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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:

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

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INFECTIOUS DISEASE IN FOCUS

Norovirus

Norovirus is a genus of genetically diverse viruses in the *Caliciviridae* family that cause viral gastroenteritis, also referred to as winter vomiting disease or stomach flu. Prior to 2002, these viruses were commonly referred to as Norwalk virus or Norwalk-like virus in reference to the only species currently identified under the genus *Norovirus* (norovirus). The term stomach “flu” is misleading in that norovirus is unrelated to the influenza virus, which causes the respiratory illness commonly referred to as flu.^{1,2} Norovirus is a hardy organism that can survive on environmental surfaces for several weeks,³ and can survive freezing and heating to 60°C.⁴ It can be transmitted by food and water, as well as from person-to-person via direct contact, contaminated surfaces, and small infectious

droplets (aerosols) that can be generated by vomiting.^{5,6,7} Symptoms of norovirus usually present as sudden onset of vomiting, diarrhea, abdominal cramps, low-grade fever, and nausea. The occurrence of norovirus is common and affects people of all age groups.⁸ Symptoms may be more severe in elderly persons, young children, or those with underlying medical conditions.^{2,5} However, norovirus infections are typically self-limiting and rarely life threatening, and do not cause long-term effects.⁵ While no specific treatment is available for norovirus infection, fluid and electrolyte replacement help to prevent dehydration resulting from vomiting and diarrhea.

Norovirus can be grouped into five genogroups (GI–GV), which can be further distinguished into 35 genotypes. In 2012, the previously dominant norovirus strain GII.4K New Orleans (2009) was replaced by the variant strain GII.4 Sydney (2012), which resulted in increased norovirus activity globally, presumably due to lack of immunity.^{13,14,15} In the last decade, new epidemic variants of GII.4 have emerged every two to three years and led to cyclical increases in norovirus activity.^{13,14,15} GII.4 Sydney (2012) was first detected in Ontario through genotyping of a subset of outbreaks reported in December 2012 and January 2013. Of outbreaks reported in the province between December 2012 and June 2013 for which genotype results are available, 51% (29/57) were GII.4 Sydney (2012).

The incubation period of norovirus is usually 24 to 48 hours, but symptoms can occur as soon as 12 hours after exposure.^{5,8,9} In healthy people, symptoms normally resolve in one to two days.⁹ Norovirus is communicable from the moment symptoms appear and the virus can continue to be shed for several weeks following infection.^{10,11} Norovirus is very contagious, with the infective dose estimated to be as low as 18 viral particles.¹² This contrasts greatly with levels of shedding, which can be as high as 10^{12} viral particles per gram of feces in infected individuals.¹²

