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# Monthly Infectious Diseases Surveillance Report

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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:

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Past issues and additional information on the [Monthly Infectious Diseases Surveillance Report](#) are available online.

## Infectious Disease in Focus

### LYME DISEASE

Lyme disease was first recognized in the late 1970s near Lyme, Connecticut and is now known to occur in many parts of Canada, the United States, Europe and temperate Asia.<sup>1</sup> It is the most frequently reported of the locally acquired vector-borne diseases in Ontario<sup>2</sup> and is caused by bacteria belonging to the *Borrelia burgdorferi* complex. Lyme disease has been a reportable disease in Ontario since 1991 and became nationally notifiable in Canada in 2009.<sup>3</sup>

Transmission of Lyme disease to humans occurs through the bite of an infected tick. In Ontario, the only tick that transmits Lyme disease is the blacklegged tick, *Ixodes scapularis*, also called the deer tick. Human infection following a tick bite occurs after 24 to 36 hours of attachment by an infected feeding tick. During this time, bacteria migrate from the tick to surrounding host tissues. Infection is characterized by a circular “bull’s-eye” rash called erythema migrans,<sup>4,5</sup> which typically occurs in 70 to 80% of those infected.<sup>3,4</sup> Other symptoms of initial infection include fever, chills, fatigue, headache, muscle and joint pain, and swollen lymph nodes that develop from three to 30 days after infection.<sup>4</sup> In contrast, later stage infection may include multiple skin rashes, extreme fatigue, arthritis and arthritic symptoms and nervous system disorders that can last from months to years.<sup>4,5</sup>

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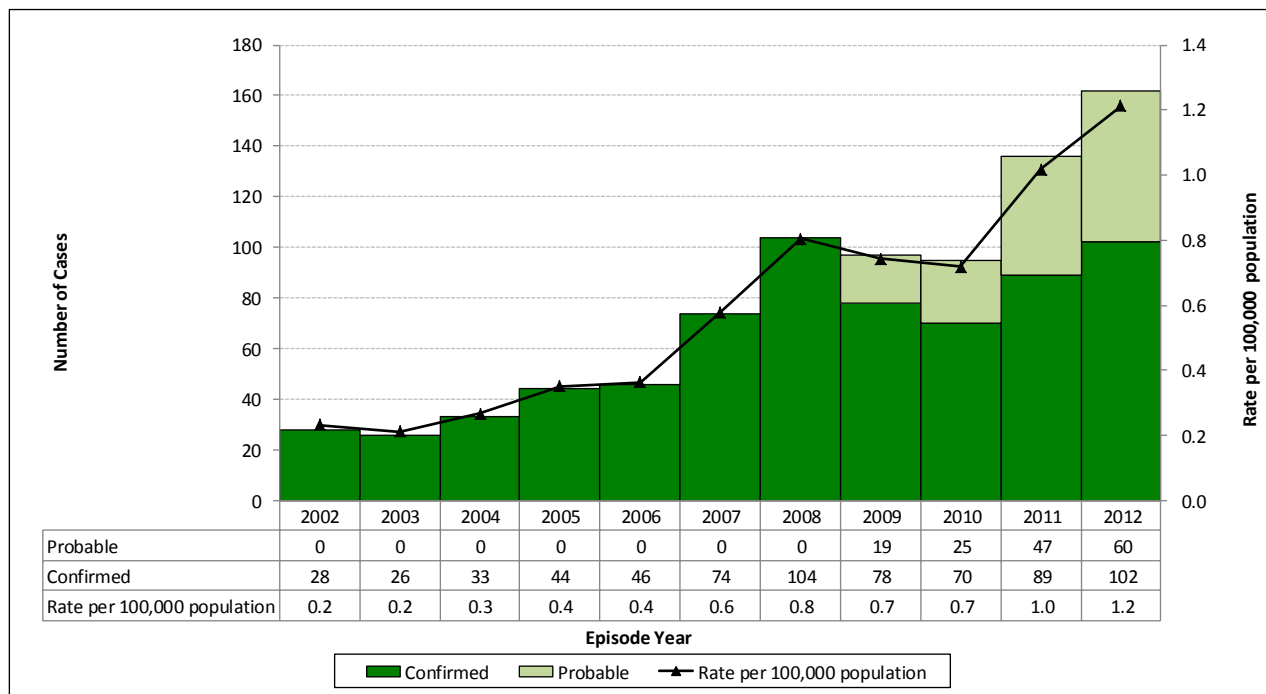
**REFERENCES**

