I live and work, Tiohtià:ke, is the traditional and unceded territory of the Kanien'kehà:ka Nation.

I am grateful for the opportunity to share their home.

Learning objectives

1. To understand the federal role in national surveillance.
2. To describe historic and current trends in infectious syphilis rates in Canada.
3. To describe historic and current trends in congenital syphilis rates in Canada.
4. To recognize and compare the diversity of syphilis epidemiology in different provinces and territories (PTs).
5. To discuss the social determinants of health associated with syphilis (and other STBBIs).

Public health surveillance: federal role & mandate

Federated model:

- Respects provincial and territorial legislative authority
- Supporting role
- Data are collected in PTs and used at the local level to inform front-line public health services (case management, outreach, etc.)
- Data next shared by PTs with PHAC for secondary use

Our partners:

- PT health authorities:
 - Responsible for preparing their health systems and health care providers to monitor, report on, and manage syphilis cases within their jurisdictions
- GoC departments that monitor syphilis trends for their specific populations

Federal focus:

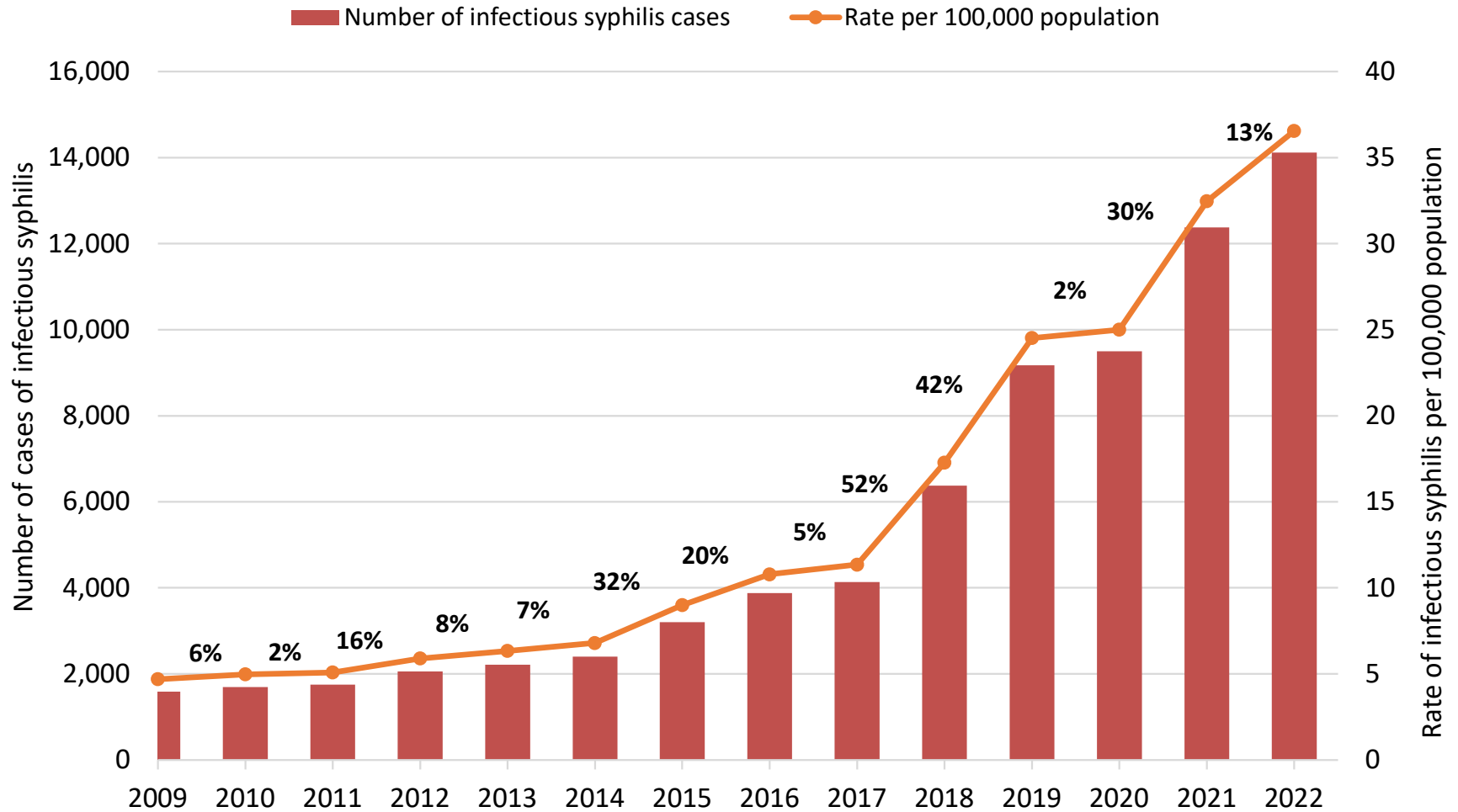
- Monitoring and trend analysis: national reports, infographics
- Identifying opportunities for federal action (e.g., PT capacity support)
- Informing federal programs and priorities: grants and contributions, policy frameworks
- International reporting commitments (e.g., WHO)

Data notes and limitations

- National surveillance data typically incomplete with respect to explanatory variables (key populations, risk factors, social determinants of health).
 - Limited to information specified in PT public health reporting systems.
 - Data on ethnicity is not available nationally.
 - Some variables collected (e.g., substance use, sexual behaviour, pregnancy status) are dependent on self-reporting, have a large proportion of missing data, and are not collected or reported consistently by all PTs.
 - Surveillance is complemented with literature reviews to contextualize the data and better understand the drivers.
- Laboratory-confirmed cases collected – hidden burden of probable, undiagnosed, or unstaged cases (diagnosis and staging can be complex).
- Federated systems engender challenges in data collection (heterogeneity, interoperability, etc.).
- Data infrastructure issues: non-standardized case report forms, case definitions, and data elements across 13 PTs; IT systems that do not readily adapt to accept new variables; etc.
- Changes in methods over time – possible inconsistency.
- Trends shown for 2020-2022 are impacted by the COVID-19 pandemic and should be interpreted with caution.

