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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.

INFECTIOUS DISEASE IN FOCUS

Hepatitis A

Hepatitis A is a virus that affects the liver. The hepatitis A virus (HAV) is a non-enveloped RNA virus in the *Picornaviridae* family. The HAV exists as a single serotype and infection results in life-long immunity. The virus is quite stable, and once shed in feces can persist in an infectious state in the environment for up to two to four weeks at room temperature.[1]

The incubation period for hepatitis A is typically 28 to 30 days, but can range from 15 to 50 days.[2] The period of communicability begins during the latter part of the

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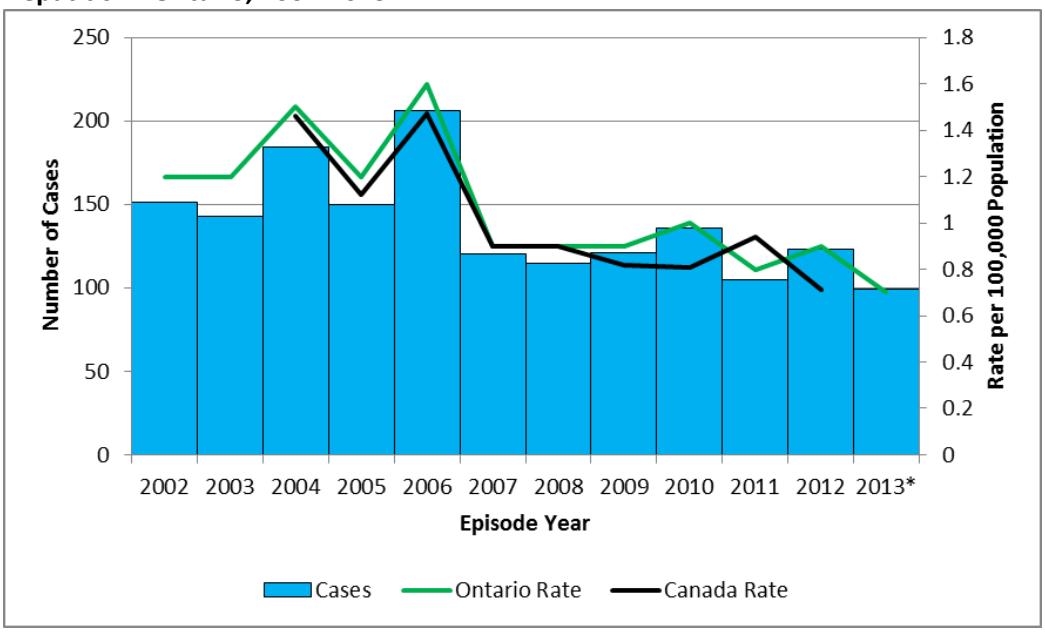
incubation period and peaks during the one to two weeks prior to the onset of jaundice. Communicability then decreases and is very low one week after the onset of jaundice.[3] However, prolonged viral excretion has been documented in children. Clinical presentation varies with age. Children are generally asymptomatic or have non-specific symptoms, with jaundice being unusual. Infection in adults is more likely to cause jaundice and can be severe, with 25% of adults requiring hospitalization, and death occurring in 1.8% of adults 50 years of age and older.[4] Of the 99 cases reported in Ontario in 2013, 66 cases (66.7%) reported jaundice. Twenty-seven cases (27.3%) reported hospitalization and death was not reported for any of the cases.

