

July 2014

Monthly Infectious Diseases Surveillance Report

Volume 3, Issue 7

The Monthly Infectious Diseases Surveillance Report is produced by Public Health Ontario (PHO) for the public health community of Ontario. We welcome feedback by email to:

SurveillanceServices@oahpp.ca. Past issues and additional information are available [online](#).

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INFECTIOUS DISEASE IN FOCUS

Invasive Meningococcal Disease

Meningococcal disease is caused by the gram-negative diplococcus, *Neisseria meningitidis* and is primarily transmitted by direct contact or respiratory droplet spread from colonized persons. Asymptomatic nasopharyngeal carriage occurs in about 5 to 10% of the population and approximately 1% of those with meningococcal colonization progress to invasive meningococcal disease (IMD).¹ The incubation period is generally 3 to 4 days, with a range of 2 to 10 days.²

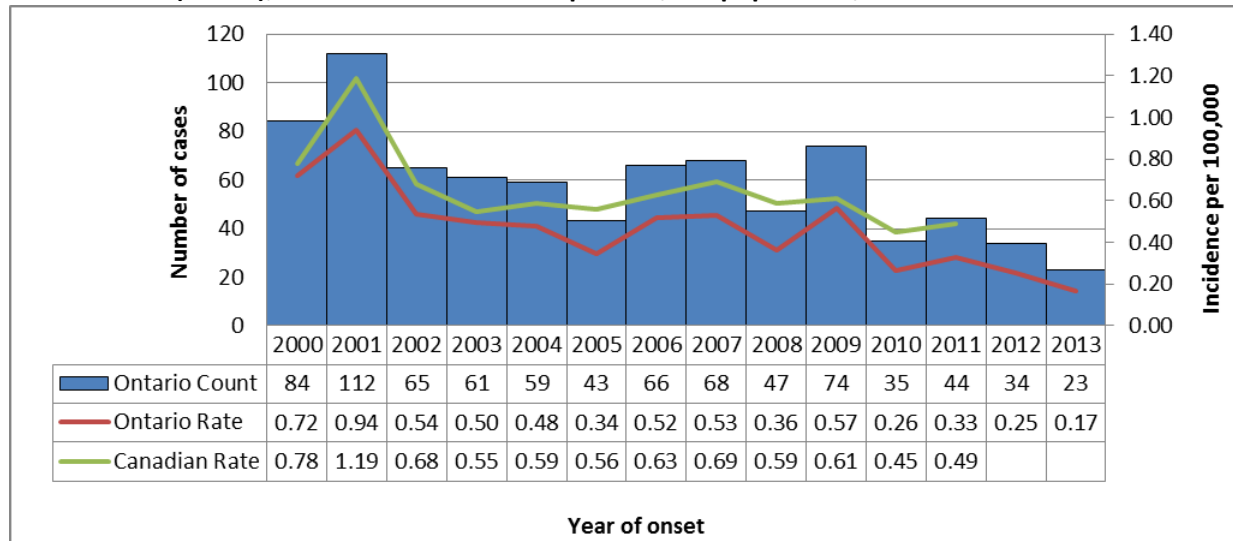
IMD is a serious and potentially life threatening disease, characterized by meningitis, meningococemia or both.³ Meningococcal meningitis often presents clinically with a sudden onset of fever, headache, stiff neck, nausea, vomiting, photophobia, and an altered mental state.⁴ Meningococemia is characterized by abrupt onset of fever and a petechial or purpuric rash, often associated with shock.⁴ The case fatality ratio (CFR) of invasive disease is between 8% and 15% and among those who survive, 10% to 20% can develop complications such as hearing impairment, limb amputation, skin scarring and intellectual disability.⁴ The disease is rare and primarily affects young children, but there is also a peak among adolescents and young adults.⁵

N. meningitidis is classified into serogroups; almost all IMD globally is associated with serogroups A, B, C, Y and W-135.² Serogroup A disease is rarely seen in Canada, and cases are usually associated with international travel to endemic regions. A conjugated vaccine against serogroup C has been publicly funded in Ontario for one-year-olds since September 2004. This was followed by a publicly-funded school-based serogroup C program for grade seven students in January 2005, which was replaced with quadrivalent conjugated vaccine against serogroups A, C, Y and W-135 in 2009.⁷ As of December 2013, a new meningococcal B vaccine (Bexsero®) has been approved for use in Canada, but is not publicly-funded for routine use.