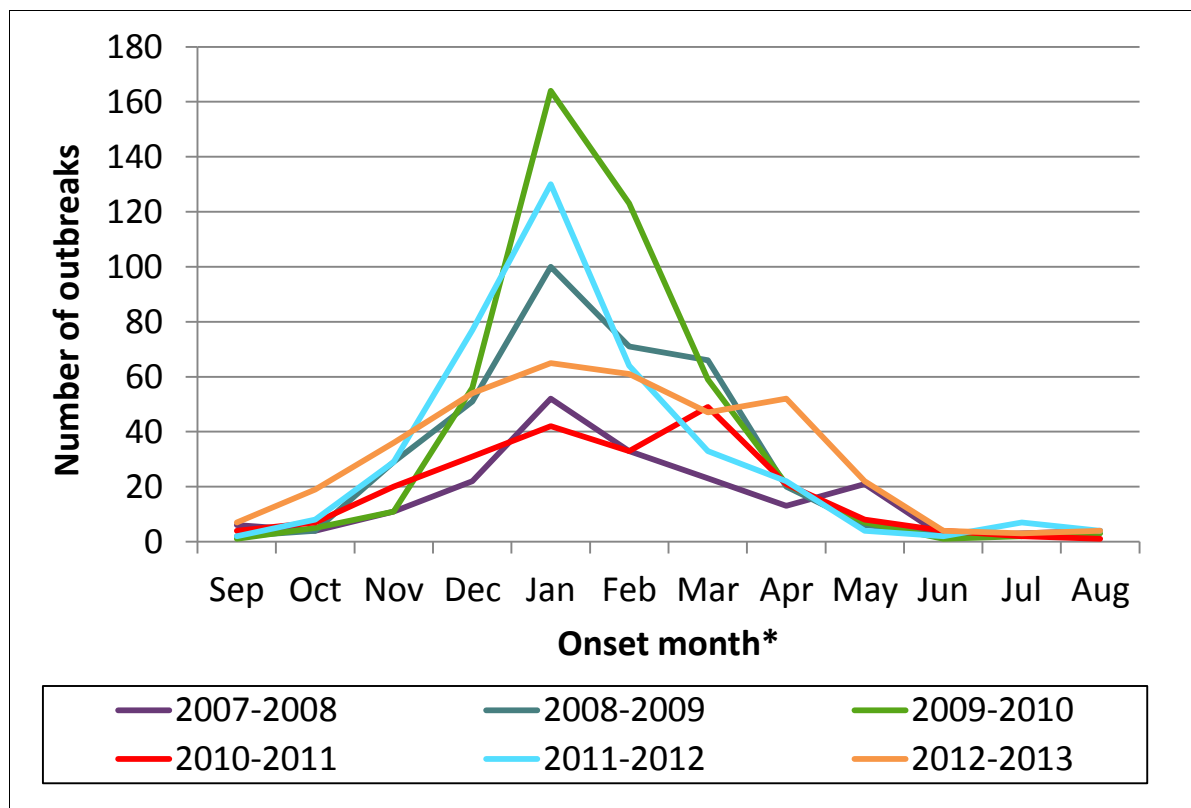
Humans are the only known reservoir for norovirus infections.^{8,12} In the past, norovirus outbreaks have been associated with sewage contamination of drinking and recreational water, environmental contamination of produce, and consumption of shellfish harvested from contaminated water.⁵ Most foodborne outbreaks occur when food is contaminated by infected food handlers.⁹ Norovirus can spread quickly in enclosed settings such as daycare centers, nursing homes, schools, and cruise ships.¹ It is the most common cause of gastroenteritis outbreaks worldwide, being responsible for at least 50% of outbreaks, and is a major cause of foodborne illness globally.¹²

As with respiratory viruses, the norovirus surveillance season typically extends from September 1 to August 31. Norovirus is not a reportable disease in Ontario; however, institutional gastroenteritis outbreaks are reportable, with norovirus often detected or implicated as the causative agent. The types of settings defined as “institutions” are specifically outlined within the [*Health Protection and Promotion Act*](#) and include hospitals, long-term care homes, correctional facilities, and day nurseries. Individual cases of norovirus are reportable only if they are identified during the investigation of food poisoning cases. As a result, the burden of norovirus in community settings in Ontario is not systematically captured.

Figure 1 compares the number of institutional norovirus outbreaks reported in the integrated Public Health Information System (iPHIS) during 2012–2013 and the previous five seasons. Norovirus activity

typically increases throughout the fall before peaking in January and then decreases in the spring with reduced activity during the summer. The 2012-2013 season was marked by increased activity early and late in season, and a less dramatic increase peaking in January 2013. It is possible that the advent of the GII.4 Sydney (2012) strain in Ontario in late 2012 and early 2013 is responsible for increased late-season activity. The total number of norovirus outbreaks in 2012-2013 (374) was higher than the five-year average (321).

Figure 1. Confirmed institutional norovirus outbreaks by onset month*, Ontario: September 1, 2008 to August 31, 2013



Data source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/11/04].

* Onset month reflects the onset date of the index case in the outbreak; if no onset date was available, the outbreak reported date was used.