Diagnosis of hepatitis A is done through serological testing. A positive IgM indicates acute infection, however it can remain positive for six months, or sometimes longer, after acute infection. Recent vaccination with the hepatitis A vaccine can also result in a positive IgM and on occasion, the IgM can be falsely positive. IgG antibodies to HAV begin to develop shortly after the IgM in acute infection; IgG antibodies persist and indicate immunity to infection.[3,5]

The epidemiology of hepatitis A varies globally, with regions classified according to their level of endemicity. Canada and the United States are both areas of low endemicity.[1] The incidence rate in Ontario has been comparable to the Canadian rate (Figure 1). Overall, the incidence rate in Ontario has decreased since 2002. In 2002, 151 confirmed cases of hepatitis A were reported, corresponding to an incidence rate of 1.2 cases per 100,000 population, while in 2013, 99 confirmed cases were reported, corresponding to an incidence rate of 0.7 cases per 100,000 population. Of the 99 confirmed cases reported in 2013, 62 (62.6%) were male. The highest number of cases and incidence rates were observed among the 5-9 (12 cases; 1.6 cases per 100,000 population) and 20-29 (29 cases; 1.5 cases per 100,000 population) year age groups. In Ontario in 2013, a seasonal trend in hepatitis A was not observed as cases were reported throughout the year (Figure 2).

Figure 1. Reported number of cases and incidence rate (per 100,000 population) of confirmed cases of Hepatitis A: Ontario, 2002-2013



Data sources:

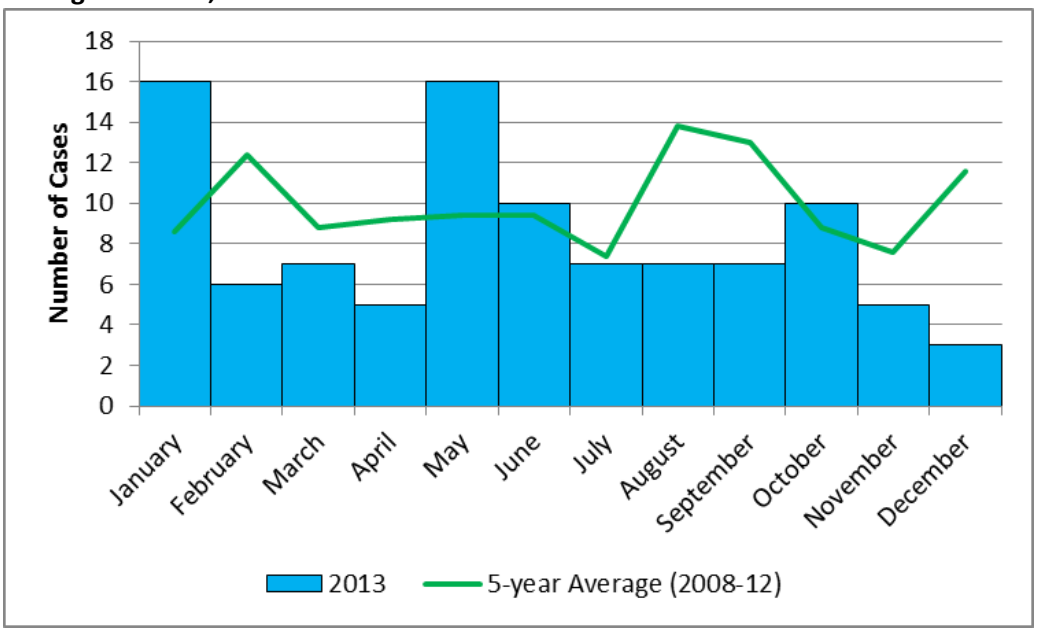
Ontario cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/10/27].

Ontario population [2004-2012]: Ontario Ministry of Health and Long-Term Care, intelliHEALTH Ontario, extracted [2013/09/16].

*The Ontario population estimate for 2012 was used to calculate the 2013 rate.

Canadian rates: Public Health Agency of Canada, Canadian Notifiable Disease Section, received by PHO [2014/07/15]; national data available up to 2012.

Figure 2. Number of confirmed Hepatitis A cases by month compared to five-year historical average: Ontario, 2013



Data source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/10/27].