Infectious syphilis: trends over time, 2009-2022

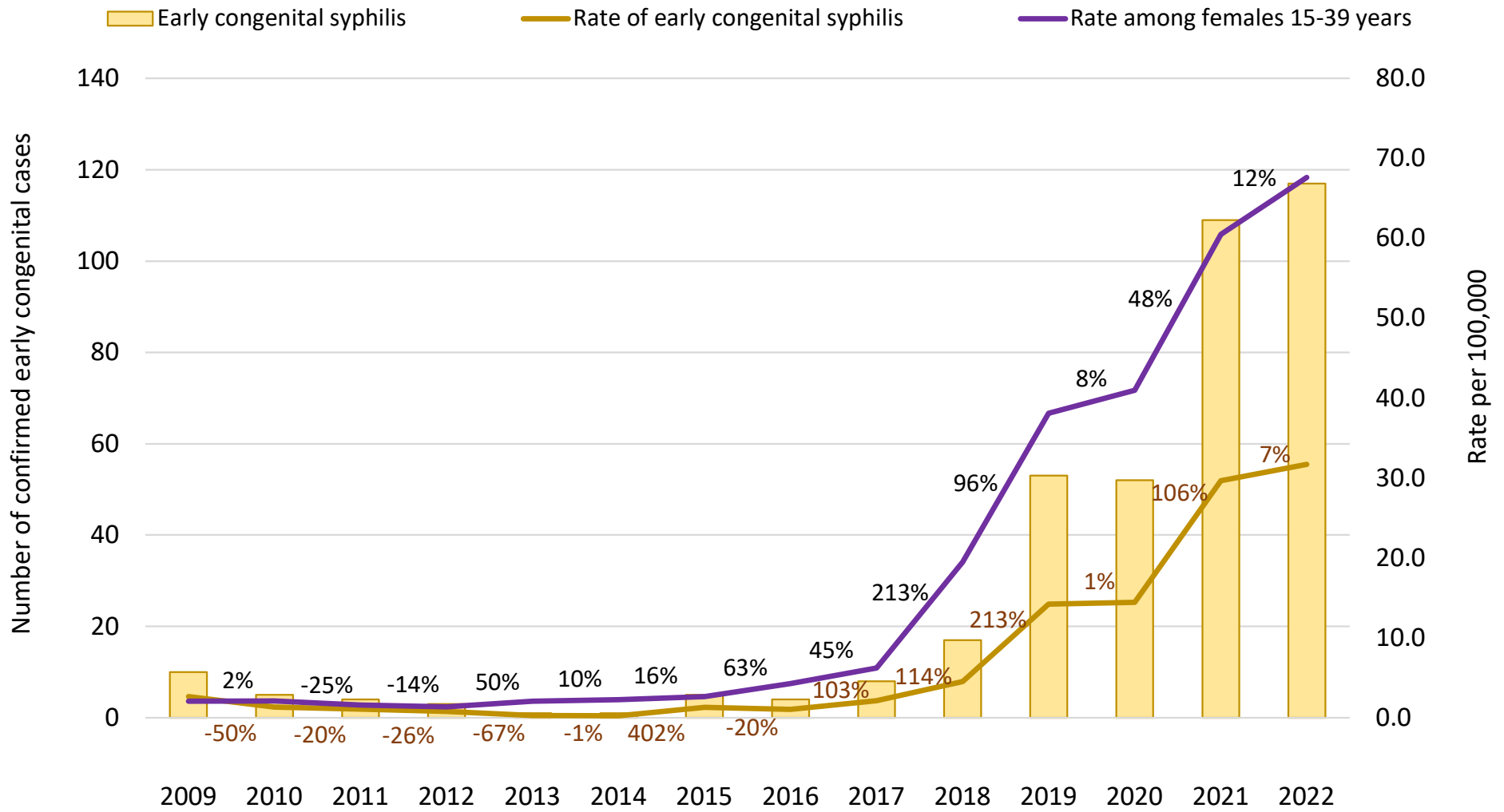
Reported counts and rates per 100,000 population of total infectious syphilis in Canada, 2009 to 2022



Note: percentages (%) on the figure represent yearly rate changes.

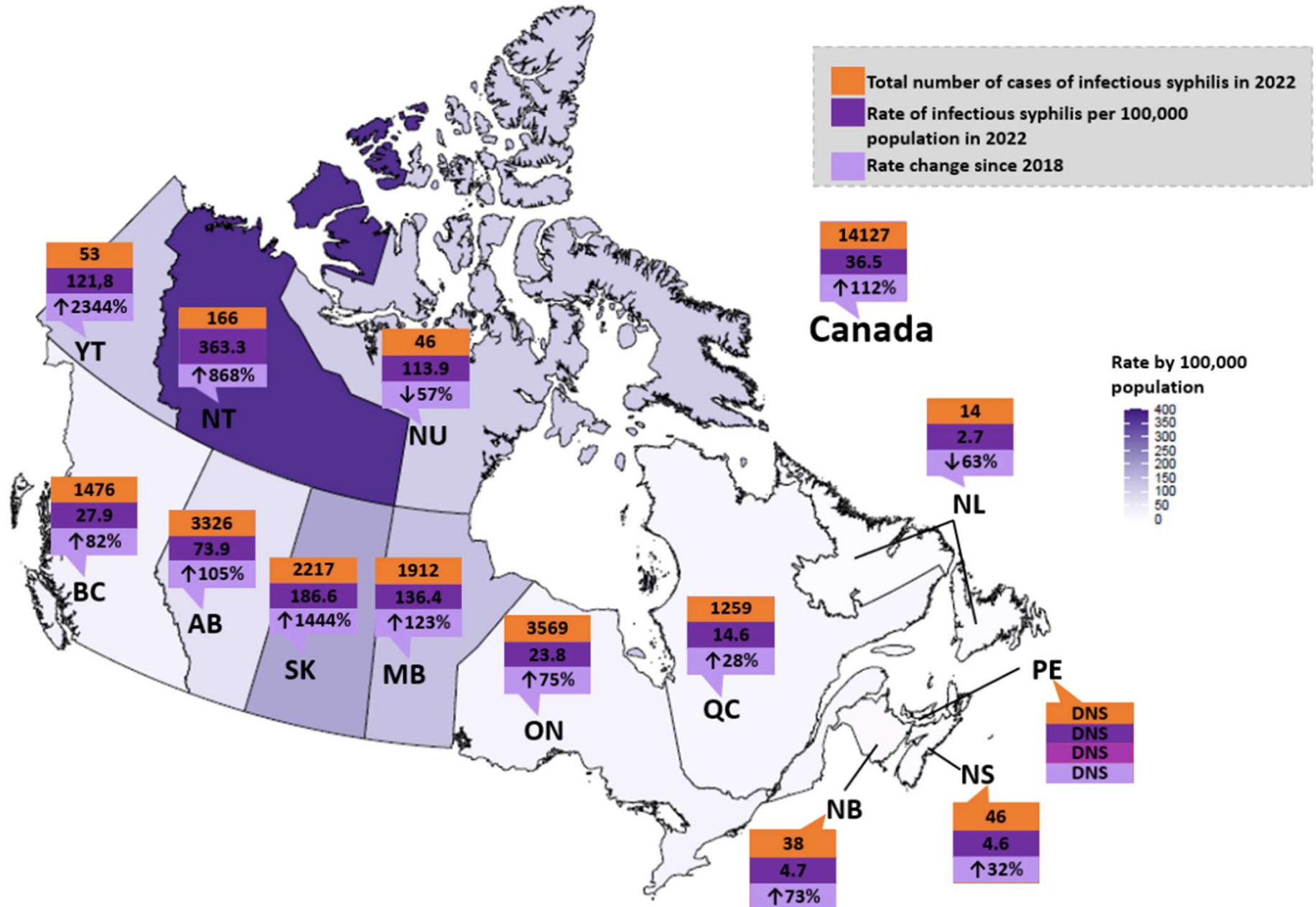
Congenital syphilis: trends over time, 2009-2022

Reported case counts and rates per 100,000 live births of confirmed early congenital syphilis, compared to rates per 100,000 population of infectious syphilis among females 15-39 years old in Canada, 2009 to 2022



Note: percentages (%) on the figure represent yearly rate changes.