For this analysis, unique IMD cases were identified via probabilistic data linkage for the years 2000 to 2010 and by deterministic data linkage for the years 2011 to 2013, using integrated Public Health Information System (iPHIS) and Public Health Ontario Laboratories (PHOL) records.

IMD is an endemic but rare disease in Ontario. Between 2000 and 2013, a total of 815 IMD cases were identified, with 23 occurring in 2013. The overall annual incidence ranged from a high of 0.94 per 100,000 population in 2001 to a low of 0.17 per 100,000 population in 2013, with significant decrease over time (Figure 1). Similarly, national data also showed a decrease in IMD incidence since 2000.

Figure 1. Total number and incidence of invasive meningococcal disease (IMD) in Ontario by year, 2000 to 2013 (n=815), and Canadian IMD rate per 100,000 population, 2000 to 2011.



Data source:

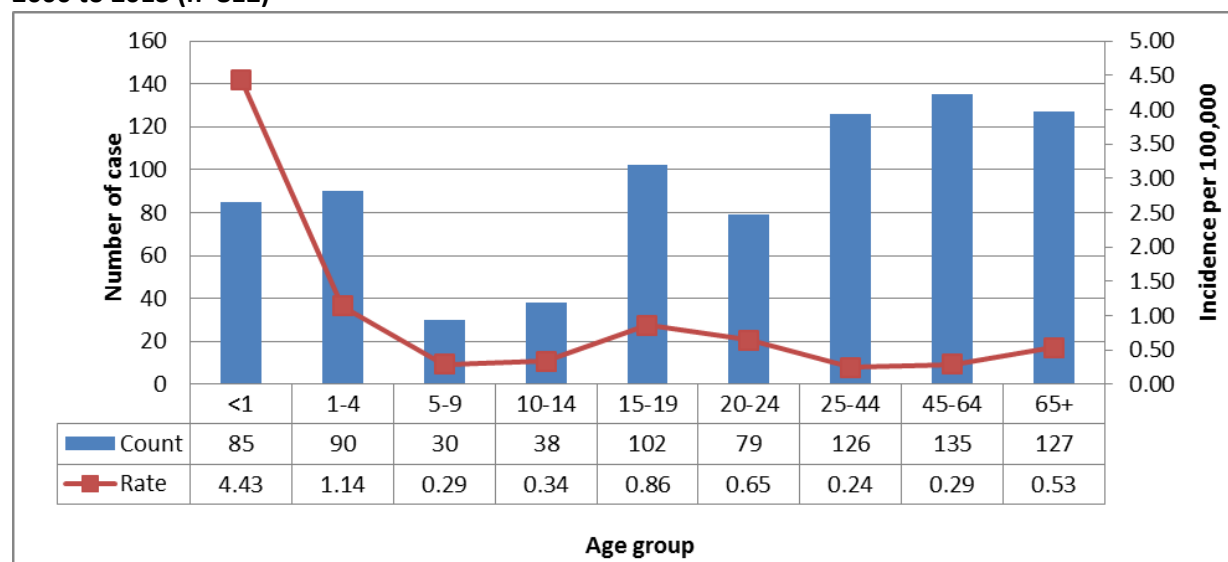
Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/05/30] and Public Health Ontario Laboratories (PHOL).

Population estimates [2000-2012]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2013/09/16].

Population projection [2013]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2013/02/01].

The median age of IMD cases was 23.5 years, with a range of 2 weeks to 101 years old. Disease incidence was highest among children less than 5 years, with a second smaller peak among adolescents and young adults aged 15 to 24 years (Figure 2). Overall, there was a relatively equal distribution between males and females, with 48.5% and 51.5%, respectively. However, among persons age 65 and over, 63.5% of cases were among females. In 2013, the age and sex distribution was generally similar without the secondary peak among adolescents and young adults, however the case count was low (n=23 cases) and rates were unstable.

Figure 2. Total number and annualized incidence of invasive meningococcal disease by age, Ontario, 2000 to 2013 (n=812)*



Data source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/05/30] and Public Health Ontario Laboratories (PHOL).