**APPENDIX – REPORTABLE DISEASES**

The majority of blacklegged ticks are found in the southern portions of the province as these areas have more favourable climatic conditions for the ticks' survival. As a result, most human exposures to Lyme disease occur in areas where established populations of infected ticks are present. In addition to the mammalian hosts, blacklegged ticks also feed on birds, which in turn can disperse ticks along migratory pathways.<sup>3</sup> This results in what is estimated to be an infrequent but potential risk of human exposure to infected ticks almost anywhere in the province. Ontario and other parts of Canada have seen an increase in the number of Lyme disease endemic areas and blacklegged tick populations.<sup>3</sup> The blacklegged tick primarily inhabits areas with thick vegetation and deciduous or mixed forests with adequate leaf litter. In the early 1990s, there was only one area in Ontario known to have blacklegged ticks carrying *B. burgdorferi*, but as of 2013, this has grown to seven areas spread across the north shores of Lake Erie, Lake Ontario, and the St. Lawrence River.<sup>3</sup> In Ontario, the majority of this expansion is occurring in the southeastern portion of the province along the St. Lawrence River.

From 2002 to 2012, a total of 845 confirmed and probable human cases of Lyme disease were reported in Ontario. Over this period, reported cases increased from 28 cases in 2002 to 162 cases reported in 2012, which corresponds to annual incidence rates increasing from 0.2 cases per 100,000 population in 2002 to 1.2 cases per 100,000 population in 2012 (Figure 1). Similar trends in incidence have also been identified in the United States (U.S.) but with substantially higher rates of disease in the U.S. The U.S. Centers for Disease Control and Prevention (CDC) reported an increase in annual incidence rates over this period but with rates stabilizing after 2009. In 2011, the incidence rate for Lyme disease in the U.S. was 7.8 cases per 100,000 population,<sup>5</sup> compared to Ontario's rate of 1.0 case per 100,000 population in that year. Annual incidence rates for Canada are not available for comparison.

**Figure 1. Incidence rate and number of cases of Lyme disease by case classification: Ontario, 2002-2012**



**Ontario cases:** Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/02/20].

**Ontario population:** Ontario Population Estimates and Projections (Statistics Canada and Ontario Ministry of Finance), Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2012/10/15]

**Note:** The Lyme disease confirmed case definition changed in 2009 such that clinical cases were no longer considered confirmed. Clinical cases are now considered probable cases and case counts for 2009 and subsequent years include both confirmed and probable cases to ensure valid comparisons of trends over time.