Humans are the primary reservoir for the virus and transmission occurs through the fecal-oral route. Infection can occur directly from person-to-person through transfer of the virus on hand or fomites, or indirectly by the ingestion of food or water contaminated by human fecal matter. Infection can also occur sexually and although rare, transmission can occur through contaminated blood or blood products.[1] In Ontario in 2013, three of the 86 cases (3.5%) for which risk factor information was available reported oral-anal contact.

National and international outbreaks reported since 2002 have been increasingly linked to imported produce such as sundried tomatoes, green onions, and fruits including pomegranates and berries.[6-10] In Ontario, local outbreaks have been associated with person-to-person transmission in childcare settings while province-wide outbreaks have been linked to imported contaminated produce. In April 2012, evidence from an outbreak investigation involving six RNA fingerprint-matched cases implicated fresh blackberries from a common grocery chain, distributor, and country of origin as the most likely source of illness.[11] A national outbreak also occurred in 2011 involving 21 RNA-matched cases, seven of which were in Ontario; however, a source for the outbreak was not identified.

Hand-washing and vaccination are important in decreasing the risk of hepatitis A transmission. In Ontario, the hepatitis A vaccine is publically-funded for men who have sex with men, persons who use intravenous drugs, and those with chronic liver disease. The hepatitis A vaccine is also recommended for travellers to HAV endemic regions as risk among non-immune travellers to those regions is high.[4] In Ontario in 2013, 42 (42.4%) of the 99 cases reported they were not immunized against hepatitis A, while 11 (11.1%) cases reported immunization; immunization status was unknown or not reported for the remaining 46 cases. Furthermore, 62 of the 86 cases (72.1%) for which risk factor information was available reported travel outside of the province in the 50 days prior to illness. Locations of travel included India, Pakistan, and Bangladesh. All 62 travel-related cases were either unimmunized or immunization status was not reported. Post-exposure prophylaxis (PEP) is also recommended for individuals with known exposure to the virus, such as household, sexual, and day care contacts and those who may have eaten contaminated food items from an infected food handler. The Provincial Infectious Diseases Advisory Committee on Immunization released the Hepatitis A Post-exposure Prophylaxis Guide in October 2013, which provides recommendations regarding HAV PEP.[12]

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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, with the exception of influenza, measles, rubella, and congenital rubella syndrome. Influenza surveillance data are regularly reported through the Ontario Respiratory Virus Bulletin and the Laboratory-based Respiratory Pathogen Surveillance Report. Measles, rubella, and congenital rubella syndrome have been eliminated in Canada, although cases continue to occur related to travel importations. Statistical comparisons are no longer included for these diseases.

Table 1. Summary of statistically significant increases in reportable disease incidence: Ontario, January 1 to September 30, 2014

Reportable disease	2014				Historical comparisons						5-year avg annual count (2009-2013)
	Sep	Sep rate ŧ	YTM	YTM rate ŧ	Current month 5-year avg (2009-2013)	Current month 5-year avg (2009-2013) rate ŧ	% difference in rates (current month minus 5-year avg)†	YTM 5-year avg (2009-2013)	YTM 5-year avg (2009-2013) rate ŧ	% difference in rates (YTM 2014 minus YTM 5-year avg)†	
Gonorrhoea (All Types)[1,2]	529	38.2	4313	311.5	387	29.2	31.1	3022	227.7	36.8	4071
Group A Streptococcal Disease, Invasive[1]	28	2.0	585	42.3	33	2.5	-18.7	444	33.5	26.2	585
Salmonellosis[1]	267	19.3	2372	171.3	252	19.0	1.7	2105	158.6	8.0	2632

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/10/16].
Ontario Population: Population Estimates [2009-2013]: Statistics Canada, distributed by Ministry of Health and Long-Term Care, received [2014/07/03]. Population Projections [2014]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted by PHO [2014/04/11].
ŧ 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 September 30, 2014) compared to the five-year historical average (January 1 to September 30, 2009-2013), using a likelihood ratio test.
[2] Statistically significant difference ($p<0.05$) in incidence reported in current month (September 2014) compared to the five-year historical average (September 2009-2013), using a likelihood ratio test.