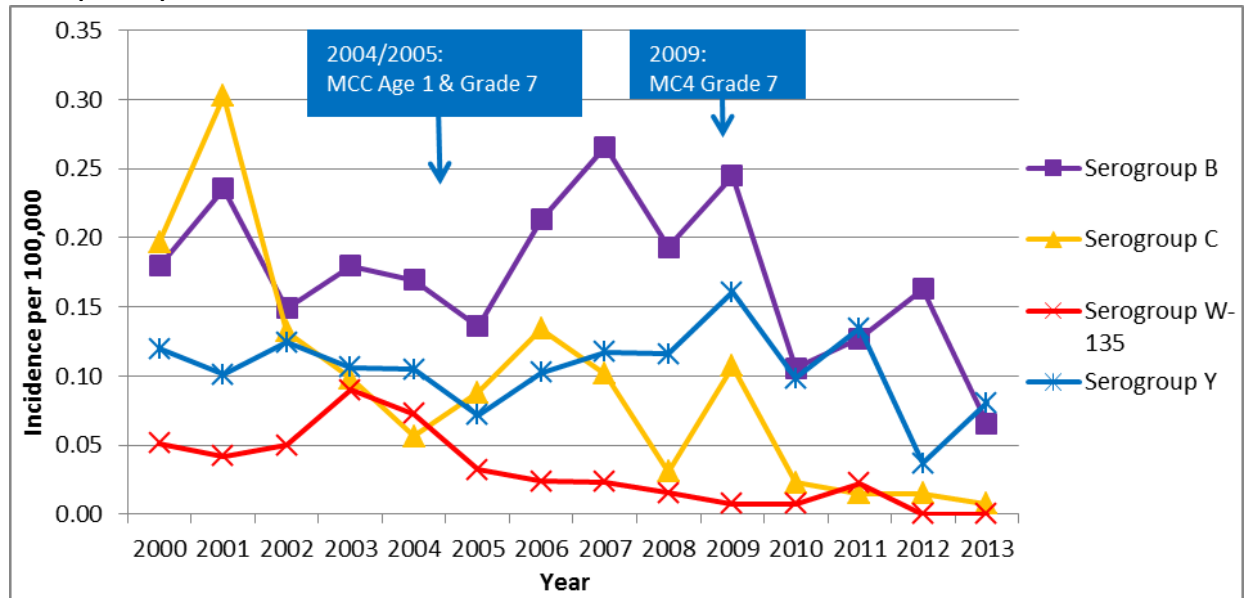
***Note:** Three cases with missing age were excluded.

Although the annual incidence of IMD in Ontario was 0.17 per 100,000 population in 2013, we observed some geographic variation with six of seven health regions reporting cases in 2013 (no cases were reported in North West region). Eastern (N=5) had the highest incidence of 0.29 per 100,000 population, whereas Toronto (N=4) had the lowest incidence of 0.14 per 100,000. The remaining health regions reported an incidence of 0.15, 0.15, 0.18 and 0.19 per 100,000 for Central East (N=6), Central West (N=4), North East (N=1) and South West (N=3), respectively.

In 2013, as in previous years, a seasonal pattern was observed where IMD primarily occurred in winter and spring months and declined in summer. Some evidence suggests that the increase in IMD in winter/spring is influenced by the influenza virus enhancing the risk of bacterial invasion in colonized individuals.⁸

When examining meningococcal disease trends by serogroup, we observed the incidence of serogroup C to have declined significantly over time between 2000 and 2013 (Figure 3). There has also been a decrease in incidence of serogroups Y and W-135 disease since the introduction of the quadrivalent conjugated program in 2009. The incidence of serogroup B disease has been variable throughout the period of surveillance, dropping to 0.07 per 100,000 in 2013.

Figure 3. Annual incidence of invasive meningococcal disease (IMD) in Ontario, by serogroup, 2000 to 2013 (n=709)*



Data source:

Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/05/30] and Public Health Ontario Laboratories (PHOL)

Population estimates [2000-2012]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2013/09/16].

Population projection [2013]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2013/02/01].

***Note:** Four serogroup A, one serogroup Z, 86 non-groupable and 15 cases with unknown serogroups excluded.

Immunization status could only be determined for 1.0% (4/406) of all cases with serogroups that were vaccine-preventable (A, C, W-135, and Y) between 2000 and 2013. All four cases had received meningococcal C conjugate vaccine and subsequently developed serogroup Y disease.