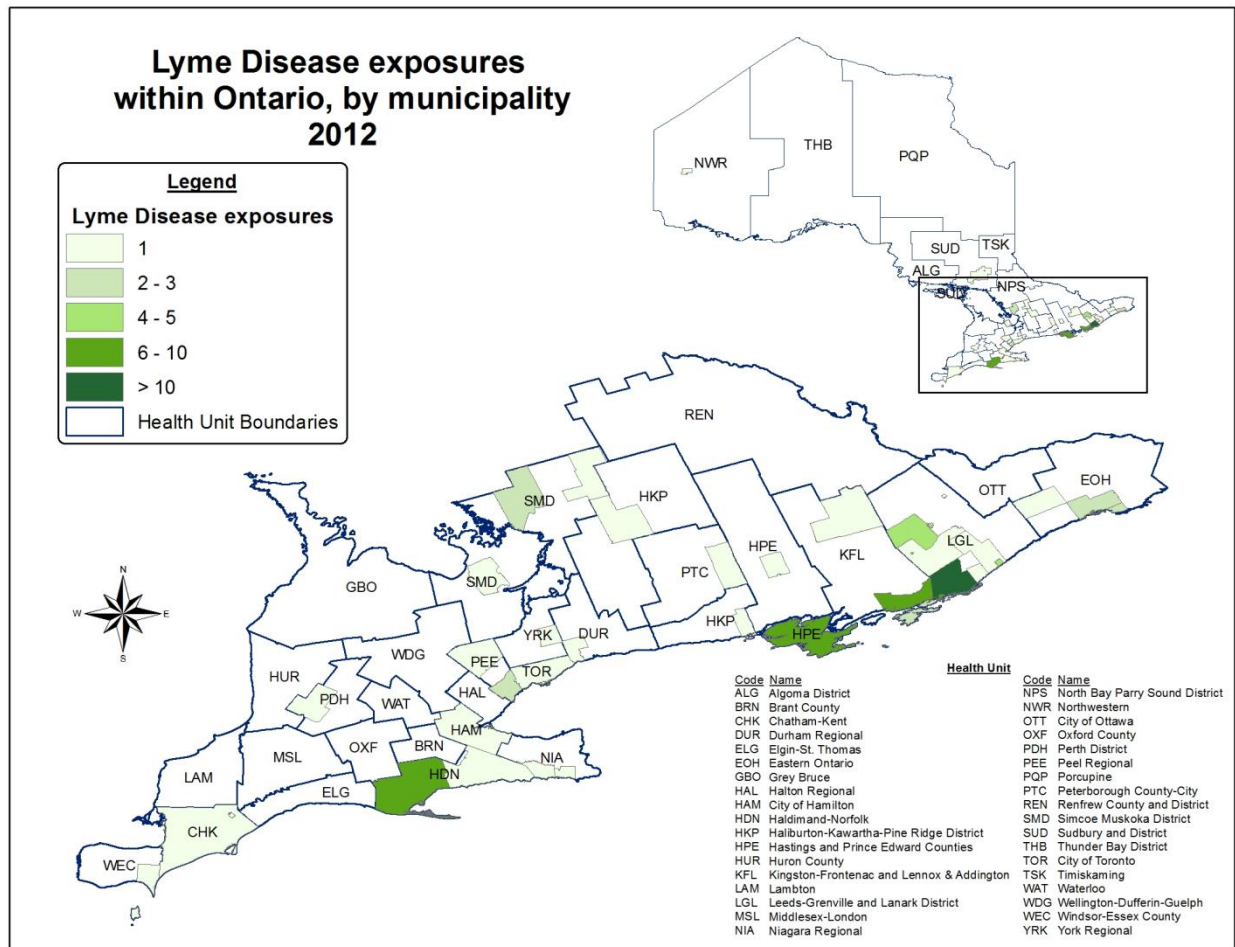
Of the 162 cases of Lyme disease reported in Ontario in 2012, cases ranged in age from less than one year to 84 years with a median age of 50 years. Cases aged 55 to 59 years had the highest age-specific incidence rate at 2.9 cases per 100,000 population. Overall, male cases accounted for 53% (86/161) of cases, where gender was available, in 2012. Three percent (4/162) of cases were hospitalized and no deaths were reported.

Similar to other jurisdictions in North America, the occurrence of Lyme disease in Ontario demonstrates a clear seasonal pattern with more cases reported in the summer months. In 2012, the majority of cases were reported in the months of June, July and August, which together accounted for 73% of cases reported in Ontario in that year. The highest rates of Lyme disease cases by health unit of residence in 2012 occurred in health units located in Eastern Region: Leeds, Grenville and Lanark District (LGL); Kingston-Frontenac, Lennox and Addington (KFLA); Eastern Ontario (EO); and Hastings and Prince Edward Counties (HPE). Incidence rates in these health units ranged from 5.5 cases per 100,000 population in Hastings and Prince Edward Counties to 17.0 cases per 100,000 population in Leeds, Grenville and Lanark District. Of cases that reported an exposure (140/162), 26% (37/140) reported out of province travel and 74% (103/140) were locally acquired. Of the locally acquired cases, 92% (95/103) were associated with exposure locations concentrated primarily in southern and eastern Ontario, and 8% (8) with unspecified exposure locations within Ontario (Figure 2). The most frequently reported health units of exposure in 2012 were Leeds,

Grenville and Lanark District; Hastings and Prince Edward Counties; Kingston-Frontenac, Lennox and Addington; and Haldimand-Norfolk (Figure 2).

