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REPORT ON SEXUALLY TRANSMITTED INFECTIONS IN CANADA: 2008

Community Acquired Infections Division
Centre for Communicable Diseases and Infection Control
Public Health Agency of Canada

Canada

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REPORT ON SEXUALLY TRANSMITTED INFECTIONS IN CANADA

2008

Information to the readers of the Report on Sexually Transmitted Infections in Canada: 2008

The Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada is pleased to provide you with the 2008 edition of the *Report on Sexually Transmitted Infections in Canada*. This document provides an overview of reported cases and trends in the three nationally reportable bacterial sexually transmitted infections (STIs): chlamydia, gonorrhea, and infectious syphilis by age, sex, and location for Canada. The surveillance data presented are drawn from reports sent to the Public Health Agency of Canada (PHAC) from provinces and territories.

This report consists of four sections. Sections one to three correspond to the three nationally reportable bacterial STIs. Each section summarizes major findings and trends in the respective infection, and the embedded tables and figures are updated from those in earlier publications of these data. New to the third section in this report is the inclusion of reported congenital syphilis rates across Canada. The fourth section features an international comparison of the reported STI rates between Canada and the United States, Australia, and the United Kingdom. Technical notes and explanatory details specific to provincial or territorial surveillance data are presented at the end of this report.

The publication of this report would not have been possible without the collaboration of all provinces and territories, whose ongoing contribution to national STI surveillance is gratefully acknowledged.

This report and other national surveillance and research on STIs, hepatitis C and other blood-borne infections are also available at: http://www.phac-aspc.gc.ca/sti-its-surv-epi/nat_surv-eng.php.

Any comments and suggestions that would improve the usefulness of future publications are appreciated and should be sent to the attention of the Community Acquired Infections Division at PHAC.Web.Mail@phac-aspc.gc.ca.

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Executive Summary

Sexually transmitted infections (STIs) continue to be a significant and increasing public health concern in Canada. Reported rates of chlamydia, gonorrhea and syphilis have been rising since 1997, and this upward trend is continuing unabated. This report outlines the trends in these three nationally notifiable STIs, providing an overview of the descriptive epidemiology of these infections in Canada with a focus on the past decade. Longer term secular trends are presented for context.

Chlamydia continues to be the most commonly reported STI in Canada. Reported rates of chlamydia infections have increased by 80.2% over the past decade. A steady increase in reported rates has been observed in both genders and across all age groups, with the highest relative increase among males. However, females remain disproportionately affected by chlamydia infection. In 2008, the reported rate among women was almost twice as high as that of their male counterparts, and 86.7% of reports among females were for those under the age of 30. Geographic variation was observed with the highest chlamydia rates reported in Nunavut, the Northwest Territories and Yukon.

The overall reported rate of gonorrhea increased by 116.5% over the past decade. The majority of reported cases were in those under 30 years of age. Females between the ages of 15 to 24 and males between the ages of 20 to 24 accounted for the highest reported rates of gonorrhea. The older male population, particularly those over the age of 60, experienced a dramatic rise in the rate of reported cases since 1999, although reported rates remain low in this group compared to other age groups. Like chlamydia, the distribution of reported cases of gonorrhea varies geographically across Canada. The highest reported rates occurred in the Northwest Territories and Nunavut, followed by Manitoba and Saskatchewan.

The overall reported rate of infectious syphilis increased by 568.2% over the past decade. Reported rates of infection were highest among males aged 25 to 39; among females, highest rates were reported among those 20 to 24 years old. During this time period, outbreaks were reported in Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Montreal, and the Yukon among men who have sex with men and among heterosexual populations. Most recently, during 2008–2009, outbreaks have been reported in the Northwest Territories and Nova Scotia.

Reported Cases and Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Infectious Syphilis, 1999 and 2008

	Chlamydia		Gonorrhea		Infectious Syphilis	
	Cases	Rates	Cases	Rates	Cases	Rates
1999	42,141	138.2	5,381	17.6	191	0.6
2008	82,919	248.9	12,723	38.2	1,394	4.2

Comparisons of reported STI rates to those of other western regions such as the United States, Australia, and the United Kingdom demonstrate that the observed increase in bacterial STIs is not unique to Canada, along with other similarities in trends. In all four countries, chlamydia is the most commonly reported STI and affects predominantly younger age groups, especially females. Gonorrhea rates in each country are highest in males aged 20 to 24. Across countries, males have the highest rates of infectious syphilis, reflecting the recent occurrence of outbreaks among men who have sex with men (MSM).

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Chlamydia, gonorrhea, and syphilis are sexually transmitted infections of public health significance included on the list of nationally notifiable diseases in Canada. Resultant surveillance data are analyzed and summarized periodically, focusing on changes over the past decade. To provide context for the past 10 years, a longer secular trend is presented for each disease in the introduction. Several observations for 2008 are noteworthy.

CHLAMYDIA

(Chlamydia trachomatis)

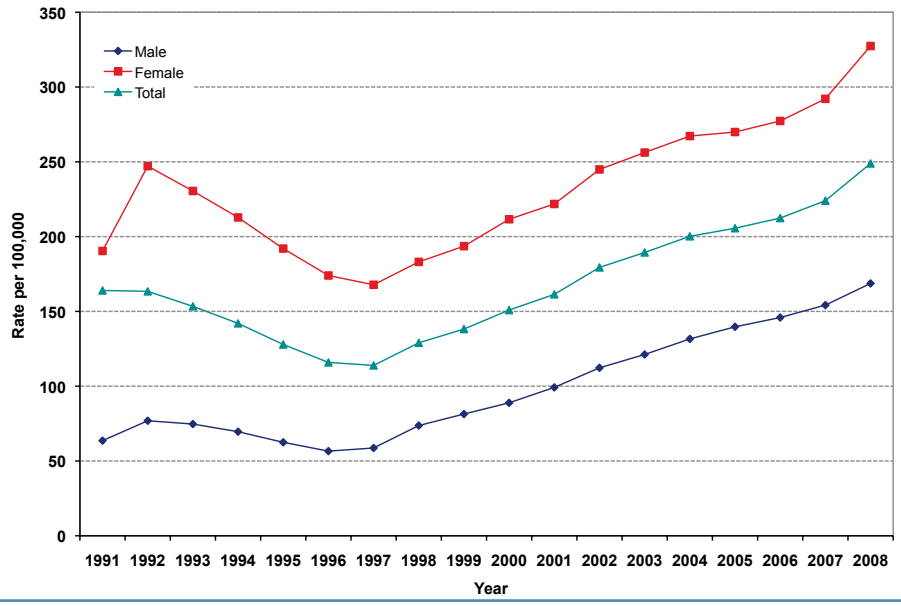
Chlamydia *(Chlamydia trachomatis)*

Chlamydia, an infection caused by *Chlamydia trachomatis,* has been notifiable nationally since 1990 and remains the most commonly reported bacterial sexually transmitted infection (STI) in Canada. Since asymptomatic infections are common in men and women, affected individuals unaware of their status in the absence of screening could contribute to the spread of infection. Complications associated with untreated infections are also of concern because chlamydia disproportionately affects a younger population, particularly women. A serious, common complication affecting women is pelvic inflammatory disease, which can lead to chronic pelvic pain, ectopic pregnancy, and infertility. Untreated chlamydia in pregnant women can be transmitted to their infants during childbirth, resulting in outcomes such as neonatal conjunctivitis or pneumonia. Less frequently, complications also develop in men, which include epididymoorchitis and other less common conditions[1]. As with other non-ulcerative STIs, chlamydia may increase the risk of HIV acquisition and transmission by recruiting HIV susceptible inflammatory cells to the genital tract and by increasing the shedding of HIV-infected cells[2].