The epidemiologic profile of IMD cases in Ontario is consistent with what is seen elsewhere.^{9,10} The reduction of IMD, particularly serogroup C, suggests that the publicly funded vaccination programs have had an impact in Ontario, similar to that seen in other countries.^{11,12} Ongoing surveillance and monitoring, as well as documentation of the immunization status of every case of IMD is important to further assess the impact of the toddler and adolescent programs on disease burden in Ontario.

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SIGNIFICANT REPORTABLE DISEASE ACTIVITY

Table 1 provides a list of reportable diseases for which incidence in 2014 was significantly higher ($p < 0.05$) than expected compared to the five-year historical average (2009-2013). Both monthly and year-to-month (YTM) comparisons were made for each of the reportable diseases listed in Appendix 1.

Table 1. Summary of statistically significant increases in reportable disease incidence: Ontario, January 1 to May 31, 2014

Reportable disease	2014				Historical comparisons						5-year avg annual count (2009-2013)
	May	May rate ‡	YTM	YTM rate ‡	Current month 5-year avg (2009-2013)	Current month 5-year avg (2009-2013) rate ‡	% difference in rates (current month minus 5-year avg)†	YTM 5-year avg (2009-2013)	YTM 5-year avg (2009-2013) rate ‡	% difference in rates (YTM 2014 minus YTM 5-year avg)†	
Gonorrhoea (All Types) ^{1,2}	465	33.6	2229	161.0	310	23.2	44.8	1611	120.5	33.6	4070
Group A Streptococcal Disease, Invasive ¹	68	4.9	388	28.0	55	4.1	19.4	290	21.7	29.1	585
Influenza ¹	510	36.8	7824	565.1	443	33.1	11.2	3625	271.1	108.4	7329
Measles ¹	2	0.1	21	1.5	2	0.1	-3.4	4	0.3	382.9	8
Salmonellosis ¹	210	15.2	1185	85.6	217	16.3	-6.7	1025	76.7	11.6	2632

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/06/18].

Population Estimates [2009-2012], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: [2013/09/16].

Population Projections [2013-2014], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: [2014/04/11].

‡ Rates listed are cases per 1,000,000 population.

† Percent (%) difference is calculated using unrounded rates; numbers displayed in these columns may vary from calculations using rounded rates.

¹ Statistically significant difference ($p < 0.05$) in incidence reported in year-to-month (January 1 to May 31, 2014) compared to the five-year historical average (January 1 to May 31, 2009-2013), using a likelihood ratio test.

² Statistically significant difference ($p < 0.05$) in incidence reported in current month (May 2014) compared to the five-year historical average (May 2009-2013), using a likelihood ratio test.

GONORRHEA (ALL TYPES)

Statistically significant increases in the monthly and/or YTM incidence of laboratory-confirmed gonorrhea in Ontario, in comparison to corresponding monthly/YTM historical five-year averages, have been noted since September 2013, as identified in the [November 2013](#) issue of this report. The [March 2014](#) issue of this report provides a summary of possible reasons for this increase. PHO is continuing to investigate.

GROUP A STREPTOCOCCAL DISEASE, INVASIVE

There was a significant increase in the YTM incidence of laboratory-confirmed invasive Group A Streptococcus (iGAS) cases reported in Ontario in May 2014. A provincial iGAS summary was produced in January 2014 and distributed to public health units. The report documented that the annual incidence of iGAS cases reported in Ontario has been gradually increasing since 2008. The age and sex distribution of iGAS cases in Ontario has not changed substantially compared to previous years. The reason for the overall increase in iGAS in Ontario over this period is not fully understood. PHO is working with a number of public health units to further investigate reasons for the increases.

INFLUENZA

The YTM incidence rate of reported laboratory-confirmed influenza cases for January 1 to May 31, 2014 was significantly higher than the historical five-year (2009-2013) average YTM rate for the same period.

During the 2013/2014 season in Ontario, influenza A activity peaked in late December and early January, and then declined. Influenza B activity began to rise around mid-January 2014. The dominant circulating influenza type switched from influenza A to B at the beginning of March 2014, and influenza B activity peaked in early to mid-April 2014. The resulting combination of above average counts and rates of influenza A and influenza B early in 2014, led to the significantly higher YTM rate for January 1 to May 31, 2014 as compared to the historical five-year average. Towards the end of May 2014 the level of influenza activity observed was approaching levels expected for that time of year.