The increasing trend in incidence in Ontario may be partially explained by greater awareness of the disease among the general public and health care providers, as well as factors related to improved surveillance of Lyme disease. From 2007 to 2011, the number of tests requested for Lyme disease at Public Health Ontario Laboratory increased by 50%. There is also evidence of increased risk of exposure to the disease as the geographic range of the tick vector expands,<sup>2</sup> which is supported by Ontario-specific data that show strong agreement between exposure locations for locally acquired cases and areas in southern and eastern Ontario where established populations of *B. burgdorferi* infected ticks and small mammals have been found.

**Figure 2. Number of Lyme disease cases by municipality and health unit of exposure: Ontario, 2012**



**Ontario cases:** Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/02/20].

**Note:** The health unit of exposure was determined using the location of most likely exposure and is not necessarily the health unit of residence at the time of case identification.

Persons most at risk of contracting Lyme disease are those involved in outdoor activities such as hiking, camping, hunting, and dog walking. When outdoors, tick bites can be prevented by using insect repellent containing DEET, avoiding tall grassy areas and thick vegetation, staying in the center of paths when hiking, and wearing light coloured, long-sleeved clothing with pants tucked into socks. After outdoor activities that increase risk of exposure to ticks, individuals should immediately have a shower to wash off any unattached ticks and to check the rest of their body. Infected ticks can only transmit the bacteria following attachment for at least 24 to 36 hours. Individuals that have had a tick attached for a sufficient period of time or with symptoms compatible with Lyme disease should see their health care provider.

## Significant Reportable Disease Activity

Table 1 provides a list of reportable diseases for which incidence in 2013 was significantly higher than expected compared to the five-year historical average (2008-2012). Both monthly and year-to-month (YTM) comparisons were made for each of the reportable diseases listed in Appendix 1.

**Table 1.** Summary of significant increases in reportable disease incidence: Ontario, January 1 to July 31, 2013

Reportable disease	2013				Historical comparisons						5-year avg annual count (2008-2012)
	July	July rate ‡	YTM	YTM rate ‡	Current month 5-year avg (2008-2012)	Current month 5-year avg (2008-2012) rate ‡	% difference in rates (current month minus 5-year avg)†	YTM 5-year avg (2008-2012)	YTM 5-year avg (2008-2012) rate ‡	% difference in rates (YTM 2013 minus YTM 5-year avg)†	
Chlamydial Infections*	2,759	201.5	20,194	1475.1	2,607	197.1	2	18,558	1,402.9	5	32,295
Legionellosis*	63	4.6	137	10.0	11	0.8	444	37	2.8	258	124

**Ontario Cases:** Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/08/21].

**Ontario Population:** Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2012/10/15].

‡ 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.

\* Statistically significant difference ( $p < 0.05$ ) in incidence reported in year-to-month (January to July 2013) compared to the five-year historical average (January to July 2008-2012).

### CHLAMYDIA

There was a significant increase in the number of chlamydia cases reported YTM (January to July 2013) compared to the five-year (2008 to 2012) average for January to July. Potential explanations for this increase were summarized in the [May 2013](#) (Volume 2, Issue 5) edition of the Monthly Infectious Diseases Surveillance Report. The increase was also noted in the [June](#), [July](#) and [August](#) editions (Volume 2, Issues 6-8). The [July 2012](#) (Volume 1, Issue 8) edition further describes the epidemiology of chlamydia in Ontario. However, please note that a decline in the number of chlamydia cases from January 1 to July 31 has been identified in 2013 compared to 2012. PHO is investigating potential causes for the decline.

## LEGIONELLOSIS

From January 1 to July 31, 2013, monthly case counts for legionellosis have been significantly higher than expected compared to historical five-year average monthly counts (2008-2012). The majority of cases continue to be reported from health units in and around the Golden Horseshoe area, which is similar to where cases have been reported in previous years. One geographic cluster involving 11 cases from two health units was identified in late July; however, no common exposures were identified among these cases. A common source exposure was identified for two cases in a northern health unit. No other clusters or common exposures have been identified. Legionellosis follows a seasonal trend, with the majority of cases occurring between July and October each year. Case and laboratory data both indicate that the 2013 seasonal increase of legionellosis in Ontario began in June and appears to have peaked in July.