Reported rates of chlamydia infections in Canada increased consistently over time.

- Though chlamydia became reportable in 1990, regular national reporting commenced in 1991. Reported rates decreased steadily until 1997, when this trend reversed (Figure 1).
- In 2008, 82,919 cases of chlamydia infections were reported, corresponding to a rate of 248.9 per 100,000 (Figure 1). The overall rate in 2008 increased by 80.2% since 1999 (138.2 per 100,000).
- On average, over the past decade, nationally reported chlamydia rates have increased by 6.8% per year. The change from 2007 to 2008 was sharper than previous years with an increase of 11.1%.
- Reported rates of chlamydia infections increased consistently over time in both sexes. Between 1999 and 2008, rates in males increased by 107.4% from 81.4 to 168.7 per 100,000, and rates in females increased by 69.1% from 193.6 to 327.4 per 100,000 (Figure 1).
- Consistent with historical trends, the reported rate in women was almost twice as high as that in men in 2008 (Figure 1).

Figure 1: Reported Rates of Chlamydia by Sex and Overall, 1991 to 2008, Canada



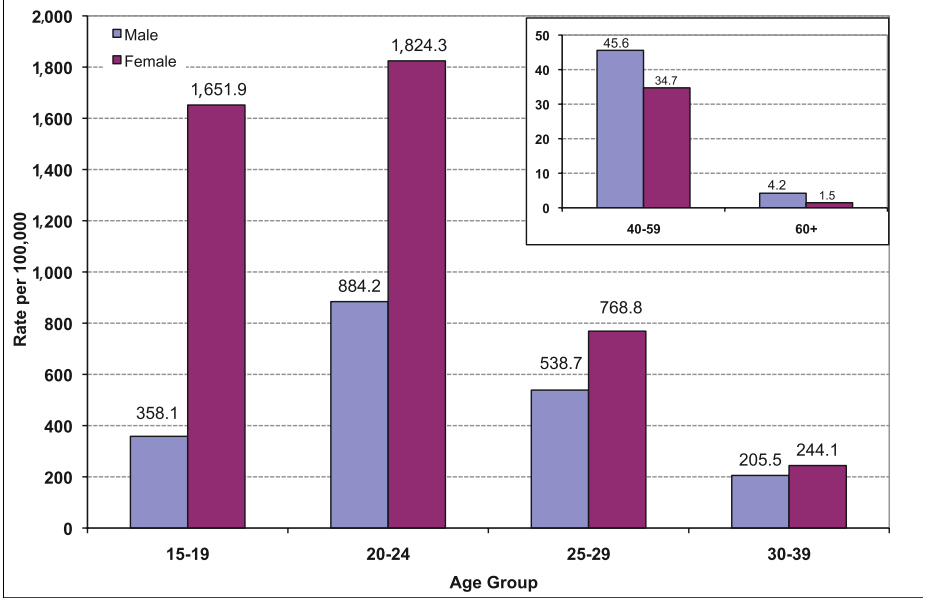
During 2008, reported rates of chlamydia infections continue to be highest in the younger population, particularly females.

- In 2008, the majority of reported chlamydia infections (82.6%) were among the young population under 30 years of age. This is in contrast to infectious syphilis in which the same age group accounted for only 26.3% of reported cases.

- In both women and men, the highest reported rates of chlamydia infections were in 20 to 24 year olds, although the rate in women (1824.3 per 100,000) was more than twice as high as that in men (884.2 per 100,000) (Figure 2).

- The ratio of female to male rates decreased with age. In the 40 and older age groups, rates were higher in men than in women. (Figure 2).

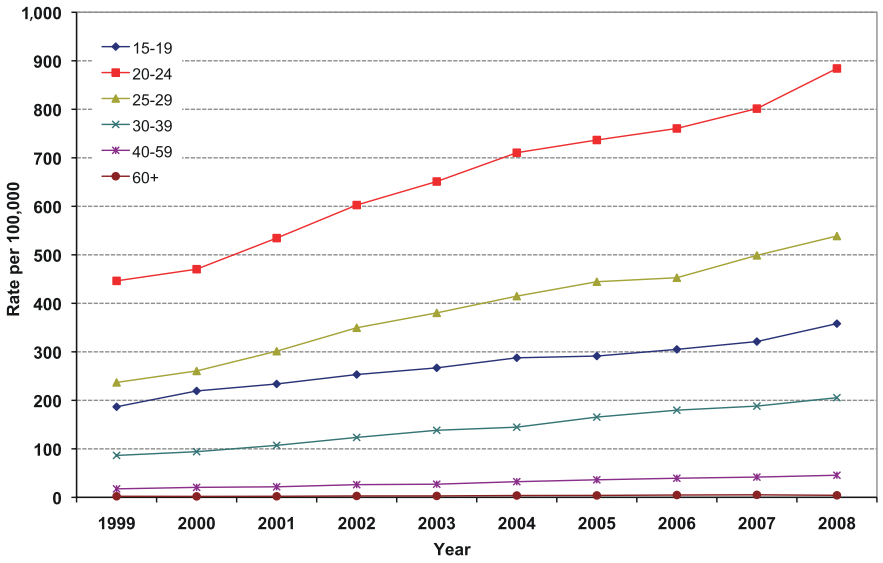
Figure 2: Reported Rates of Chlamydia by Sex and Age Group, 2008, Canada



Reported rates of chlamydia infections increased across age groups in both males and females aged 15 and older.

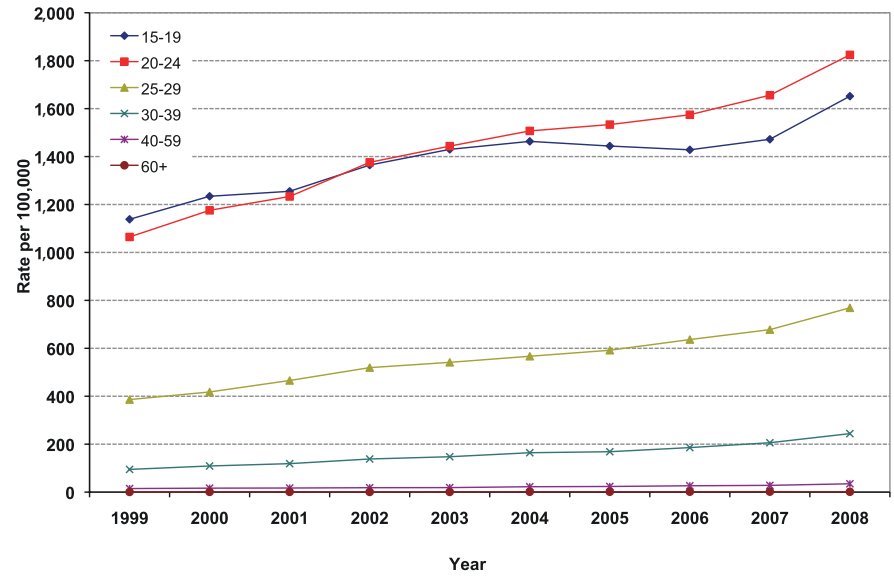
- Over the past decade, among males, the greatest absolute increase in reported rates of chlamydia infections was seen in 20 to 24 year olds. The rate increased from 446.3 per 100,000 in 1999 to 884.2 per 100,000 in 2008 (Figure 3).