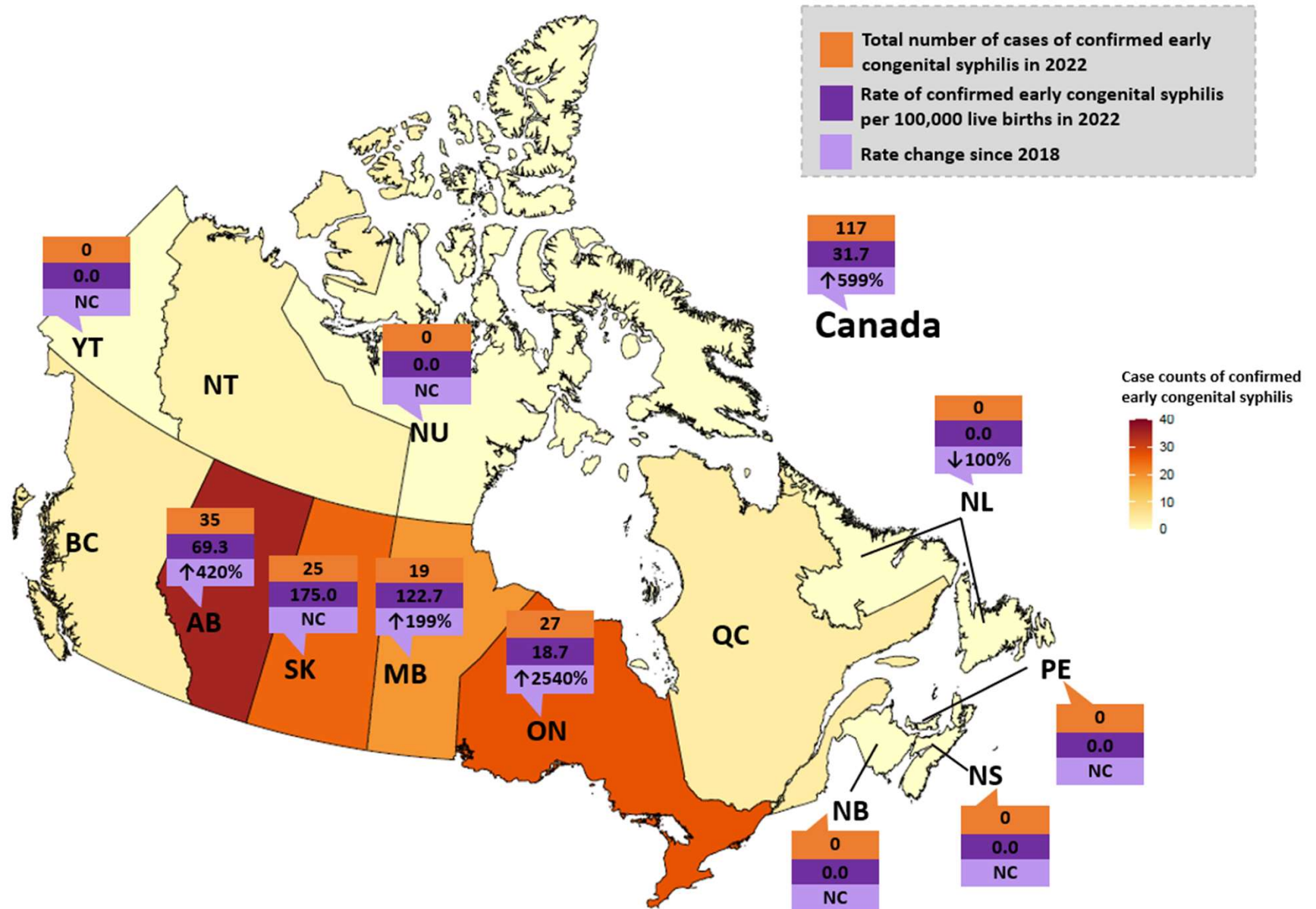
Regional distributions of infectious syphilis: 2022



DNS: data not shown to reduce the risk of identifying individuals (low case counts).

Note: Caution should be used when comparing rates across provinces and territories. Reported rates in provinces and territories with a relatively small population size are prone to fluctuation and instability due to small changes in case counts for small population denominators resulting in large rate changes. To contextualize rates, it is also important to look at the case counts per province and territory.