GONORRHEA (ALL TYPES)

Statistically significant increases in the monthly and YTM incidence of laboratory-confirmed gonorrhea in Ontario, in comparison to corresponding monthly/YTM historical five-year averages, have been noted since September 2013. PHO continues to investigate and has completed an analysis of gonorrhea cases from January 1 to June 30, 2014. The initial results of this analysis were communicated to public health units. Please refer to the summary under the **Significant Reportable Disease Activity** section in the March 2014 issue for possible reasons behind the increase. Additional analyses will be completed over the coming months and a summary will be shared in the Infectious Disease In Focus section of the February 2015 monthly report.

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 from January 1 to September 30, 2014. The age and sex distribution of iGAS cases in Ontario has not changed substantially compared to previous years. While the reasons for the increase in iGAS cases reported in Ontario in 2014 have not been identified, an updated epidemiologic summary of provincial iGAS cases will be shared with public health units in November 2014.

SALMONELLOSIS

Statistically significant increases in the YTM incidence rate of salmonellosis in Ontario, in comparison to the corresponding YTM historical five-year (2009-2013) averages, have been reported for the sixth consecutive month. This increase is due to outbreaks and/or increased rates of several *Salmonella* subtypes including *S.* Typhimurium related to feeder rodents, *S*. Thompson likely related to chicken consumption, several serotypes related to chia product consumption, and *S.* Enteritidis, the source of which is currently unknown. PHO and partners continue to investigate the increased rates of salmonellosis using epidemiologic and laboratory methods.

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.

Current high profile infectious disease activity in other jurisdictions has been described in recent issues of this report. Please refer to the August 2014 issue for a review of the ebola outbreak in West Africa, and the October 2014 issue for a review of enterovirus D68.

RECENTLY DISCONTINUED ENHANCED SURVEILLANCE DIRECTIVES

CYCLOSPORIASIS

The Public Health Agency of Canada, in collaboration with provincial and federal partners, led an investigation into an increase in non-travel related cases of cyclosporiasis. A national Outbreak Investigation Coordinating Committee (OICC) was established on July 11 to share epidemiological, microbiological, and food safety information and PHO issued an Enhanced Surveillance Directive (ESD) the same day to assist with the timely collection of information for Ontario cases. The increase in non-travel related cyclosporiasis cases reported in Ontario appears to have begun in May, with the majority of cases occurring in June and July. A total of 85 outbreak-confirmed cases were reported nationally, 52 of which were reported in Ontario. A source for the outbreak was not identified; however, evidence collected during food safety investigations as well as in a cohort analysis suggested cilantro and imported blackberries were possible sources of the outbreak. The ESD was discontinued on September 26, and the outbreak was declared over on September 30.