Figure 3: Reported Rates of Chlamydia in Males by Age Group, 1999 to 2008, Canada



- In females, between 1999 and 2008, the greatest absolute increase in reported rates of chlamydia infections was seen in 20 to 24 year olds (Figure 4). The rate increased from 1064.6 to 1824.3 per 100,000.

Figure 4: Reported Rates of Chlamydia in Females by Age Group, 1999 to 2008, Canada



- Although reported rates in older women remained low compared to other age groups, substantial increases were seen since 1999, especially in 30 to 59 year old women. Between 1999 and 2008, reported rates in 30 to 39 year olds increased by 157.5% (from 94.8 to 244.1 per 100,000) and by 133.9% in 40 to 59 year olds (from 14.8 to 34.7 per 100,000) (Figure 4).

The majority of cases in 2008 occurred in the most populated provinces in Canada, while reported rates of chlamydia infections were highest in the Northern territories.

- Reported chlamydia rates continue to be highest in Nunavut, the Northwest Territories and Yukon (Table 1).
- Between 1999 and 2008, the greatest increase in reported chlamydia rates occurred in Manitoba, with an increase of 122.0% (Table 1).
- In 2008, the national female-to-male chlamydia rate ratio was 2.0:1.0, reflecting that more women than men were reported with chlamydia. Across the country, the ratio ranged from highest in Newfoundland and Labrador (2.9:1.0) to lowest in the Northwest Territories (1.5:1.0).

Table 1: Reported Cases and Rates[1] of Chlamydia by Province/Territory, 1999 and 2008, Canada

Jurisdiction	Number of Cases		Rates per 100,000[3]		Rate Change (%)
	1999	2008	1999	2008	1999–2008
Canada	***42,141***	***82,919***	***138.2***	***248.9***	80.2
BC	5,402	10,766	134.1	245.7	83.2
AB	5,416	12,047	**183.0**	**336.0**	83.6
SK	2,656	5,203	**259.0**	**512.1**	97.7
MB	2,967	6,965	**259.7**	**576.6**	122.0
ON	13,256	26,245	115.0	203.0	76.5
QC	7,968	15,043	108.4	194.1	79.0
NB	1,136	1,389	**150.6**	185.9	23.4
NS	1,364	2,033	**145.1**	216.7	49.3
PE	148	193	107.6	138.0	28.3
NL	433	596	80.1	117.3	46.5
YT	176	232	**567.0**	**700.0**	23.4
NT	1,219	870	**1,796.4**	**2,010.0**	N/A
NU[2]	N/A	1,337	N/A	**4,251.5**	N/A

[1] Rate change calculated using unrounded values.

[2] Nunavut did not officially become a territory until 1999; prior to 1999, data for Nunavut was combined with Northwest Territories. Rate change for NT was not calculated since 1999 rates are not comparable with 2008 rates due to the creation of Nunavut.

[3] Bolded values indicate rates above the national average.

GONORRHEA

(Neisseria gonorrhoeae)

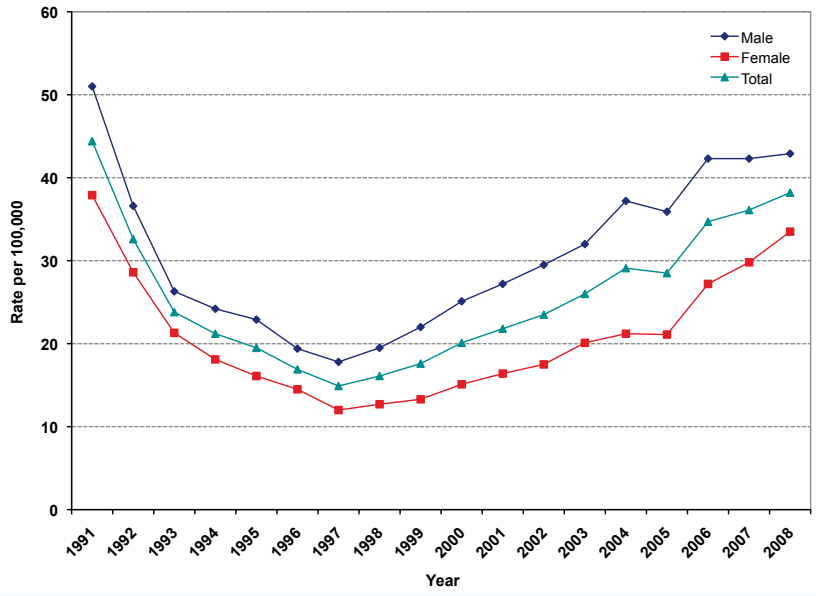
Gonorrhea *(Neisseria gonorrhoeae)*

Gonorrhea, an infection caused by *Neisseria gonorrhoeae,* has been nationally notifiable since 1924 and remains the second most commonly reported bacterial sexually transmitted infection in Canada. Untreated infections can lead to complications for both sexes, with more severe consequences for women. A serious, common complication affecting women is pelvic inflammatory disease, which can lead to chronic abdominal pain, infertility, and ectopic pregnancy. In men, untreated infections can result in epididymitis and rare cases of infertility. An uncommon complication of gonorrhea is the spread of infection to the blood stream and joints[3]. Like other non-ulcerative STIs, gonorrhea can increase the risk of HIV acquisition and transmission possibly by increasing the concentration of cells in genital secretions. These cells can serve as targets for HIV thereby increasing the risk of acquiring and/or transmitting the virus[2].

While reported rates of gonorrhea infections in Canada continue to rise in both sexes, the increase is being driven by women in more recent years.

- From 1991 to 1997, male and female rates of gonorrhea infection decreased dramatically; following 1997, sex-specific rates increased at a gradual pace until 2008 (Figure 5).
- In 2008, 12,723 cases of gonorrhea infections were reported nationally, corresponding to a rate of 38.2 per 100,000 (Figure 5). The overall rate increased by 116.5% since 1999 (17.6 per 100,000).
- Between 1999 and 2008, reported rates in both sexes increased over time. Rates in males increased by 95.1% (from 22.0 to 42.9 per 100,000) and in females by 151.1% (from 13.3 to 33.5 per 100,000) (Figure 5).
- More recently, the reported rate has stabilized in men, while continuing to increase in women. From 2007 to 2008, the reported rate increased by 1.4% in men and by 12.2% in women.