Regional distributions of congenital syphilis: 2022

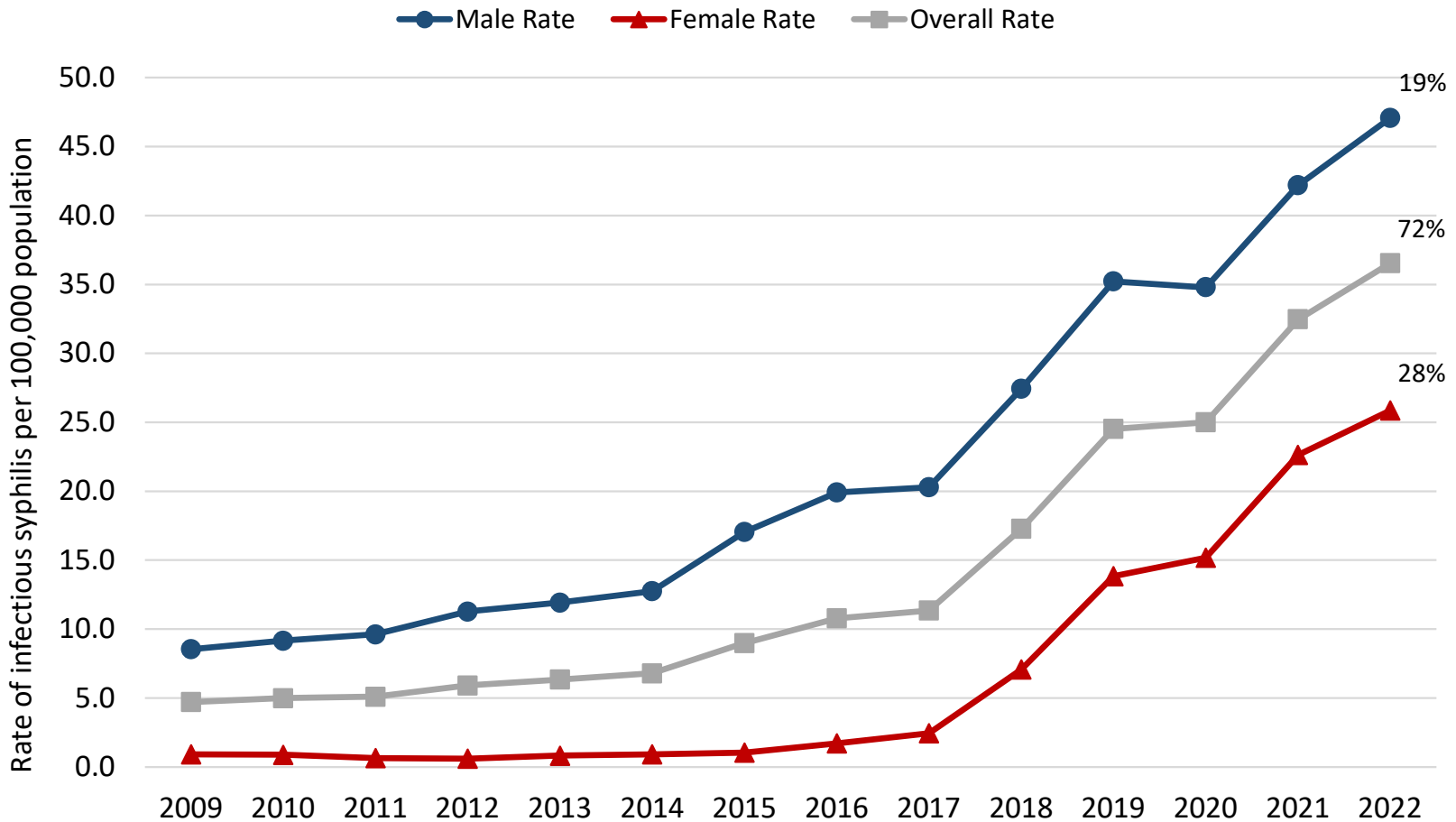


NC: Non-computable.

Note: Some provinces and territories are shown without data boxes due to low case counts. Caution should be used when comparing rates across provinces and territories. Reported rates in provinces and territories with a relatively small population size are prone to fluctuation and instability due to small changes in case counts for small population denominators resulting in large rate changes. To contextualize rates, it is also important to look at the case counts per province and territory.

Trends by sex over time: rise in rates in the heterosexual population

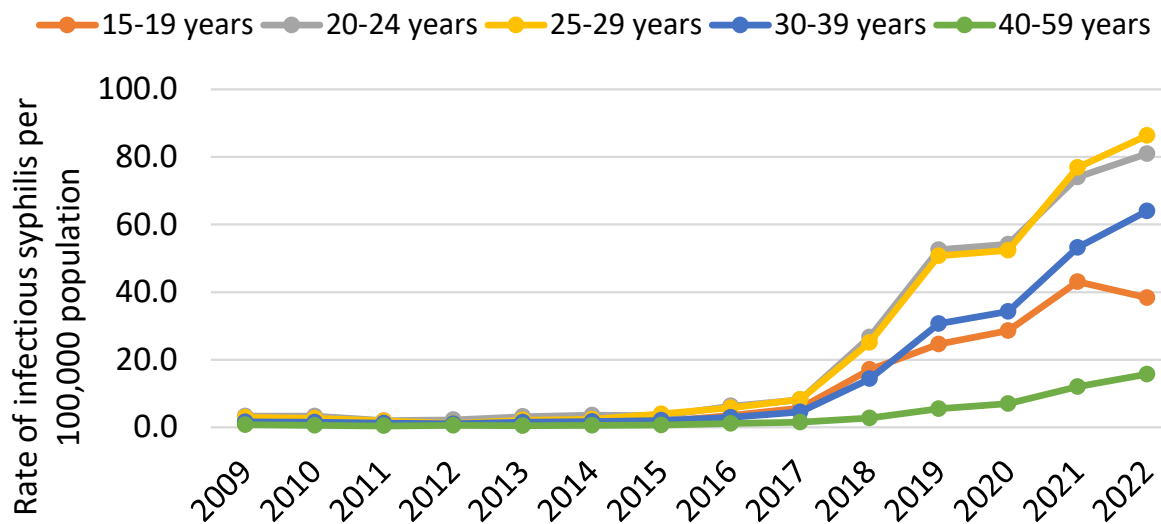
Reported rates of infectious syphilis per 100,000 population by sex in Canada, 2009 to 2022



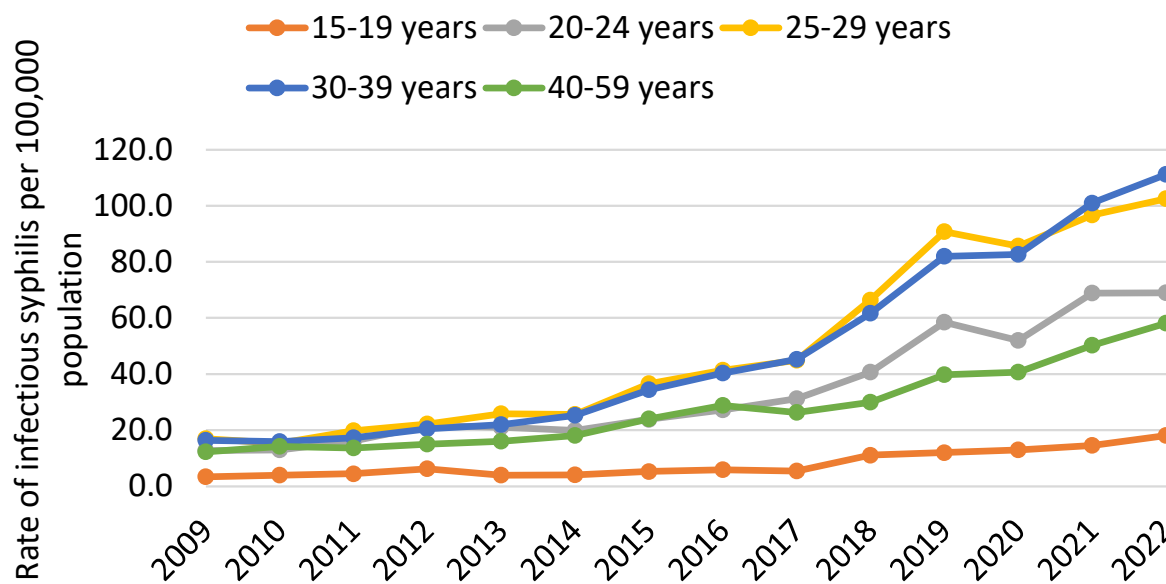
Note: The percentages shown represent the average change in rate over the past 5 years (2017-2022)