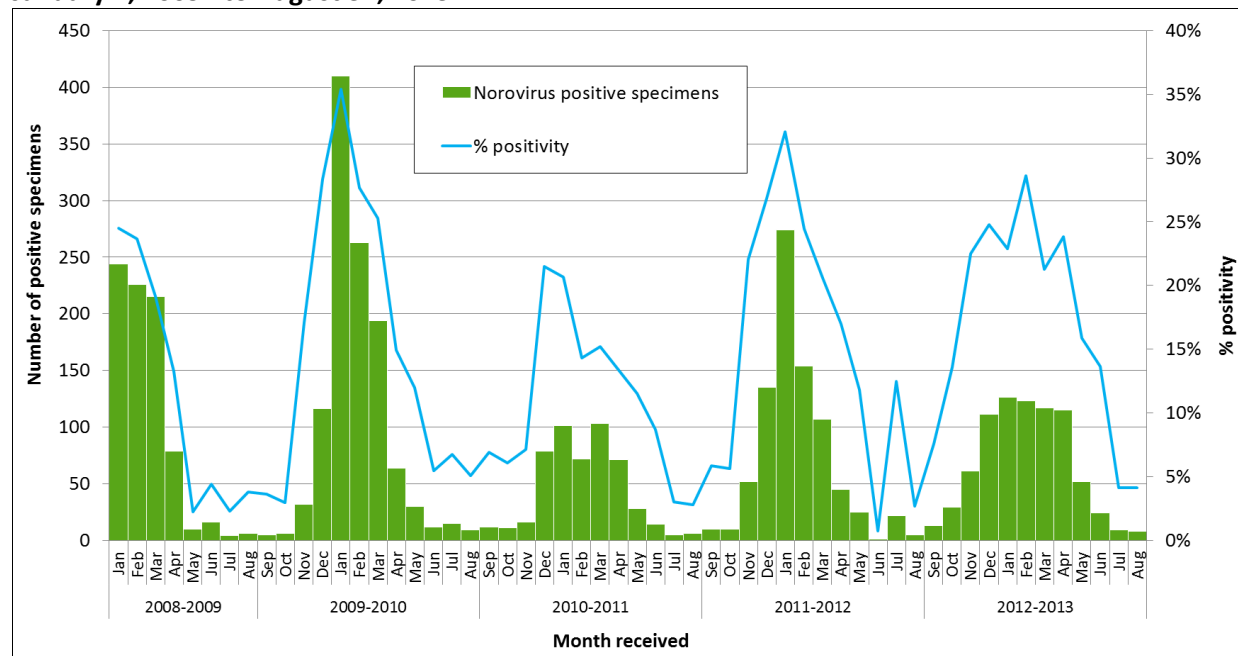
From September 1, 2012 to August 31, 2013, a total of 922 confirmed institutional gastroenteritis outbreaks were reported provincially in iPHIS. The definition of confirmed outbreaks can be found in the [Infectious Diseases Protocol, 2009, Appendix B](#). The causative agent was not reported or was unknown for 55% (511/922) of institutional gastroenteritis outbreaks in the 2012-2013 season. Norovirus accounted for 91% (374/411) of outbreaks with a known causative agent over this period. The most common settings for institutional norovirus outbreaks were long-term care homes (45%), retirement

homes (20%), acute care hospitals (10%), and child care centres (8%). Institutional norovirus outbreaks were reported in 34 of the 36 public health units in Ontario during the 2012-2013 season.

At the Public Health Ontario Laboratories (PHOL), testing for norovirus utilizes various diagnostic techniques depending on the level of activity in the province, including polymerase chain reaction (PCR), electron microscopy (EM), and viral culture. From January 2009 to October 2013, a total of 22,252 clinical specimens were submitted to PHOL for norovirus testing. Nineteen percent (4,121/22,252) of specimens submitted over this period were positive for norovirus, with distinct seasonal increases in the number of positive specimens and percent positivity (Figure 2). The seasonal increases parallel the incidence of institutional gastroenteritis outbreaks reported in iPHIS. Approximately one third (33%; 7,237/22,252) of specimens submitted for norovirus testing from January 2009 to October 2013 were outbreak-related, with multiple specimens typically submitted for each outbreak. The remaining non-outbreak specimens originate from clinical follow up of individual patients.