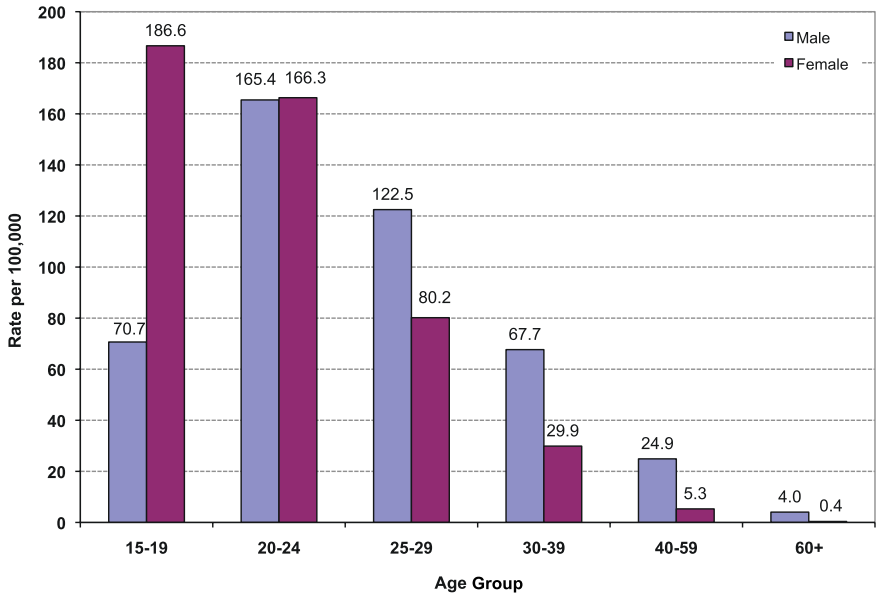
Figure 5: Reported Rates of Gonorrhea by Sex and Overall, 1991 to 2008, Canada



Reported rates of gonococcal infections in 2008 were highest in the younger population.

- People under 30 years of age accounted for the majority (71.5%) of reported cases in 2008. This is in contrast with infectious syphilis, in which the same age group accounted for only 26.3% of reported cases.
- The highest reported rate of gonorrhea infections in women was in 15 to 19 year olds (186.6 per 100,000) and 20 to 24 year olds (166.3 per 100,000) (Figure 6). The highest reported rate in men was in 20 to 24 year olds (165.4 per 100,000) followed by 25 to 29 year olds (122.5 per 100,000) (Figure 6).

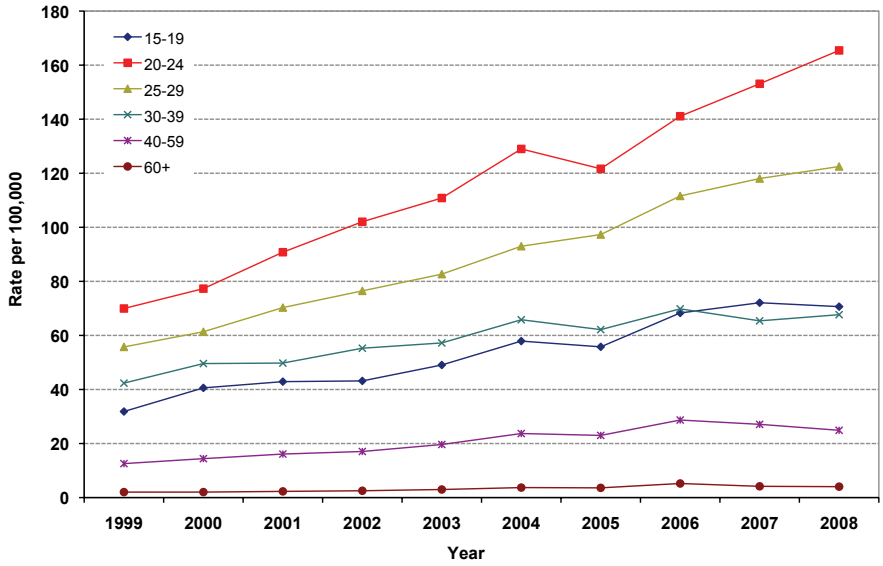
Figure 6: Reported Rates of Gonorrhea by Sex and Age Group, 2008, Canada



Reported rates of gonococcal infections increased consistently over time across age groups in both males and females aged 15 and older.

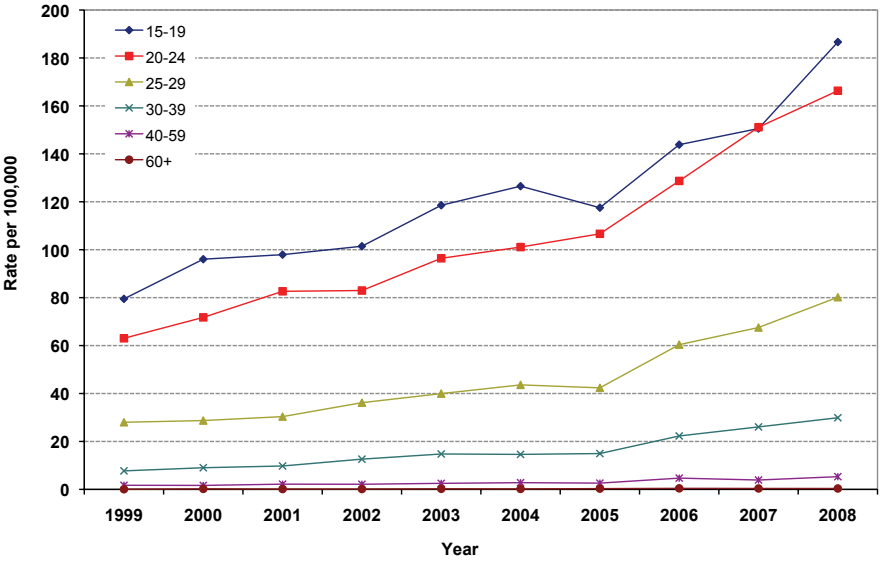
- In males, the greatest absolute increase in reported rates of gonococcal infections was seen in 20 to 24 year olds (Figure 7). The rate increased from 70.0 per 100,000 in 1999 to 165.4 per 100,000 in 2008.
- Although reported rates in older men remained low compared to other age groups, substantial increases were seen since 1999, especially in men aged 60 and older. Reported rates in senior men increased by 99.5% from 2.0 per 100,000 in 1999 to 4.0 per 100,000 in 2008 (Figure 7).

Figure 7: Reported Rates of Gonorrhea in Males by Age Group, 1999 to 2008, Canada



- In women, the greatest absolute increase in reported rates of gonococcal infections was seen in 15 to 19 year olds. The rate increased from 79.5 per 100,000 in 1999 to 186.6 per 100,000 in 2008 (Figure 8).

Figure 8: Reported Rates of Gonorrhea in Females by Age Group, 1999 to 2008, Canada



- Although reported rates in older women remained low compared to other age groups, substantial increases were seen since 1999, especially in women aged 30 to 39. The rate in 30 to 39 year olds increased by 287.4% (from 7.7 to 29.9 per 100,000) (Figure 8).

While the reported rates were highest in Nunavut and the Northwest Territories, the Prairie Provinces have seen substantial increases between 1999 and 2008.

- In 2008, the highest number of gonorrhea cases was reported in Ontario, followed by Alberta and Québec (Table 2). However, reported rates were highest in the Northwest Territories and Nunavut, followed by Manitoba, and Saskatchewan (Table 2).

- Between 1999 and 2008, the greatest increase in reported rates was in Saskatchewan, with an increase of 346.6% (Table 2). While the increase in Newfoundland and Labrador seems large at first glance, the overall number of reported cases remains small (Table 2).

Table 2: Reported Cases and Rates[1] of Gonorrhea by Province/Territory, 1999 and 2008, Canada

Jurisdiction	Number of Cases		Rate per 100,000[3]		Rate Change (%)
	1999	2008	1999	2008	1999–2008
Canada	***5,381***	***12,723***	***17.6***	***38.2***	***117.0***
BC	890	1,484	22.1	33.9	53.4
AB	535	2,126	**18.1**	**59.3**	227.6
SK	302	1,334	**29.4**	**131.3**	346.6
MB	510	1,378	**44.6**	**114.1**	155.8
ON	2,230	3,867	**19.4**	29.9	54.1
QC	623	1,655	8.5	21.4	151.8
NB	11	35	1.5	4.7	213.3
NS	63	143	6.7	15.2	126.9
PE	0	8	0.0	5.7	*
NL	1	14	0.2	2.8	1,300.0
YT	15	17	**48.3**	**51.3**	6.2
NT	201	299	**296.2**	**690.8**	N/A
NU[2]	N/A	363	N/A	**1,154.3**	N/A

[1] Rate change calculated using unrounded values.