Of those individuals tested for *Legionella* by Public Health Ontario Laboratories in July 2013, 7.4% had positive results; this was higher compared to the percentage of positive test results in July of previous years (average: 2.8% for 2010 to 2012).

The Enhanced Surveillance Directive issued on June 28, 2013 remains in effect, with health units required to submit additional exposure information to PHO for analysis. Significant disease activity associated with legionellosis has been described in each edition of the [Monthly Infectious Diseases Surveillance Report](#) since May 2013 (Volume 2, Issues 5-8).

## 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.

### MERS-COV

As of September 20, 2013, the World Health Organization (WHO) has been notified of 130 laboratory-confirmed and 17 probable cases of infection with the Middle East respiratory syndrome coronavirus (MERS-CoV). Among the 130 cases, 58 deaths have been reported. MERS-CoV cases have been reported largely from countries in the Middle East, as well as several European countries and Tunisia. All cases have occurred as a result of exposure in the Middle East.

The transmission pattern in Saudi Arabia, with many sporadic cases distributed over a large geographical area, suggests that there are infrequent introductions of the virus from a continuous non-human source; however, to date the virus reservoir remains unknown. Recent studies have provided some evidence of potential animal reservoirs for MERS-CoV, including bats and camels.

Human-to-human transmission has occurred in a number of household and healthcare clusters; however the number of laboratory confirmed secondary cases for these clusters was low. Unrecognized circulation among humans cannot be ruled out.

### Implications:

As of September 11, 2013, the Public Health Agency of Canada (PHAC) reports that there are no confirmed cases of MERS-CoV in Canada. According to PHAC, the public health risk of MERS-CoV in Canada is considered low at this time based on available information. The most up-to-date MERS-CoV information for Ontario is available online: [Guidance for Ontario Health Workers and Health Sector Employees](#).

### Sources:

[http://www.who.int/csr/disease/coronavirus\\_infections/update\\_20130920/en/index.html](http://www.who.int/csr/disease/coronavirus_infections/update_20130920/en/index.html)

<http://www.phac-aspc.gc.ca/phn-asp/2013/ncoronavirus-eng.php>

Memish ZA, Mishra N, Olival KJ, Fagbo SF, Kapoor V, Epstein JH, et al. Middle East respiratory syndrome coronavirus in bats, Saudi Arabia. *Emerg Infect Dis* [Internet]. 2013 Nov [Aug 30, 2013].

<http://dx.doi.org/10.3201/eid1911.131172>

Reusken et al. Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels: a comparative serological study. *The Lancet Infectious Diseases* 09 August 2013 (Article in Press DOI: 10.1016/S1473-3099(13)70164-6)

## Enhanced Surveillance Directives (ESD) Discontinued in August

### ***Food Poisoning***

Toronto Public Health (TPH) investigated a foodborne outbreak of *Staphylococcus aureus* that was linked to cronut burgers purchased at a food kiosk at the Canadian National Exhibition. An ESD was issued on August 23, 2013 to assist with the identification and reporting of cases with exposure dates from August 16 to 20, inclusive. Details of the investigation are still under review and a brief summary of the outbreak findings will be included in this section of an upcoming issue of the monthly report.



## References

1. Lingren E, Jaenson TGT. Lyme borreliosis in Europe: influences of climate and climate change, epidemiology, ecology and adaptation measures. World Health Organization, Copenhagen, Denmark. 2006.
2. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Technical Report: Update on Lyme Disease Prevention and Control. Toronto, ON: Queen's Printer for Ontario; 2012. Available from: <http://www.publichealthontario.ca/en/eRepository/PHO%20Technical%20Report%20-%20Update%20on%20Lyme%20Disease%20Prevention%20and%20Control%20Final%20030212.pdf>.
3. Public Health Agency of Canada. Lyme disease and other tick-borne diseases: Information for health professionals. [cited 2013 August 7]. Available from: <http://www.phac-aspc.gc.ca/id-mi/tickinfo-eng.php>.
4. Ogden NH, Lindsay LR, Morshed M, Sockett PN, Artsob H. The emergence of Lyme disease in Canada. CMAJ. 2009;180(12): 1221-1224. Centers for Disease Control and Prevention. Atlanta, GA. Lyme disease: signs and symptoms; 2013 Jan 11 [cited 2013 Aug 14]. Available from: [http://www.cdc.gov/lyme/signs\\_symptoms/index.html](http://www.cdc.gov/lyme/signs_symptoms/index.html).
5. Centers for Disease Control and Prevention. Lyme Disease Incidence Rates by State, 2002-2011. Atlanta, GA: CDC; 2012 October 29 [cited 2013 August 7]. Available from: <http://www.cdc.gov/lyme/stats/chartstables/incidencebystate.html>.