The 7,237 outbreak-related specimens submitted to PHOL over this period correspond to 3,007 distinct outbreaks. Sixty-five percent (1,943/3,007) of these outbreaks were positive for norovirus. The majority of norovirus-positive outbreaks were institutional: 84% (1,190/1,411) of outbreaks for which the setting is known. As noted above, community outbreaks of norovirus are not reportable, unless they are identified during the investigation of food poisoning cases (likely underrepresented as a result). From January 2009 to October 2013, institutional outbreaks had the highest percent positivity for norovirus at 70% (1,190/1,698) compared to a percent positivity of 52% (221/426) for community outbreaks. The remaining 883 outbreaks tested over this period had an unknown setting, with 532 outbreaks (60%) positive for norovirus. Specimens negative for norovirus, which correspond to 1064 outbreaks from January 2009 to October 2013, are tested for other pathogens. Over this period, rotavirus (133 outbreaks) and adenovirus (14 outbreaks) were most commonly identified as part of this additional testing, but represent a small fraction of the total compared to the 1,943 norovirus-positive outbreaks detected.

Figure 2. Norovirus positive specimens tested at PHOL and percent positivity by month, Ontario: January 1, 2009* to August 31, 2013



Data source: Public Health Ontario Laboratories (PHOL), extracted [2013/10/31].

* Complete data for the 2008-2009 norovirus surveillance season is not available.

PHOL normally experiences an annual increase in food submissions for testing during the norovirus season. For outbreaks with clinical symptoms and epidemiology indicative of norovirus, the submission of food samples is not required since the testing is currently not available at PHOL. Routine food testing is complex and valuable resources may be unnecessarily consumed when foods are submitted in norovirus suspected outbreaks prior to laboratory confirmation of clinical cases. In unique situations, testing may be discussed with the PHOL Environmental Laboratory prior to the collection of any samples.

Prevention of norovirus transmission can be challenging, particularly in institutional environments. The Ontario Ministry of Health and Long-Term Care guide on the [Control of Gastroenteritis Outbreaks in Long-Term Care Homes \(October 2013\)](#) should be used to manage and control outbreaks in institutional settings. Adequate hand hygiene is essential to minimizing the risk of norovirus transmission, especially after using the toilet, changing diapers or handling incontinence products, and before eating or preparing food.^{1,12} Safe food handling practices can help to prevent norovirus infections, such as cooking shellfish thoroughly and washing fruits and vegetables before consumption. Cleaning and disinfecting high-touch surfaces in healthcare settings, particularly during respiratory and gastrointestinal outbreaks, reduces the risk of disease transmission.²

The Provincial Infectious Diseases Advisory Committee's [Environmental Cleaning for Prevention and Control of Infections \(May 2012\)](#) provides guidance on cleaning and disinfection in healthcare settings. Food handlers, healthcare workers, and caregivers with symptoms of gastrointestinal illness should remain off work until at least 48 hours after symptoms resolve.^{2,16} Contact and droplet precautions

reduce the risk of transmission from infected individuals, as does exclusion of infected children from group child care.⁹ Implementation of prevention and control practices is particularly important during the winter months when norovirus activity typically peaks in Ontario.

SUMMARY OF IMMUNIZATION COVERAGE FOR ONTARIO SCHOOL PUPILS, 2011/12 SCHOOL YEAR

Introduction

Accurate and timely immunization coverage information is important to predict the susceptibility of the population to vaccine preventable diseases (VPDs) and the risk of disease or outbreaks. In Ontario, the *Immunization of School Pupils Act* (ISPA),^{17,18} requires that Public Health Units (PHUs) maintain immunization records for school pupils and conduct an assessment of immunization annually. Currently, for six designated diseases referenced in the ISPA (diphtheria, tetanus, polio, measles, mumps and rubella), students with incomplete immunizations must be vaccinated or provide an exemption statement (religious/conscientious or medical) or risk school suspension. The Immunization Records Information System (IRIS) has supported the implementation of the ISPA. Over the course of 2013-2014, PHUs will be transitioning from IRIS to the immunization module of the Panorama application.