[2] Nunavut did not officially become a territory until 1999; prior to 1999, data for Nunavut was combined with Northwest Territories. Rate change for NT was not calculated since 1999 rates are not comparable with 2008 rates due to the creation of Nunavut.

* The rate change cannot be quantified.

[3] Bolded rates indicate rates above national average.

- In 2008, the national male-to-female rate ratio was 1.3:1, reflecting that more males than females were reported with gonococcal infections (Table 3). However, this average masks variations across the country. In four jurisdictions (Prince Edward Island, Manitoba, Saskatchewan and Yukon Territory), more cases were reported in females than males.

Table 3: Male-to-Female Ratio of Reported Rates of Gonorrhea by Province/Territory, 2008, Canada

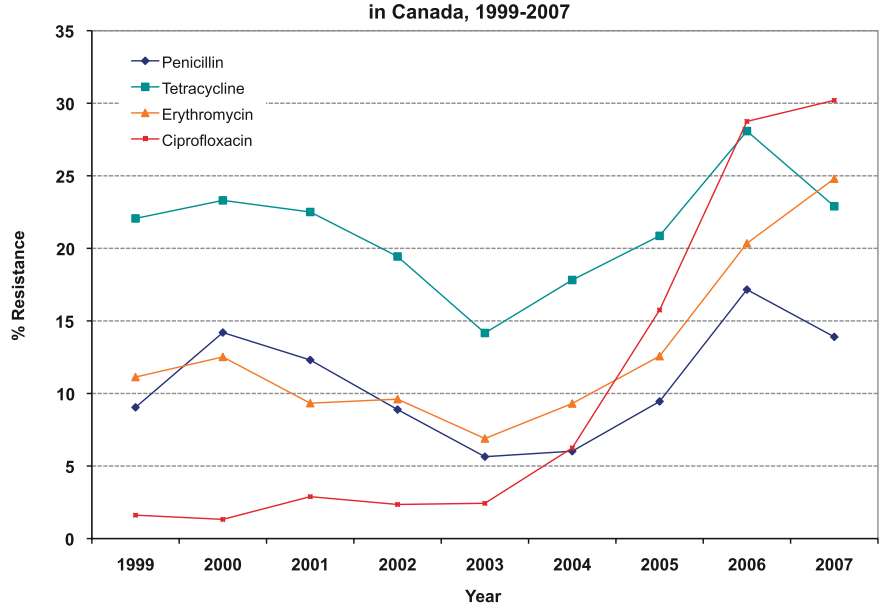
Jurisdiction	Male-to-Female Rate Ratio
Canada	1.3 : 1.0
BC	1.8 : 1.0
AB	1.3 : 1.0
SK	0.7 : 1.0
MB	0.8 : 1.0
ON	1.4 : 1.0
QC	1.8 : 1.0
NB	1.1 : 1.0
NS	1.1 : 1.0
PE	0.3 : 1.0
NL	N/A
YT	0.7 : 1.0
NT	1.0 : 1.0
NU	1.0 : 1.0

Antimicrobial Resistance

Uncomplicated gonorrhea can be treated with single dose oral or injectable antibiotics. The challenge arises when resistant strains are treated with antibiotics to which the bacteria have decreased susceptibility. When this occurs, there is increased likelihood of transmission due to treatment failure and the development of adverse sequelae unless the resistant organism is identified and treated appropriately. Gonococcal resistance to penicillin, erythromycin and tetracycline is long established, while ciprofloxacin resistance has developed more recently[4-6]. None of these antibiotics are currently recommended as preferred treatments in the Canadian Guidelines on Sexually Transmitted Infections[1].

- Canadian gonococcal resistance surveillance is a collaborative effort between the National Microbiology Laboratory (NML) at PHAC and provincial and territorial laboratories.
- Submission to the NML of gonococcal isolates that have decreased susceptibility to at least one antibiotic is voluntary and not standardized across the country.
- Further, the shift from culture to Nucleic Acid Amplification Test (NAAT) has created challenges in monitoring resistance as specimens available for testing are becoming more limited.
- Antibiotics tested for gonococcal resistance at the NML include penicillin, tetracycline, spectinomycin, erythromycin, azithromycin, ciprofloxacin, cefixime and ceftriaxone.
- Using the most current data available for 2007, 30.2% of cultured strains demonstrated resistance to ciprofloxacin, up from 2.4% in 2003 (Figure 9).
- While azithromycin is one of the drugs included for surveillance, less than 1% of tested strains show resistance each year.
    - In 2007, 0.2% of cultured strains demonstrated resistance to azithromycin. Note that these strains were from three jurisdictions and the overall numbers were low.

Figure 9: Antimicrobial Susceptibility of *Neisseria Gonorrhoeae* Strains Tested in Canada, 1999-2007



* Percentages are calculated using the number of all GC cultures tested in each province, including susceptible and resistance cultures, as the denominator.

There are no resistant strains for spectinomycin, cefixime, and ceftriaxone.

SYPHILIS

(Treponema pallidum)

Syphilis (*Treponema pallidum*)

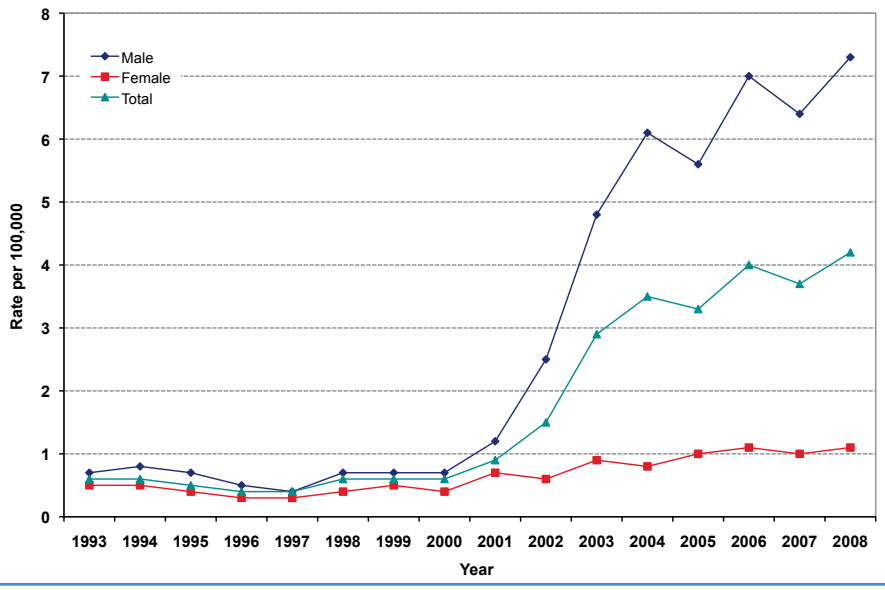
Syphilis, an infection caused by the bacterium *Treponema pallidum*, has been nationally notifiable since 1924. If left untreated, it progresses through different stages, with primary, secondary and early latent (less than one year after the point of infection) stages being infectious. Only these infectious stages are included in national reports. Untreated syphilis will enter into a non-infectious late latent stage of the infection that may lead to serious complications associated with tertiary syphilis. This includes damage to the central nervous system, cardiovascular system, eyes, skin and other internal organs. Untreated syphilis can be fatal[1]. Individuals infected with syphilis are at an increased risk of contracting and transmitting HIV[2].