For more information about the current influenza season, please see the [Ontario Respiratory Virus Bulletin](#), which is published weekly during the influenza season and bi-weekly in the summer. It provides detailed surveillance information on influenza and other respiratory pathogens in Ontario.

MEASLES

Statistically significant increases in the monthly and YTM incidence of confirmed measles cases in Ontario, in comparison to the corresponding monthly/YTM historical five-year averages, have been reported for the third consecutive month. Please refer to the [May 2014](#) issue of this report for further details. Further information on measles can be found in the measles [Ontario Health Profile](#) infographic.

SALMONELLOSIS

Statistically significant increases in the year-to-month (YTM) incidence rate of salmonellosis in Ontario, in comparison to the corresponding YTM historical five-year averages, have been reported for the second consecutive month. An increase in travel-related salmonellosis cases was identified as the cause for the YTM increase in the [previous month](#). Although travel-related cases contributed to an increase in salmonellosis from January 1 to April 30, 2014, there was a decrease in travel-related cases in May 2014, and thus, a decrease in the number of cases, and thereby rates, observed in May in comparison to the May five-year historical average. In addition to travel-related cases occurring between January 1 and

April 30, 2014, the current increase in YTM incidence rate may be due in part to a number of salmonellosis outbreaks that have been identified and investigated this year. At least 86 cases of salmonellosis in 2014 have been identified as outbreak-related, of these, 27 cases have been reported in May 2014. In comparison, a total of 39 cases of salmonellosis were identified as outbreak-related between January 1 and May 31, 2013, of these, three cases were reported in May 2013. More information on one of the salmonellosis outbreaks we are currently investigating can be found [here](#).

INFECTIOUS DISEASE ACTIVITY IN OTHER JURISDICTIONS

This section of the report provides a snapshot of current activity related to infectious diseases across Canada and/or globally. The items included in this section are selected based on ongoing or potential implications for public health in Ontario.

FOOD POISONING INVESTIGATION AT FIFA'S 2014 WORLD CUP SOCCER TOURNAMENT: IMPLICATIONS FOR LARGE EVENTS IN CANADA

Summary:

On June 17, 2014, it was reported that at least 40 volunteers at the 2014 World Cup soccer tournament reported becoming ill with food poisoning after eating at a Saturday luncheon served to approximately 300 people. The cases experienced abdominal pain, diarrhea and vomiting. The causative agent was not reported. The luncheon meals were catered by a company located 500 miles away from the tournament site. The primary caterer is not believed to be the source of the contaminated food as the products were reported to have arrived at the proper temperature. A "white sauce" supplied by a secondary company to accompany the meal may have been the source of illness, as the sauce was reportedly maintained at sub-optimal temperatures.¹

Implications for Ontario:

The primary challenges of large catered events are the maintenance of appropriate time and temperature requirements of foods during preparation, storage and transportation. Large scale events may cause caterers to prepare volumes of food that stretch the capacity of their existing facilities. This can lead to unusual or temporary arrangements such as secondary food sources that may not maintain the same standards of food safety compliance.

During the summer months in Ontario, seasonal events such as fairs, festivals and special occasion events usually involve the preparation and service of large volumes of foods. This outbreak serves as a reminder of the important role public health continues to play in ensuring that food served at these events is monitored for compliance with food safety requirements.

Source:

1. <http://www.foodsafetynews.com/2014/06/world-cup-volunteers-reportedly-sickened-after-catered-lunch-in-brasilgia/>

RECENTLY DISCONTINUED ENHANCED SURVEILLANCE DIRECTIVES

There have been no recently discontinued Enhanced Surveillance Directives to report.