Trends by age over time: younger populations affected

FEMALES

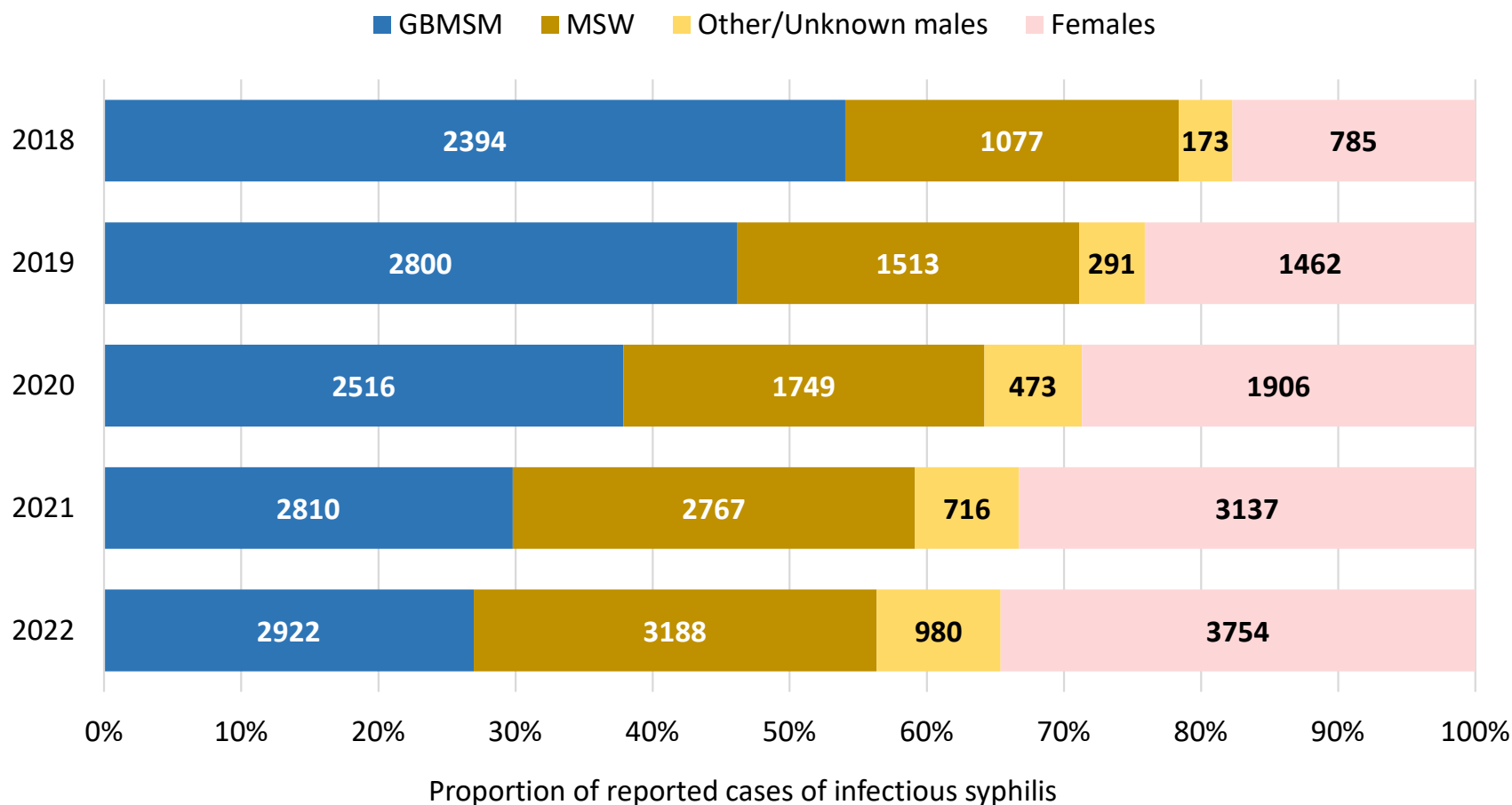


MALES



Trends by sex and sexual behaviour: shift in cases to the heterosexual population

Reported cases of infectious syphilis by key population in Canada, 2018 to 2022



Notes: Data based on the eight provinces and territories that have consistently reported information on sexual behaviour since 2018: BC, AB, SK, ON, NB, NS, YT, NT. Provinces and territories reporting fewer than 10 cases of infectious syphilis in 2018-2022 among GBMSM were excluded from the figure. The proportion of missing or unknown data for male sexual behavior in 2022 is 0%.

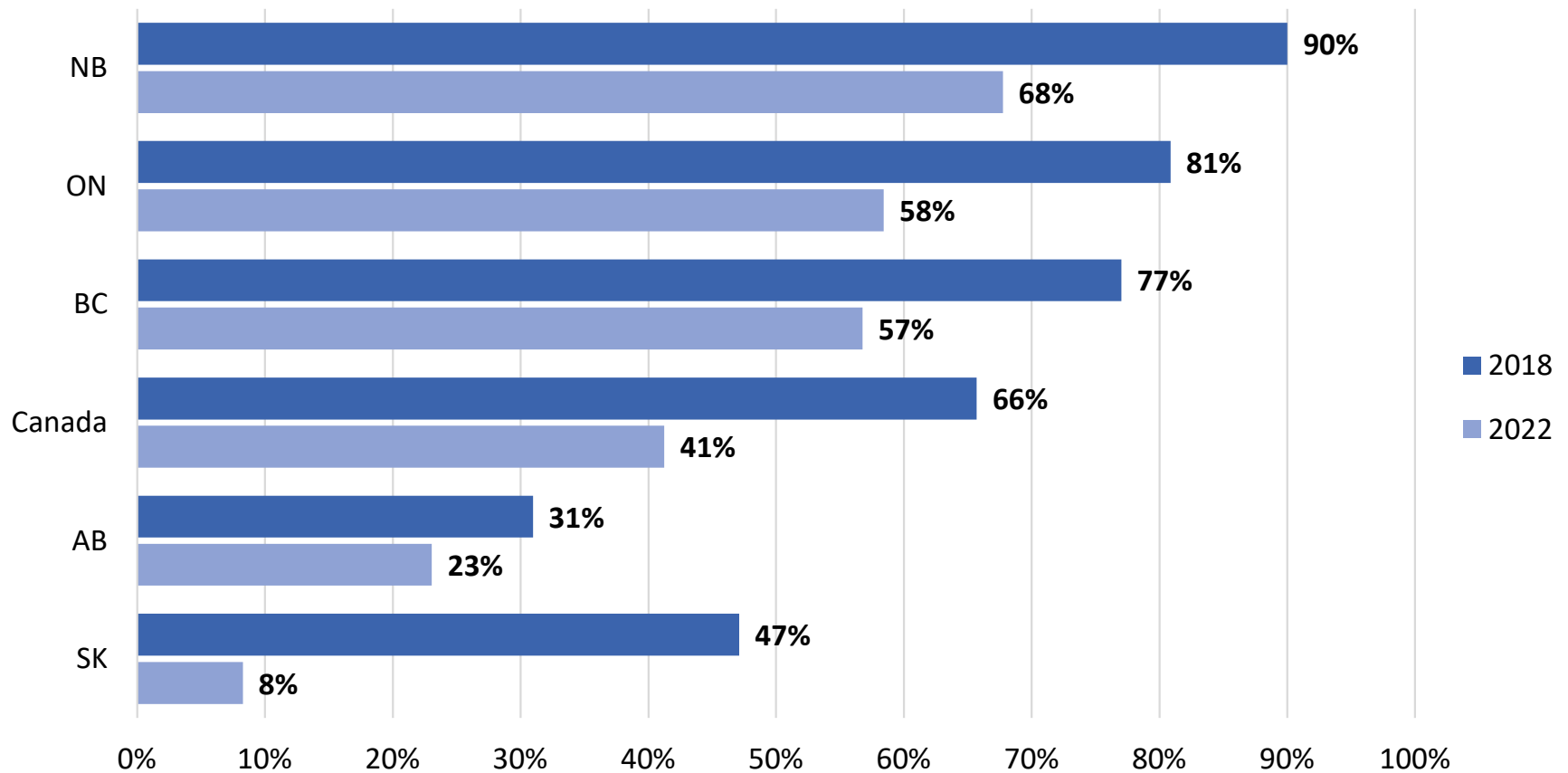
GBMSM: gay, bisexual and other men who have sex with men.