Congenital syphilis is caused by the vertical transmission of *Treponema pallidum* from an infected mother to her fetus. Congenital syphilis may not be diagnosed until later in life, as the disease can often be asymptomatic for life or may present with symptoms that are not identified in the first few weeks. Only early congenital syphilis cases (diagnosed in those under 2 years of age) are reported nationally.

Reported rates of infectious syphilis in Canada remained stable between 1999 and 2001, then spiked upwards in the following three years, particularly among males. Since 2004, the rates are climbing at a slower rate in both sexes.

- From 1993 to 2000, reported rates of infectious syphilis were relatively stable and similar between genders (Figure 10). Reported rates started to climb sharply in 2001, more so in men than in women.
- In 2008, 1,394 cases of infectious syphilis were reported to PHAC, corresponding to a rate of 4.2 per 100,000. The overall rate increased by 568.2% since 1999 (0.6 per 100,000) (Figure 10).

Figure 10: Reported Rates of Infectious Syphilis by Sex and Overall, 1993 to 2008, Canada



- Historically, a greater number of cases have been reported in men than in women. In 2008, men accounted for 86.1% of reported cases.
- Between 1999 and 2008, reported rates of infectious syphilis increased in both sexes, but primarily in males. During this period, the rate in men increased by 870.7% (from 0.7 to 7.3 per 100,000) and in women increased by 123.4% (from 0.5 to 1.1 per 100,000) (Figure 10).

- The male-to-female rate ratio increased from 1.5:1.0 in 1999 to 6.4:1.0 in 2008, reflecting that more males than females were reported with infectious syphilis, and this disparity increased over time (Table 4).
- The male-to-female ratio is much higher in some jurisdictions: Québec, Ontario and British Columbia outbreaks are predominantly among men.

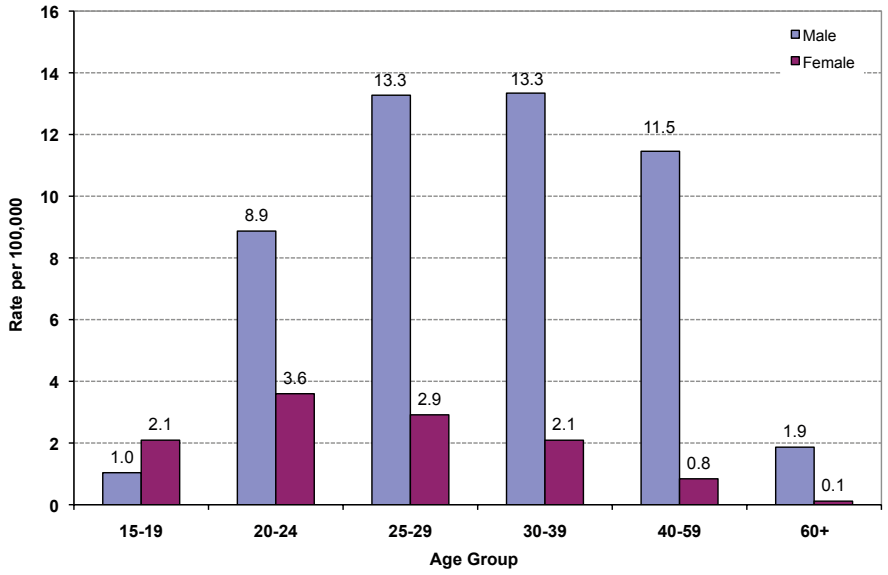
Table 4: Male-to-Female Ratio of Reported Rates of Infectious Syphilis by Province/Territory, 2008, Canada

Jurisdiction	Male-to-Female Rate Ratio
Canada	6.4 : 1.0
BC	13.9 : 1.0
AB	1.4 : 1.0
SK	2.0 : 1.0
MB	3.4 : 1.0
ON	13.6 : 1.0
QC	45.7 : 1.0
NB	1.8 : 1.0
NS	N/A
PE	N/A
NL	N/A
YT	N/A
NT	1.3 : 1.0
NU	N/A

The age-specific distribution of infectious syphilis cases differed from chlamydia and gonorrhea in that reported rates were highest in the older population, particularly in males aged 30 to 39.

- In 2008, people aged 30 and older accounted for 73.6% of reported cases.
- In men, the highest reported rate of infectious syphilis was shared between 25 to 29 year olds and 30 to 39 year olds (13.3 per 100,000) (Figure 11). Together, these age groups accounted for almost 40% of reported cases in men in 2008.
- In women, the highest reported rate was in 20 to 24 year olds (3.6 per 100,000) (Figure 11).

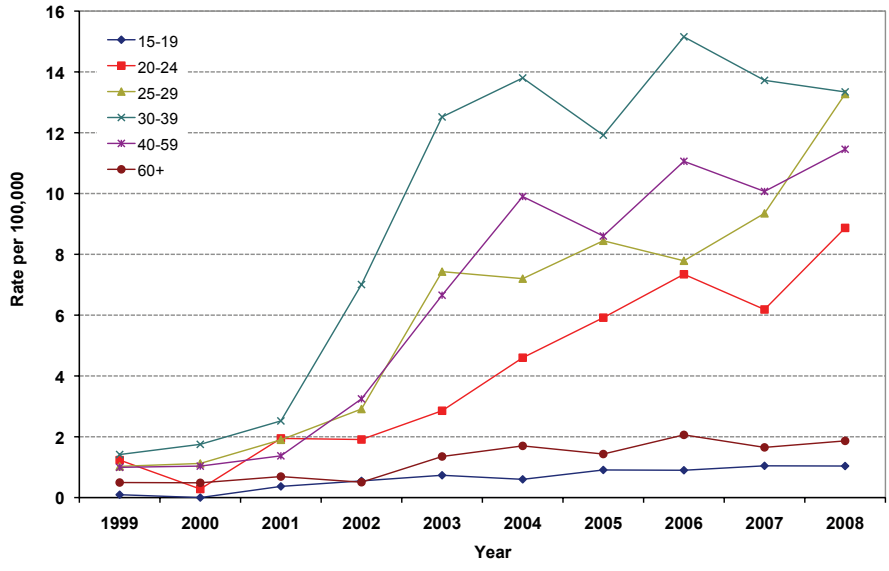
Figure 11: Reported Rates of Infectious Syphilis by Sex and Age Group, 2008, Canada



While highest rates of infectious syphilis are reported in males over 30, more recently, the greatest increases were in men 20 to 29 years old.