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 ŧ	Current month 5-year avg (2009-2013)	Current month 5-year avg (2009-2013) rate ŧ	% difference rates (current month minus 5-year avg)†	YTM 5-year avg (2009-2013)	YTM 5-year avg (2009-2013) rate ŧ	% difference rates (YTM 2014 minus YTM 5-year avg)†	
Acute Flaccid Paralysis α	0	0	0	0	0	0	0	0	5	-	-	-	**5**	0.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AIDS	2	3	4	6	2	7	11	6	8	-	-	-	**49**	3.5	8	0.6	-6	85	6.4	-45	108
Amebiasis	46	65	62	65	68	69	73	43	44	-	-	-	**535**	38.6	70	5.2	-39	633	47.7	-19	807
Botulism	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	0	0.0	-	2	0.2	-100	2
Brucellosis	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	0	0.0	-100	5	0.4	-100	5
Campylobacter Enteritis	229	197	225	201	249	395	501	431	420	-	-	-	**2,848**	205.7	384	29.0	5	2,821	212.6	-3	3,596
Chlamydial Infections	3,119	2,716	2,870	3,001	2,877	2,910	3,101	2,875	3,224	-	-	-	**26,693**	1928.0	3,019	227.5	2	25,569	1,927.0	0	33,991
Cholera	0	0	0	0	0	0	0	1	0	-	-	-	**1**	0.1	0	0.0	-	0	0.0	379	0
Cryptosporidiosis	14	15	17	15	14	27	57	70	48	-	-	-	**277**	20.0	38	2.8	22	262	19.8	1	311
Cyclosporiasis	2	2	4	7	13	56	27	7	7	-	-	-	**125**	9.0	5	0.4	40	106	8.0	13	117
Encephalitis	4	0	0	1	2	2	3	0	1	-	-	-	**13**	0.9	1	0.1	20	13	0.9	-1	18
Encephalitis/Meningitis	12	9	7	10	8	14	22	25	15	-	-	-	**122**	8.8	17	1.3	-15	104	7.9	12	141
Food Poisoning, All Causes	4	1	7	1	1	2	1	0	1	-	-	-	**18**	1.3	5	0.4	-82	76	5.7	-77	90
Giardiasis	89	84	90	79	84	100	114	159	112	-	-	-	**911**	65.8	142	10.7	-25	1,079	81.3	-19	1,387
Gonorrhoea (All Types)	485	397	451	435	466	463	600	487	529	-	-	-	**4,313**	311.5	387	29.2	31	3,022	227.7	37	4,071
Group A Streptococcal Disease, Invasive	84	73	88	77	72	60	68	35	28	-	-	-	**585**	42.3	33	2.5	-19	444	33.5	26	585
Group B Streptococcal Disease, Neonatal	6	6	5	3	6	2	1	4	7	-	-	-	**40**	2.9	4	0.3	77	40	3.0	-3	54
Haemophilus Influenzae B Disease, Invasive	0	0	2	0	1	0	0	0	0	-	-	-	**3**	0.2	0	0.0	-100	3	0.2	-4	4
Hepatitis A	6	7	10	3	9	4	5	7	8	-	-	-	**59**	4.3	12	0.9	-38	89	6.7	-37	117
Hepatitis B	21	10	4	11	8	7	8	9	6	-	-	-	**84**	6.1	11	0.8	-47	88	6.6	-8	113
Hepatitis C	359	335	377	394	344	341	336	336	374	-	-	-	**3,196**	230.8	360	27.1	0	3,295	248.3	-7	4,340
HIV	45	49	54	54	66	50	63	64	65	-	-	-	**510**	36.8	72	5.4	-13	622	46.8	-21	815
Influenza	2,917	1,067	1,547	1,799	507	33	19	3	15	-	-	-	**7,907**	571.1	35	2.6	-59	4,280	322.6	77	7,330
Legionellosis	7	2	3	2	2	13	27	27	10	-	-	-	**93**	6.7	27	2.0	-64	120	9.1	-26	161
Leprosy	0	0	1	0	0	0	0	0	0	-	-	-	**1**	0.1	0	0.0	-100	3	0.2	-63	3
Listeriosis	2	2	3	4	4	2	6	5	8	-	-	-	**36**	2.6	4	0.3	74	41	3.1	-15	52
Lyme Disease	3	3	6	4	16	43	68	24	7	-	-	-	**174**	12.6	13	1.0	-49	156	11.8	7	174
Malaria	15	12	8	14	18	23	25	19	18	-	-	-	**152**	11.0	23	1.7	-24	179	13.5	-18	220
Measles	1	2	10	6	2	0	0	1	0	-	-	-	**22**	1.6	#	#	#	#	#	#	#
Meningitis	6	7	10	6	4	14	13	15	9	-	-	-	**84**	6.1	12	0.9	-27	87	6.5	-7	115