MSW: Men who have sex with women.

Other/unknown males: cases assigned male at birth that identify as transgender or nonbinary and have sex with men and/or women/sexual behaviour of the male case is unknown.

Regional distributions of GBMSM cases

Proportion of GBMSM cases among male cases by province and territory, 2018 vs. 2022



Note: Data based on the eight PTs that have consistently reported information on sexual behaviour since 2018: BC, AB, SK, ON, NB, NS, YT, NT. PTs reporting fewer than 10 cases of infectious syphilis in 2018 or 2022 among gbMSM were excluded from the figure. The proportion of missing or unknown data for male sexual behavior in 2022 is 0%.

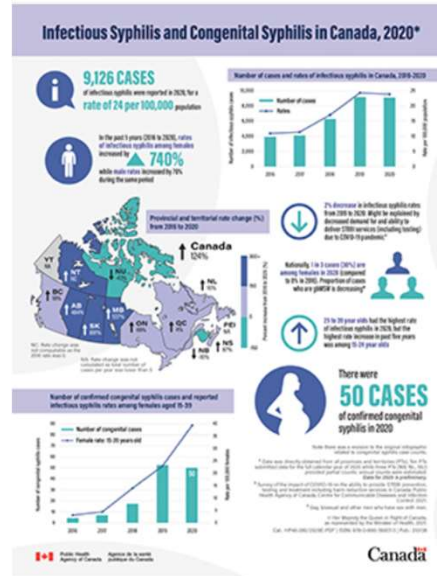
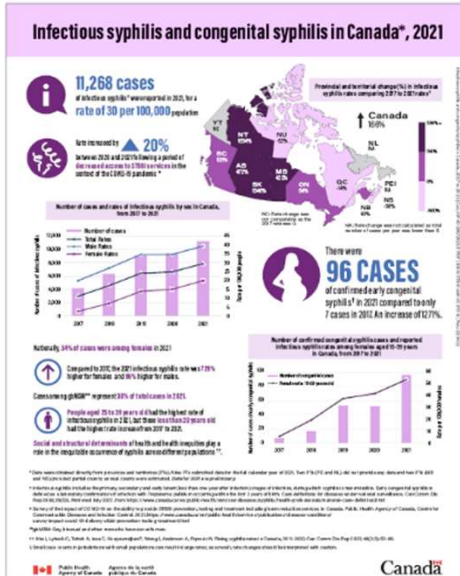
GBMSM: gay, bisexual and other men who have sex with men.

Social determinants of health and other risk factors for syphilis

- Established factors:¹ income, access to health care, number of sexual partners, etc.
- Limited knowledge from Canadian literature on potential drivers of current rates of infectious and/or congenital syphilis:²⁻¹²
 - young age
 - housing instability
 - substance use
 - mental illness
 - recent sexually transmitted infection
 - lack of prenatal screening and/or inadequate treatment of syphilis during pregnancy
- Varies by PT, according to different epidemiological contexts:¹ some risk factors may be more implicated than others in certain jurisdictions.

Thank you

Our publications:



Rising syphilis rates in Canada, 2011–2020

Josephine Aho¹, Cassandra Lybeck¹, Ashorkor Tetteh¹, Carmon Issa¹, Fiona Kouyoumdjian¹, Jason Wong¹, Alexandra Anderson¹, Nashira Popovic¹

Abstract
Background: Syphilis remains one of public health concerns in Canada, with multiple jurisdictions reporting outbreaks over the past few years. The objective of this article is to describe trends in infectious and congenital syphilis in Canada 2011–2020.

Methods: Routine surveillance of syphilis is conducted through the Canadian Notifiable Disease Surveillance System (CNDSIS). In response to rising rates of syphilis, all provinces and territories (PTs) have also submitted enhanced surveillance data on infectious syphilis to the Public Health Agency of Canada through the Syphilis Outbreak Investigation Co-ordinating Committee (SOICC) starting in 2018. Descriptive analyses of CNDSIS and SOICC surveillance data 2011–2020 by age, sex, pregnancy status, male sexual orientation and PTs were performed.

Results: The national rate of infectious syphilis increased from 5.1 per 100,000 population in 2011 to 24.1 per 100,000 population in 2020. The rates increased in almost all PTs, with the Prairie provinces reporting the greatest relative increases from 2015 to 2020 (more than 400%). Rates in males were consistently higher than rates in females over the past 10 years. However, from 2016 to 2020, rates among females increased by 77%, compared with 77% among males. Although the proportion of cases who self-identify as gay, bisexual and other men who have sex with men decreased from 54% to 38% between 2018 and 2020, they still represent a high proportion of cases (according to data from eight PTs). From 2016 to 2020, rates of infectious syphilis increased in every age group, especially in females aged 15–39 years. Confirmed early congenital syphilis cases for 2020 increased considerably from prior years, with 50 cases reported in 2020, compared with 4 cases in 2016.

Conclusion: Infectious and congenital syphilis rates are a growing concern in Canada and the nature of the syphilis epidemic across Canada appears to be evolving, as indicated by recent trends. More data and research are needed to better understand the drivers associated with the recent changes in the epidemiology of syphilis in Canada.