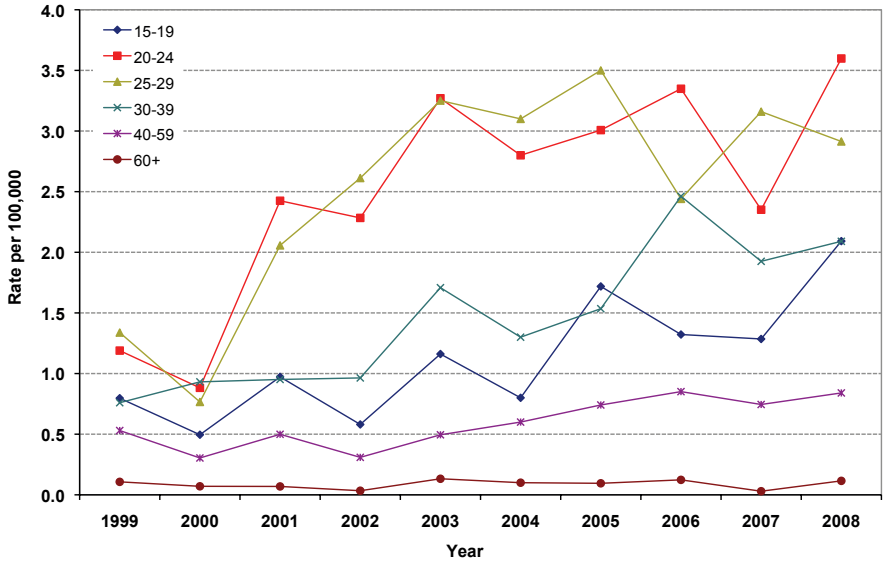
- In males, the greatest absolute increase in reported rates of infectious syphilis was in 25 to 29 year olds. The rate increased from 1.0 per 100,000 in 1999 to 13.3 per 100,000 in 2008 (Figure 12).
- Although reported rates in young men remained low compared to men aged 30 to 59, substantial increases were seen since 1999. The reported rate in 20 to 24 year old males increased by 1192.4% from 1.2 per 100,000 in 1999 to 8.9 per 100,000 in 2008 (Figure 12).

Figure 12: Reported Rates of Infectious Syphilis in Males by Age Group, 1999 to 2008, Canada



- In women, the greatest absolute increase in reported rates of infectious syphilis was in 20 to 24 year olds (Figure 13). The rate increased from 1.2 per 100,000 in 1999 to 3.6 per 100,000 in 2008.

Figure 13: Reported Rates of Infectious Syphilis in Females by Age Group, 1999 to 2008, Canada



The majority of reported cases were concentrated in Canada's most populous provinces. However, the highest reported rate was in NWT due to a recent outbreak.

- In 2008, the highest reported rate of infectious syphilis was in the Northwest Territories, followed by Alberta (Table 5).

- Between 1999 and 2008, the largest increase in reported rates of infectious syphilis was in Alberta, with an increase of 6700% (Table 5).

- During the same period, outbreaks of infectious syphilis were reported across Canada, including Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Montreal, and Yukon[7-14]. Most recently, an outbreak of infectious syphilis amongst injection drug users and heterosexuals was reported in the Northwest Territories[15].

Table 5: Reported Cases and Rates[1] of Infectious Syphilis by Province/Territory, 1999 and 2008, Canada

Jurisdiction	Number of Cases		Rate per 100,000[3]		Rate Change (%)
	1999	2008	1999	2008	1999–2008
Canada	***191***	***1394***	***0.6***	***4.2***	***600.0***
BC	129	235	**3.2**	**5.4**	68.8
AB	2	244	0.1	**6.8**	6700.0
SK	1	12	0.1	1.2	1100.0
MB	0	13	0.0	1.1	*
ON	54	444	0.5	3.4	580.0
QC	4	369	0.1	**4.8**	4700.0
NB	0	11	0.0	1.5	*
NS	1	4	0.1	0.4	300.0
PE	0	1	0.0	0.7	*
NL	0	8	0.0	1.6	*
YT	0	0	0.0	0.0	*
NT	0	53	0.0	**122.4**	*
NU[2]	N/A	0	N/A	0.0	N/A

[1] Rate change calculated using unrounded values.

[2] Nunavut did not officially become a territory until 1999; prior to 1999, data for Nunavut was combined with Northwest Territories. Rate change for NT was not calculated since 1999 rates are not comparable with 2008 rates due to the creation of Nunavut.

[*] The rate change cannot be quantified.

[3] Bolded rates indicate rates above national average.

Congenital Syphilis

- Congenital syphilis rates in Canada are very low. However, data from recent years suggest an increase in reported cases and corresponding rates and can be linked to jurisdictions that have reported outbreaks of syphilis[16] (Table 6).

Table 6: Reported Cases and Rates of Confirmed Early Congenital Syphilis[1], 1999 to 2008, Canada

Year	Total reported cases	Rate (per 100,000 live births)[2]	Number of reported cases[1]												
			BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU
1999	1	0.297	0	0	0	0	1	0	0	0	0	0	0	0	0
2000	2	0.610	1	0	0	0	0	1	0	0	0	0	0	0	0
2001	1	0.300	1	0	0	0	0	0	0	0	0	0	0	0	0
2002	3	0.912	0	1	1	0	1	0	0	0	0	0	0	0	0
2003	0	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	8	2.338	3	5	0	0	0	0	0	0	0	0	0	0	0
2006	7	1.974	2	4	0	0	1	0	0	0	0	0	0	0	0
2007	8	2.175	2	5	0	0	1	0	0	0	0	0	0	0	0
2008	8	2.136	4	2	0	0	1	0	0	0	0	0	0	1	0

[1] Refers to laboratory confirmed case of early congenital syphilis (within 2 years of birth)

[2] Source: Statistics Canada, Canadian Vital Statistics, Birth Database

INTERNATIONAL COMPARISON

International Comparison

To provide international context for the trends highlighted in this report, the current state of sexually transmitted infections (STIs) in Canada is compared to other western countries with a similar population health status and a well-established public health infrastructure. Countries selected for comparison are the United States, Australia, and United Kingdom. Statistics presented below are either drawn from published health reports or provided directly by respective national health departments. Differences in case numbers and reported rates need to be interpreted with caution due to differences in case definitions, reporting sources, screening programs and screening rates, age groupings and other factors.

Chlamydia

- Chlamydia is the most commonly reported bacterial STI in all four countries. Reported rates of chlamydia infections ranged from 201.8 per 100,000 in United Kingdom to 401.3 per 100,000 in United States (Table 7).
- The United Kingdom only reported uncomplicated genital chlamydial infections whereas other countries reported all laboratory-confirmed clinical isolates, which included both genital and extra-genital specimens. This difference may in part explain the lower rate reported in the United Kingdom.
- In all countries except the United Kingdom, females accounted for at least 60% of all reported cases. The ratio of reported rates between males and females ranged from 1.0:1.0 in United Kingdom to 1.0:2.8 in United States (Table 7).
- In all countries, highest rates were reported in the younger population: 15 to 24 year olds in women and 20 to 24 year olds in men.

Table 7: Reported Cases and Rates of Chlamydia in Canada, Australia, the United Kingdom and the United States, 2008

Country	Number of Chlamydia Cases			Reported Rate of Chlamydia (per 100,000)			M : F Rate Ratio
	Total	Male	Female	Total	Male	Female	
Canada*	82,919	27,876	54,967	248.9	168.7	327.4	1.0 : 2.0
Australia*	58,513	23,614	34,784	273.8	222.2	323.8	1.0 : 1.5
United Kingdom	123,018	61,863	61,155	201.8	206.8	196.9	1.0 : 1.0
United States	1,210,523	313,779	893,004	401.3	211.1	583.8	1.0 : 2.8

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada for Canadian statistics. National Notifiable Disease Surveillance, Department of Health and Ageing for Australian statistics [17]. HIV and Sexually Transmitted Infections Department, Health Protection Agency for United Kingdom statistics [18]. Division of STD Prevention, Centers for Disease Control and Prevention for American statistics [19].