Meningococcal Disease, Invasive	5	3	5	1	3	2	1	0	2	-	-	-	**22**	1.6	3	0.2	-36	30	2.3	-30	40
Mumps	1	0	0	0	1	1	0	1	3	-	-	-	**7**	0.5	6	0.4	-49	47	3.5	-86	67
Ophthalmia Neonatorum	0	1	0	0	0	0	0	0	0	-	-	-	**1**	0.1	1	0.0	-100	2	0.2	-60	3
Paralytic Shellfish Poisoning	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Paratyphoid Fever	4	0	3	3	2	2	1	0	4	-	-	-	**19**	1.4	4	0.3	6	42	3.1	-56	48
Pertussis (Whooping Cough)	8	9	10	14	14	16	30	37	18	-	-	-	**156**	11.3	37	2.8	-53	337	25.4	-56	425
Q Fever	2	2	0	0	1	1	1	1	1	-	-	-	**9**	0.7	1	0.1	-32	10	0.7	-10	13
Rabies	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	0	0.0	-	0	0.0	-100	0
Rubella	0	0	1	0	0	0	0	0	0	-	-	-	**1**	0.1	#	#	#	#	#	#	#
Rubella, Congenital Syndrome	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	#	#	#	#	#	#	#
Salmonellosis	238	230	260	258	230	229	331	329	267	-	-	-	**2,372**	171.3	252	19.0	2	2,105	158.6	8	2,632
Shigellosis	26	24	21	21	20	16	38	15	20	-	-	-	**201**	14.5	20	1.5	-2	208	15.7	-7	256
Streptococcus Pneumoniae, Invasive	113	84	90	105	109	69	49	45	76	-	-	-	**740**	53.4	61	4.6	20	818	61.7	-13	1,206
Syphilis, Early Congenital	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	0	0.0	-100	1	0.1	-100	1
Syphilis, Infectious	68	53	81	67	47	56	46	53	38	-	-	-	**509**	36.8	62	4.7	-41	594	44.8	-18	781
Syphilis, Other	43	45	43	61	46	46	50	25	31	-	-	-	**390**	28.2	62	4.6	-52	582	43.9	-36	768
Tetanus	0	0	0	0	1	1	0	1	0	-	-	-	**3**	0.2	0	0.0	-100	1	0.1	105	1
Tuberculosis	34	45	53	53	56	53	45	42	48	-	-	-	**429**	31.0	50	3.8	-9	488	36.8	-16	639
Tularemia	0	0	0	0	0	0	0	0	0	-	-	-	**0**	0.0	0	0.0	-100	1	0.0	-100	1
Typhoid Fever	6	11	4	7	8	2	5	9	8	-	-	-	**60**	4.3	7	0.5	6	66	4.9	-12	83
Verotoxin Producing E. Coli Including HUS	7	6	4	5	8	18	29	21	10	-	-	-	**108**	7.8	22	1.6	-56	150	11.3	-31	181
West Nile Virus Illness	0	0	0	0	0	0	1	5	5	-	-	-	**11**	0.8	23	1.7	-79	81	6.1	-87	84
Yellow Fever	0	1	0	0	0	0	0	1	0	-	-	-	**2**	0.1	0	0.0	-	0	0.0	379	0
Yersiniosis	10	10	15	14	18	15	21	12	12	-	-	-	**127**	9.2	14	1.1	-18	158	11.9	-23	200

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2014/10/16].

Ontario Population: Population Estimates [2009-2013]: Statistics Canada, distributed by Ministry of Health and Long-Term Care, received [2014/07/03]. Population Projections [2014]: Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted by PHO [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.

ŧ 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.

Historical comparison data are not provided for measles, rubella, and congenital rubella syndrome because these diseases have been eliminated in Canada, although cases continue to occur related to travel importations.

α Case counts for Acute Flaccid Paralysis were manually updated to reflect the accurate number of confirmed reports as of October 16, 2014.

Note 1: Does not include cases for 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 are available.