Keywords: infectious syphilis, congenital syphilis, surveillance, GARD, heterosexual transmission, pregnant individuals, Canada.

Introduction
Syphilis is the third most reported sexually transmitted infection in Canada, after chlamydia and gonorrhoea. A bacterial infection caused by *Treponema pallidum* subspecies *pallidum*, syphilis is primarily transmitted through genital, anal or oral sexual contact and can also be vertically transmitted to the fetus during pregnancy or to the neonate at delivery. Syphilis can rarely and effectively be treated with penicillin, but if left untreated it can progress through several different stages: primary, secondary, early latent, late latent, and tertiary syphilis.

Syphilis is only infectious during the first three stages of infection (primary, secondary or early latent), which occur within the first year. Acute neurosyphilis can also develop during this time. As more advanced disease stages, syphilis can lead to serious health consequences such as neurological, card-muscular or musculoskeletal complications. Congenital syphilis, which is syphilis transmitted in utero, can have severe debilitating effects and can lead to stillbirth or neonatal death (1).

SYPHILIS IN CANADA
TECHNICAL REPORT ON
EPIDEMIOLOGICAL TRENDS,
DETERMINANTS AND INTERVENTIONS

PROTECTING AND EMPOWERING CANADIANS TO IMPROVE THEIR HEALTH

Available here:

[Sexually transmitted and blood-borne infections surveillance resources and publications - Canada.ca](https://www.canada.ca/en/public-health/services/syphilis-surveillance.html)

✉ sti-hep-its@phac-aspc.gc.ca

APPENDIX

Methods

- Data on infectious and congenital syphilis from 2009 to 2017 were extracted from the Canadian Notifiable Disease Surveillance System (CNDSS). Data from 2018 to 2022 were extracted from provincial and territorial (PT) data submissions to the Syphilis Outbreak Investigation Coordinating Committee (SOICC), a federal/provincial/territorial (FPT) group that runs an enhanced surveillance program for syphilis.
 - Due to periodic updates of the historical surveillance data, counts and rates for a particular disease and year may change over time.
 - In cases where there are discrepancies between data reported by the Public Health Agency of Canada (PHAC) and those reported by individual provinces and territories, provincial/territorial data should be considered to be more accurate as they are the most current.
- Data for total population and live births were obtained from Statistics Canada. These population and live birth denominators were used to calculate national, provincial and territorial rates of infectious syphilis, rates of infectious syphilis by age, sex, and province and territory, and rates of congenital syphilis.
- Total case counts and rates presented nationally are based on cases that are male, female, transgender, and of unknown and other sex.

Methods (cont'd)

	Average number of PTs that provided 2018-2022 enhanced surveillance data	Submitting PTs, by year (2018-2022)	Average proportion of missing/unknown data, 2018-2022
Infectious syphilis diagnosis	13	All	NA
Gender	13	All	<1%
Age group	13	All	<1%*
Age group, stratified by gender	13	All	<1%*
Key populations			
Sexual behaviour among males	11	2018, 2019, 2021, 2022: BC, AB, SK, MB, ON, NB, NS, PE, NL, YT, NT 2020: BC, AB, SK, MB, ON, NB, NS, YT, NT	2%
Pregnant individuals	11	BC, AB, SK, MB, ON, NB, NS, PE, NL, YT, NT	NA
Substance use			
Sexual behaviour among males	9	2018: AB, SK, ON, NB, NS, PE, NL, YT 2019: AB, SK, ON, NB, NS, PE, NL, YT, NT 2020: AB, SK, MB, ON, NB, NS, YT, NT 2021-2022: AB, SK, MB, ON, NB, NS, PE, NL, YT, NT	1%
Pregnant individuals	10	AB, SK, MB, ON, NB, NS, PE, NL, YT, NT	NA
Congenital syphilis diagnosis	13	All	NA

* Data not available from 2018-2019

References for social determinants of health and other risk factors

1. Public Health Agency of Canada. *Syphilis in Canada: Technical report on epidemiological trends, determinants and interventions*. Ottawa (ON): PHAC; 2020. <https://www.canada.ca/en/services/health/publications/diseases-conditions/syphilis-epidemiological-report.html>
2. Aho J, Lybeck C, Tetteh A, Issa C, Kouyoumdjian F, Wong J, Anderson A, Popovic N. Rising syphilis rates in Canada, 2011–2020. *Can Commun Dis Rep* 2022;48(2/3):52–60. <https://doi.org/10.14745/ccdr.v48i23a01>
3. Willemsma K, Barton L, Stimpson R, Pickell I, Ryan V, Yu A, Pederson A, Ogilvie G, Grennan T, Wong J. Characterizing female infectious syphilis cases in British Columbia to identify opportunities for optimization of care. *Can Commun Dis Rep* 2022;48(2/3):68–75. <https://doi.org/10.14745/ccdr.v48i23a03>
4. Sorokopud-Jones, Megan. University Of Manitoba. *Concurrent Sexually Transmitted and Blood Borne Infections (STBBIs) among People Living with HIV in Manitoba, 2018-2022*. Abstract, presented at Canadian Conference on HIV/AIDS Research, April 30, 2023.
5. Gratrix J, Karwacki J, Eagle L; Rathjen L, Singh AE, Chu A, Smyczek P. Outcomes of infectious syphilis in pregnant patients and maternal factors associated with congenital syphilis diagnosis, Alberta, 2017–2020. *Can Commun Dis Rep* 2022;48(2/3):61–7.
6. Ms. Alyssa Green, Ms. Leanne McLean, Dr. Julie Kryzanowski, Dr. Rupeena Purewal, Dr. Maureen Anderson, *Characterizing prenatal and congenital syphilis in Saskatchewan, Canada, 2019-2022*. 12th TEPHINET Regional Scientific Conference of the Americas, 2023. Poster 15:25.
7. Benoit P, Tennenhouse LG, Lapple A, Hill-Carroll G, Shaw SY, Bullard J, Plourde P. Congenital syphilis re-emergence in Winnipeg, Manitoba. *Can Commun Dis Rep* 2022;48(2/3):89–94.
8. Canadian Paediatric Surveillance Program 2022 Results. Ottawa (ON): Canadian Paediatric Society; 2023.
9. Orser L, MacPherson P, O'Byrne P. Syphilis in Ottawa: An evolving epidemic. *Can Commun Dis Rep* 2022;48(2/3):76–82. <https://doi.org/10.14745/ccdr.v48i23a04>
10. Ferlatte, Olivier; Salway, Travis; Samji, Hasina; Dove, Naomi; Gesink, Dionne; Gilbert, Mark; Oliffe, John L.; Grennan, Troy; Wong, Jason. An Application of Syndemic Theory to Identify Drivers of the Syphilis Epidemic Among Gay, Bisexual, and Other Men Who Have Sex With Men. *Sexually Transmitted Diseases* 45(3):p 163-168, March 2018. | DOI: 10.1097/OLQ.0000000000000713
11. Konrad, Stephanie; Mak, Donna B.; Grennan, Troy; Zakher, Bernadette; Brownrigg, Bobbi; Ogilvie, Gina; Morshed, Muhammad; Tyndall, Mark; Gilbert, Mark; Kraiden, Mel; Wong, Jason. Characteristics of Gay, Bisexual and Other Men Who Have Sex With Men With Multiple Diagnoses of Infectious Syphilis in British Columbia, Canada, 2005–2014. *Sexually Transmitted Diseases* 46(7):p 423-428, July 2019. | DOI: 10.1097/OLQ.0000000000000995
12. Round JM, Plitt SS, Eisenbeis L, Smyczek P, Gratrix J, Charlton C, Fathima S, O'Brien A. Examination of Care Milestones for Preventing Congenital Syphilis Transmission Among Syphilis-Infected Pregnant Women in Alberta, Canada: 2017-2019. *Sexually Transmitted Diseases* 2022 Jul 1;49(7):477-483. doi: 10.1097/OLQ.0000000000001640. Epub 2022 Apr 26. PMID: 35470347.