## Appendix – Reportable Diseases

### Appendix 1. Confirmed cases of reportable diseases by month: Ontario, 2008-2013\*

Reportable disease	2013												Historical comparisons								
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTM	YTM rate †	Current month 5-year avg (2008-2012)	Current month 5-year avg (2008-2012) rate †	% difference rates (current month minus 5-year avg)†	YTM 5-year avg (2008-2012)	YTM 5-year avg (2008-2012) rate †	% difference rates (YTM 2013 minus YTM 5-year avg)†	5-year avg (2008-2012) annual count
AIDS	11	4	11	1	13	7	5						52	3.8	9	0.7	-45	70	5.3	-28	114
Amebiasis	63	65	63	89	62	65	75						482	35.2	78	5.9	-7	480	36.3	-3	796
Botulism	0	0	0	0	0	0	0						0	0.0	0	0.0	-	2	0.1	-100	3
Brucellosis	0	1	0	1	0	1	1						4	0.3	1	0.1	-19	3	0.3	14	4
Campylobacter Enteritis	154	201	247	216	304	404	481						2,007	146.6	514	38.9	-10	1,951	147.5	-1	3,561
Chlamydial Infections	3,145	2,753	2,870	3,116	2,823	2,728	2,759						20,194	1475.1	2,607	197.1	2	18,558	1,402.9	5	32,295
Cholera	0	0	0	0	0	0	0						0	0.0	0	0.0	-	0	0.0	-100	1
Cryptosporidiosis	11	15	19	12	6	15	48						126	9.2	49	3.7	-6	152	11.5	-20	316
Cyclosporiasis	1	3	5	15	12	14	16						66	4.8	18	1.4	-162	96	7.3	-34	120
Cytomegalovirus Infection, Congenital	2	0	1	1	0	0	2						6	0.4	1	0.1	142	4	0.3	32	6
Encephalitis	1	2	4	0	0	1	0						8	0.6	2	0.1	-100	10	0.8	-26	18
Encephalitis/Meningitis	4	13	6	7	7	18	23						78	5.7	18	1.3	26	78	5.9	-4	154
Food Poisoning, All Causes	6	2	4	4	4	0	2						22	1.6	12	0.9	-84	80	6.0	-73	123
Giardiasis	125	106	86	77	93	83	81						651	47.6	141	10.7	-45	813	61.5	-23	1,435
Gonorrhoea (All Types)	448	296	338	346	316	335	368						2,447	178.7	342	25.8	4	2,242	169.5	5	3,935
Group A Streptococcal Disease, Invasive	50	59	51	55	53	49	41						358	26.2	40	3.0	-1	376	28.4	-8	565
Group B Streptococcal Disease, Neonatal	5	3	7	5	4	6	5						35	2.6	5	0.4	1	29	2.2	17	54
Haemophilus Influenzae B Disease, Invasive	2	0	0	0	2	1	0						5	0.4	0	0.0	-100	3	0.2	73	4
Hepatitis A	16	6	8	5	15	10	6						66	4.8	7	0.6	-22	65	4.9	-2	120
Hepatitis B	9	9	8	7	8	6	10						57	4.2	13	1.0	-23	73	5.5	-25	122
Hepatitis C	329	283	350	368	379	309	345						2,363	172.6	363	27.5	-8	2,636	199.3	-13	4,444
Hepatitis D	0	0	0	0	0	1	0						1	0.1	0	0.0	-	2	0.1	-40	3
Herpes, Neonatal	0	0	0	0	0	0	0						0	0.0	0	0.0	-100	4	0.3	-100	7
HIV	51	40	54	61	64	66	47						383	28.0	67	5.1	-32	509	38.5	-27	860
Influenza	3,324	797	511	360	115	15	4						5,126	374.4	78	5.9	-95	4,110	310.7	21	6,844
Legionellosis	9	8	8	6	10	33	63						137	10.0	11	0.8	444	37	2.8	258	124
Leprosy	0	0	0	0	0	0	0						0	0.0	0	0.0	-100	2	0.1	-100	3
Listeriosis	0	1	1	1	1	2	9						15	1.1	8	0.6	11	33	2.5	-56	62