Appendix – Reportable Diseases

Appendix 1. Confirmed cases of reportable diseases, and probable cases of select reportable diseases, by month: Ontario, 2009-2014*

Reportable disease	2014														Historical comparisons						5-year avg (2009-2013) annual count
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTM	YTM rate †	Current month 5-year avg (2009-2013)	Current month 5-year avg (2009-2013) rate †	% difference rates (current month minus 5-year avg)†	YTM 5-year avg (2009-2013)	YTM 5-year avg (2009-2013) rate †	% difference rates (YTM 2014 minus YTM 5-year avg)†	
Acute Flaccid Paralysis	0	0	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0	0	-	0
AIDS	2	2	5	8	1	-	-	-	-	-	-	-	18	1.3	9	0.6	-89	50	3.8	-66	108
Amebiasis	45	63	60	59	58	-	-	-	-	-	-	-	285	20.6	58	4.3	-3	338	25.2	-18	805
Botulism	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	1	0.0	-100	1	0.1	-100	2
Brucellosis	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-100	2	0.1	-100	5
Campylobacter Enteritis	228	195	221	199	226	-	-	-	-	-	-	-	1,069	77.2	248	18.6	-12	1,058	79.1	-2	3,595
Chlamydial Infections	3,111	2,708	2,853	2,982	2,811	-	-	-	-	-	-	-	14,465	1044.8	2,764	206.7	-2	14,143	1,057.7	-1	33,986
Cholera	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-	0	0.0	-100	0
Cryptosporidiosis	14	15	16	15	8	-	-	-	-	-	-	-	68	4.9	10	0.8	-24	78	5.8	-15	311
Cyclosporiasis	2	2	3	7	6	-	-	-	-	-	-	-	20	1.4	18	1.3	-68	42	3.1	-54	117
Encephalitis	4	0	0	1	1	-	-	-	-	-	-	-	6	0.4	1	0.1	-20	7	0.5	-15	19
Encephalitis/Meningitis	12	9	9	9	8	-	-	-	-	-	-	-	47	3.4	6	0.5	21	39	2.9	17	142
Food Poisoning, All Causes	4	1	7	1	1	-	-	-	-	-	-	-	14	1.0	5	0.4	-81	31	2.3	-57	90
Giardiasis	86	80	83	72	62	-	-	-	-	-	-	-	383	27.7	105	7.9	-43	533	39.8	-31	1,386
Gonorrhoea (All Types)	485	395	447	437	465	-	-	-	-	-	-	-	2,229	161.0	310	23.2	45	1,611	120.5	34	4,070
Group A Streptococcal Disease, Invasive	83	72	88	77	68	-	-	-	-	-	-	-	388	28.0	55	4.1	19	290	21.7	29	585
Group B Streptococcal Disease, Neonatal	6	6	4	3	4	-	-	-	-	-	-	-	23	1.7	6	0.4	-36	22	1.6	1	54
Haemophilus Influenzae B Disease, Invasive	0	0	2	0	1	-	-	-	-	-	-	-	3	0.2	1	0.1	21	2	0.2	21	4
Hepatitis A	5	7	10	4	7	-	-	-	-	-	-	-	33	2.4	10	0.8	-35	49	3.7	-4	114
Hepatitis B	19	11	5	11	7	-	-	-	-	-	-	-	53	3.8	9	0.7	-25	49	3.7	4	114
Hepatitis C	351	335	379	394	345	-	-	-	-	-	-	-	1,804	130.3	353	26.4	-6	1,816	135.8	-4	4,336
HIV	46	46	55	51	60	-	-	-	-	-	-	-	258	18.6	65	4.9	-11	347	25.9	-28	814
Influenza	2,912	1,060	1,544	1,798	510	-	-	-	-	-	-	-	7,824	565.1	443	33.1	11	3,625	271.1	108	7,329
Legionellosis	7	1	3	3	2	-	-	-	-	-	-	-	16	1.2	5	0.3	-58	20	1.5	-24	161
Leprosy	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-100	1	0.1	-100	3
Listeriosis	2	2	3	4	3	-	-	-	-	-	-	-	14	1.0	3	0.3	-15	16	1.2	-15	52
Lyme Disease	1	2	4	5	6	-	-	-	-	-	-	-	18	1.3	15	1.1	-60	26	1.9	-32	172
Malaria	15	12	7	13	13	-	-	-	-	-	-	-	60	4.3	22	1.6	-42	74	5.5	-21	220
Measles	1	2	10	6	2	-	-	-	-	-	-	-	21	1.5	2	0.1	-3	4	0.3	383	8
Meningitis	6	7	9	6	4	-	-	-	-	-	-	-	32	2.3	9	0.6	-55	38	2.8	-19	115
Meningococcal Disease, Invasive	5	3	5	1	2	-	-	-	-	-	-	-	16	1.2	3	0.2	-40	19	1.4	-20	40
Mumps	1	0	0	0	2	-	-	-	-	-	-	-	3	0.2	4	0.3	-52	26	1.9	-89	67
Ophthalmia Neonatorum	0	1	0	0	0	-	-	-	-	-	-	-	1	0.1	0	0.0	-	1	0.1	-31	3
Paralytic Shellfish Poisoning	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0	-	0	0	-	0
Paratyphoid Fever	4	0	2	4	2	-	-	-	-	-	-	-	12	0.9	3	0.2	-40	27	2.0	-57	48
Pertussis (Whooping Cough)	8	7	10	14	10	-	-	-	-	-	-	-	49	3.5	43	3.2	-77	156	11.7	-70	425
Q Fever	2	2	0	0	1	-	-	-	-	-	-	-	5	0.4	1	0.1	21	4	0.3	21	13
Rabies	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-	0	0.0	-100	0
Rubella	0	0	1	0	0	-	-	-	-	-	-	-	1	0.1	0	0.0	-	1	0.1	-20	1
Rubella, Congenital Syndrome	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-	0	0.0	-	0
Salmonellosis	235	230	260	250	210	-	-	-	-	-	-	-	1,185	85.6	217	16.3	-7	1,025	76.7	12	2,632
Shigellosis	26	24	20	21	15	-	-	-	-	-	-	-	106	7.7	27	2.0	-47	109	8.2	-6	257
Streptococcus Pneumoniae, Invasive	112	86	88	99	110	-	-	-	-	-	-	-	495	35.8	107	8.0	-1	599	44.8	-20	1,205
Syphilis, Early Congenital	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-100	1	0.0	-100	1
Syphilis, Infectious	63	43	66	42	20	-	-	-	-	-	-	-	234	16.9	68	5.1	-71	331	24.7	-32	779
Syphilis, Other	38	36	40	38	23	-	-	-	-	-	-	-	175	12.6	58	4.3	-62	328	24.5	-48	766
Tetanus	0	0	0	0	1	-	-	-	-	-	-	-	1	0.1	0	0.0	-	1	0.1	21	1
Tuberculosis	32	44	54	46	50	-	-	-	-	-	-	-	226	16.3	54	4.1	-11	262	19.6	-17	638
Tularemia	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-	0	0.0	-	1
Typhoid Fever	6	11	4	6	7	-	-	-	-	-	-	-	34	2.5	7	0.5	2	41	3.1	-20	83
Verotoxin Producing E. Coli including HUS	7	6	4	4	8	-	-	-	-	-	-	-	29	2.1	14	1.0	-44	46	3.4	-39	181
West Nile Virus Illness	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-100	1	0.0	-100	84
Yellow Fever	0	0	0	0	0	-	-	-	-	-	-	-	0	0.0	0	0.0	-100	0	0.0	-100	0
Yersiniosis	10	10	14	13	19	-	-	-	-	-	-	-	66	4.8	16	1.2	18	91	6.8	-30	199