Routine surveillance of syphilis

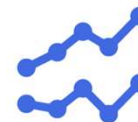
- Limited to **laboratory confirmed** infections (including all stages of syphilis and early congenital infection) reported to the Canadian Notifiable Disease Surveillance System (CNDSS) - [National case definitions](#)
- Relies on **voluntary** reporting to the CNDSS by provincial and territorial (PT) health authorities of data that are collected under PT public health acts for mandatory reporting to public health by labs and health care providers.
 - Multilateral Information Sharing Agreement (MLISA) enables but does not compel data sharing.
 - local use informs case management, interventions, as well as trend monitoring.
 - PHAC use informs federal programs and policies, national epidemiologic trends, international reporting commitments (e.g., Global AIDS Monitoring).
- **Strengths:**
 - limited under-reporting of confirmed cases (lab-based in most jurisdictions);
 - consistent long-term trends by age group, sex, geography (at PT level);
 - long history of federal-provincial-territorial (FPT) partnership and collaboration.
- **Limitations:**
 - Time delays between reporting year and publication date:
 - » annual data submissions include >50 conditions (PT burden);
 - » variations in PT data submissions (content, formats, consistency of reporting on syphilis stages, etc.) require time to process and validate.
 - demographic information usually limited to age, sex, and PT; limited/no explanatory variables.
 - changes/improvements rely on consensus from PTs in the context of multiple competing jurisdictional priorities.

Notifiable Disease Charts

From [Public Health Agency of Canada](#)

Please select one of the following options to explore Notifiable Disease Data.

[Simple Chart \(All Years\)](#)



[Select up to 6 diseases to view pre-built charts and graphs.](#)

[Custom Chart Age/Sex Breakdown \(1991 - 2021\)](#)



[Create a custom chart from the available options.](#)

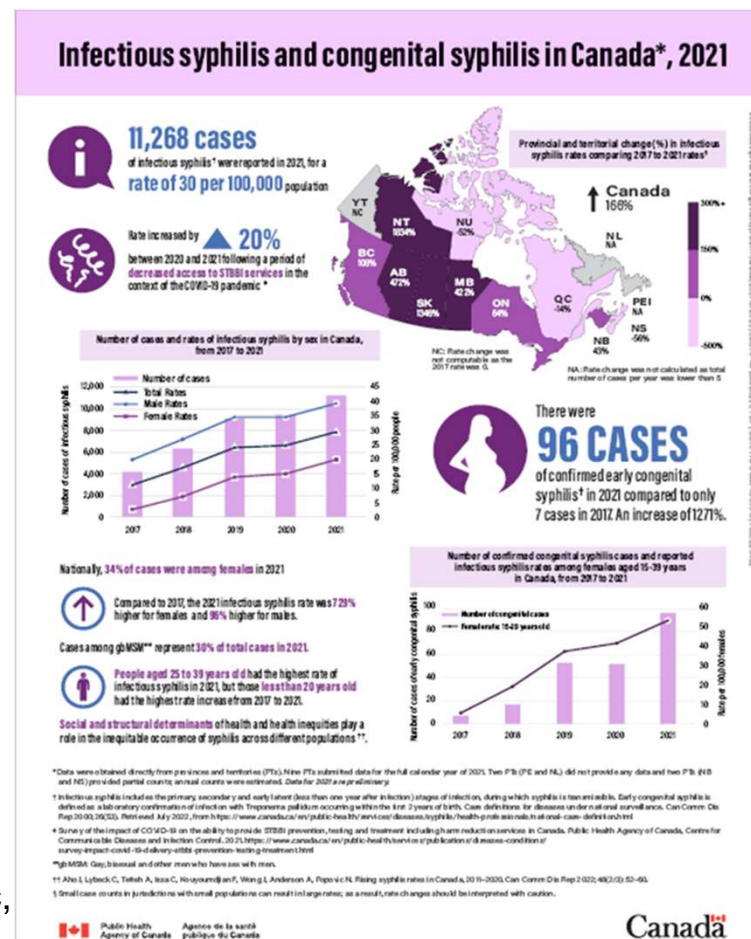
[Large Data Extract \(MS Excel, CSV\)](#)



[Extract a large dataset and export to MS Excel or CSV.](#)

Enhanced surveillance of syphilis

- Began in 2019 in response to rising rates, through the federal-provincial-territorial (FPT) Syphilis Outbreak Investigation Coordination Committee (SOICC).
 - twice yearly data collection and meetings to discuss national epidemiology and emerging issues, facilitate the sharing of best practices between provinces and territories (PTs), and solicit feedback on ongoing projects and strategies.
- Enables more frequent data collection with additional variables beyond routine datasets (i.e., male sexual behaviour, pregnancy status, substance use).
- **Strengths:**
 - participation of all PTs;
 - much faster data collection → publication timeline (reports available within 12 months of calendar year);
 - able to examine shift in epidemiology/expansion of epidemics to heterosexual populations;
 - maintained data collection schedule during peak pandemic, demonstrating FPT priority.
- **Limitations:**
 - incomplete or missing data on explanatory variables collected.



Policy context

Federal action on syphilis is guided by and aligned with the objectives, strategic goals, and guiding principles of the [*Pan-Canadian Framework for Action on STBBI*](#), as well as the federal commitments highlighted in the [*Government of Canada Five-Year Action Plan on STBBI*](#).

- The Action Plan is currently undergoing renewal to accelerate efforts to achieve new global targets, for which health professionals play a crucial role.