Lyme Disease	1	0	3	3	19	41	48						115	8.4	38	2.8	23	85	6.4	30	124
Malaria	14	10	11	15	17	32	26						125	9.1	26	2.0	-5	124	9.3	-2	214
Measles	1	1	5	1	0	4	2						14	1.0	0	0.0	866	15	1.1	-10	17
Meningitis	8	4	10	10	4	15	11						62	4.5	13	1.0	-17	63	4.7	-5	119
Meningococcal Disease, Invasive	3	2	0	1	1	3	2						12	0.9	4	0.3	-46	30	2.3	-61	45
Mumps	2	1	1	2	2	0	0						8	0.6	32	2.4	-100	76	5.7	-90	130
Ophthalmia Neonatorum	0	2	0	0	0	0	0						2	0.1	0	0.0	-100	2	0.1	7	3
Paratyphoid Fever	2	8	9	6	2	0	1						28	2.0	2	0.2	-60	35	2.7	-23	52
Pertussis (Whooping Cough)	19	17	14	13	24	23	24						134	9.8	51	3.9	-55	310	23.4	-58	535
Q Fever	1	0	0	4	2	1	1						9	0.7	1	0.1	21	5	0.4	67	11
Rabies	0	0	0	0	0	0	0						0	0.0	0	0.0	-	0	0.0	-100	0
Rubella	0	0	0	1	0	0	0						1	0.1	0	0.0	-	1	0.1	-3	1
Rubella, Congenital Syndrome	0	0	0	0	0	0	0						0	0.0	0	0.0	-100	0	0.0	-100	0
Salmonellosis	151	185	212	183	195	191	296						1,413	103.2	286	21.6	0	1,531	115.8	-11	2,610
Shigellosis	21	22	29	22	28	14	25						161	11.8	30	2.3	-21	156	11.8	-1	254
Streptococcus Pneumoniae, Invasive	142	100	94	117	79	62	39						633	46.2	50	3.7	-24	712	53.8	-14	1,213
Syphilis, Early Congenital	0	0	0	0	0	0	0						0	0.0	0	0.0	-	1	0.0	-100	1
Syphilis, Infectious	66	51	48	47	61	47	23						343	25.1	56	4.2	-60	423	31.9	-22	719
Syphilis, Other	56	43	46	47	35	37	19						283	20.7	73	5.5	-75	527	39.8	-48	882
Tetanus	1	1	0	0	0	0	0						2	0.1	0	0.0	-	1	0.1	142	1
Tuberculosis	39	45	47	64	46	32	64						337	24.6	60	4.6	2	381	28.8	-15	636
Tularemia	0	0	0	0	0	0	1						1	0.1	0	0.0	-	0	0.0	142	1
Typhoid Fever	7	7	7	5	5	0	3						34	2.5	6	0.5	-55	56	4.3	-42	90
Verotoxin Producing E. Coli including HUS	15	2	8	19	9	10	25						88	6.4	35	2.7	-32	97	7.3	-12	208
West Nile Virus Illness	0	0	0	0	1	1	5						7	0.5	9	0.7	-47	11	0.8	-37	74
Yellow Fever	0	0	0	0	0	0	0						0	0.0	0	0.0	-	0	0.0	-100	0
Yersiniosis	15	17	12	22	15	10	8						99	7.2	17	1.3	-56	134	10.1	-29	216

**Ontario Cases:** Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/08/21].

**Ontario Population:** Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted [2012/10/15].

\* Appendix 1 is not an exhaustive list of all reportable diseases in Ontario.

‡ 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:** The one rubella case in April 2013 was related to travel and was not acquired in Ontario. Although importation status was unknown for 12 of 14 measles cases between January and July 2013, it is important to note that for all cases, documentation indicates that investigation for a source occurred despite the lack of identification.

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

**Note 6:** 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.