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/06/18].

Population Estimates [2009-2012], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: [2013/09/16].

Population Projections [2013-2014], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: [2014/04/11].

* Appendix 1 is not an exhaustive list of all reportable diseases in Ontario. Case counts for amebiasis, Lyme disease, mumps, pertussis and West Nile Virus illness are based on the sum of confirmed and probable cases as reported in iPHIS.

† Rates listed are cases per 1,000,000 population.

† Percent (%) difference is calculated using unrounded rates; numbers displayed in these columns may vary from hand calculations using rounded rates.

Note 1: Does not include cases in which the Ministry of Health and Long-Term Care was selected as the Diagnosing Health Unit or cases with a Disposition Description set to 'does not meet' or 'entered in error'.

Note 2: Case counts for tuberculosis and AIDS are based on diagnosis date and not episode date. HIV case counts are based on encounter date.

Note 3: Differentials in year over year comparisons are reflective of changes in disease incidence and changes in the size of the population.

Note 4: Measles, rubella, and congenital rubella syndrome have been eliminated from Canada. However, as these diseases remain endemic in other countries, imported and import-related cases continue to occur in Ontario.

Note 5: Statistical tests comparing rates were not performed when the YTM rate in previous years was zero.

Note 6: Acute Flaccid Paralysis and Paralytic Shellfish Poisoning became reportable in Ontario in December 2013. No historical data is available.