* Totals include cases of unknown sex

Gonorrhea

- Reported rates of gonococcal infections were higher in the United States than in other countries (Table 8).
- In the United States, reported rates of gonorrhea were similar in men and women, while in all other countries, reported rates were higher in men than in women; the male-to-female rate ratio ranged from 1.3:1.0 in Canada to 2.1:1.0 in the United Kingdom (Table 8).
- Consistent across countries, the highest rates were reported in young men aged 20 to 24. Among women, highest rates were reported in a slightly younger group in most countries: 15 to 19 year olds in Australia and 16 to 19 year olds in the United Kingdom. In Canada and the United States, however, the highest rate was reported in women aged 15 to 24.

Table 8: Reported Cases and Rates of Gonorrhea in Canada, Australia, the United Kingdom and the United States, 2008

Country	Number of Gonorrhea Cases			Reported Rate of Gonorrhea (per 100,000)			M : F Rate Ratio
	Total	Male	Female	Total	Male	Female	
Canada*	12,723	7,092	5,623	38.2	42.9	33.5	1.3 : 1.0
Australia*	7,674	4,988	2,675	35.9	46.9	24.9	1.9 : 1.0
United Kingdom	16,629	11,113	5,516	27.3	37.1	17.8	2.1 : 1.0
United States	336,742	153,103	182,577	111.6	103.0	119.4	1.0 : 1.2

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada for Canadian statistics. National Notifiable Disease Surveillance, Department of Health and Ageing for Australian statistics [17]. HIV and Sexually Transmitted Infections Department, Health Protection Agency for United Kingdomstatistics [18]. Division of STD Prevention, Centers for Disease Control and Prevention for American statistics [19].

* Totals include cases of unknown sex

Syphilis

- When compared to chlamydia and gonorrhea infection, infectious syphilis is relatively rare in all four countries. Reported rates ranged from 4.1 per 100,000 in Canada to 9.1 per 100,000 in Australia (Table 9).
- As with chlamydia, the case definition for syphilis varied across countries. In both the United States and the United Kingdom, only primary and secondary infectious syphilis cases were reported. In Australia and Canada, early latent cases were also included in reporting. However, there are notable differences in the definition of early latent syphilis between these four countries. Early latent syphilis is defined as an asymptomatic individual with syphilis who has acquired the infection in the past two years (for UK and Australia) and one year for Canada and the US.
- In all four countries, men accounted for about 85% of reported cases of infectious syphilis. The disparity in reported rates between men and women varied by country; the male-to-female rate ratio ranged from 5.1:1.0 in the United States to 8.3:1.0 in the United Kingdom (Table 9).
- Among men, highest rates ranged: 25 to 39 year olds in Canada, 35 to 39 year olds in Australia, 25 to 44 year olds in the United Kingdom. In the United States, highest rates were reported among 20 to 29 year olds.
- Among women, highest rates were reported in younger populations: 15 to 19 year olds in Australia and 20 to 24 year olds in Canada, the United States and the United Kingdom.

Table 9: Reported Cases and Rates of Infectious Syphilis (Primary, Secondary, Early Latent Syphilis) in Canada and Australia and Primary and Secondary Syphilis in the United Kingdom and the United States, 2008

Country	Number of Syphilis Cases			Reported Rate of Syphilis (per 100,000)			M : F Rate Ratio
	Total	Male	Female	Total	Male	Female	
Canada*+	1,394	1,200	190	4.2	7.3	1.1	6.4 : 1.0
Australia*+	1,301	1,152	148	6.1	10.8	1.4	7.7 : 1.0
United Kingdom^	2,524	2,248	276	4.1	7.5	0.9	8.3 : 1.0
United States^	13,500	11,255	2,242	4.5	7.6	1.5	5.1 : 1.0

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada for Canadian statistics. National Notifiable Disease Surveillance, Department of Health and Ageing for Australian statistics [17]. HIV and Sexually Transmitted Infections Department, Health Protection Agency for United Kingdom statistics [18]. Division of STD Prevention, Centers for Disease Control and Prevention for American statistics [19].

* Totals include cases of unknown sex

+ Includes reported cases of primary, secondary and early latent syphilis. NB: The definition for early latent syphilis varies between the four countries. Early latent syphilis is defined as an asymptomatic individual with syphilis who has acquired the infection in the past two years (for UK and Australia) and one year for Canada and the US

^ Includes only reported cases of primary and secondary syphilis cases.

Technical Notes

Case reporting: Currently, some jurisdictions report to the Public Health Agency of Canada (PHAC) using aggregate case counts instead of case-by-case reporting. Selected variables submitted by all 13 jurisdictions are: age at diagnosis, year of diagnosis, province/territory of diagnosis, and sex. As such, national reporting is limited to analyses of these variables.

Reporting delay: A time delay may occur between when a person is tested positive for a sexually transmitted infection (STI) and when the report is received at PHAC. This time lag is referred to as reporting delay. In cases where there are discrepancies between data reported by 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. The 2008 data presented in this report are also preliminary and subject to change.

Underreporting: The number of reported cases likely underestimates the true burden of infection in a given population for a variety of reasons. For example, many people who are infected with STIs do not exhibit symptoms and therefore may not present to a healthcare practitioner for testing.

Annual trends: Observed trends must be interpreted with caution since there are a number of factors that contribute to changes:

- Rates based on small numbers are more prone to fluctuation over time; and
- There may be changes to testing patterns due to improved diagnostic capabilities, improved duplicate removal, and reporting delay.

2005 data: Reported cases for Ontario in 2005 are underestimates due to a transition in the provincial reporting system. Decreases for 2005 are likely an artifact of reporting delay, not a true reduction in disease incidence. Canadian cases and rates for 2005 are affected.

Population data source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1999–2000 final intercensal estimates, 2001–2003 final postcensal estimates, 2004–2008 updated postcensal estimates, 2008 preliminary postcensal estimates.

Overview of STI Surveillance in Canada

In Canada, national routine surveillance is generally conducted according to longstanding standard operating procedures between the provinces/territories and PHAC. As part of the plan to develop more formal processes, the first of a series of data sharing agreements was signed between Ontario and PHAC in 2007.

Provinces and territories collect and manage surveillance data using a variety of mechanisms (e.g. paper-based reporting, proprietary databases, iPHIS) and submit these data to PHAC on a regular basis. The content of the various data submissions depends on each jurisdiction's ability to collect the data elements, privacy legislation, and technological capacity. Data are submitted in a variety of formats, e.g. line-listed electronic, paper-based case reports, or aggregate data, and entered or directly loaded (depending on format) into the national Canadian Notifiable Disease Surveillance System (CNDSS) by PHAC personnel.

Extracts from CNDSS are used as the basis of national data tables and surveillance reports. Tables containing data for each province or territory are sent to their respective jurisdiction for verification. Small discrepancies between PHAC and provincial or territorial numbers are expected as a result of comparing dynamic databases, but larger differences require further investigation. If a jurisdiction revises data during the verification process, a re-submission of data to CNDSS is required.

Upon validation of provincial and territorial data, CAID staff recreates data tables and post them to the PHAC website. Finalized data tables also form the basis of annual surveillance reports, which provide a more in-depth analysis and interpretation of the data. These data are used by public health planners, academics and media, both nationally and internationally.

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