In addition to assessment activities, PHUs are responsible for the delivery of 3 school-based immunization programs: quadrivalent meningococcal conjugate vaccine (MCV4), hepatitis B (HB) and human papillomavirus (HPV) vaccines. The HB and MCV4 programs target grade 7 students and the HPV program targets grade 8 females. All three programs allow students to complete the series at a later date; this is referred to as either extended eligibility (hepatitis B and HPV) or eligibility in perpetuity (MCV4). In August, 2013, two reports summarizing immunization coverage for Ontario students were circulated to the Ministry of Health and Long-Term Care (MOHLTC) and PHUs. A summary of the key findings is summarized below.

Methods

In June 2012, Public Health Ontario (PHO) requested immunization coverage reports from IRIS from PHUs, for students between the ages of 7- (2004 birth year cohort) and 17-years (1994 birth year cohort) for most of Ontario's publicly-funded vaccines. Coverage was expressed as the proportion of enrolled students who were considered complete-for-age (CFA) for each antigen and birth cohort, using IRIS logic parameters. A student is considered CFA if the requisite number of doses of a vaccine, against a given antigen, with the appropriate interval between doses for age have been received. In addition, students with an incomplete vaccine series but who are not yet overdue for their next dose, are considered complete using IRIS logic. PHU-level estimates of coverage were provided to each PHU for validation in November 2012.

Coverage data for the school-based programs for 2011-12 and 2010-11 were requested in October 2012 through a survey. The survey requested coverage including doses administered as of August 31, 2012, and allowed PHUs to use the data source(s) they felt provided the best reflection of local coverage.

Results

All 36 PHUs provided immunization coverage data for these two assessments (Table 1 and Figure 3). Two-dose coverage among 7-year-olds for varicella was low at 5.3%. This is explained by a change in IRIS

logic to require two doses of varicella-containing vaccine to be considered CFA. This cohort of 7-year-olds did not have an ample opportunity to receive a second dose of varicella-containing vaccine through the routine program for 4- to 6-year-olds as this program was only introduced in August 2011. One-dose coverage for varicella among 5-year-olds was 75.0%. Coverage for 1 dose of meningococcal-C conjugate vaccine was 72% for 7-year-olds. This is the first birth cohort eligible for the publicly-funded toddler program since its introduction in September 2004.

Provincial coverage for tetanus, diphtheria, and pertussis, among 17-year-olds is reflective of the adolescent booster dose requirement at 14- to 16-years-of-age. In contrast, for measles, mumps, rubella and polio, no additional doses of vaccine are required after 7-years-of-age. This birth cohort was not eligible for the publicly-funded varicella vaccine program.

For the assessment of school-based immunization coverage, most PHUs (32/36, 89%) depending on the vaccine program and school year, used IRIS as their data source. Provincial coverage for 2010-11, including doses administered as part of expanded eligibility programs, was 86.4% for hepatitis B, 73.8% for MCV4 and 57.2% for HPV. In comparison, provincial coverage for 2011-12, excluding expanded eligibility, was 86.6% for hepatitis B, 84.4% for MCV4, and 70.2% for HPV. Recent temporal trends for Ontario's school-based programs are presented in Figure 3.

Discussion

Immunization coverage assessment in Ontario is supported by strong enabling provincial legislation and the dedication and commitment of a range of immunization stakeholders, in particular the staff of Ontario's 36 PHUs. While provincial coverage is high for antigens that require few doses and are routinely administered only in the first few years of life (i.e., rubella), there is a need to improve immunization coverage for other vaccines, especially those which require multiple booster doses throughout life, in order to move Ontario's immunization coverage towards established national targets and to prevent outbreaks. Ontario met the national coverage target for rubella among 17-year-olds, but met no other coverage target.

Establishing accurate immunization coverage for Ontario school pupils has several limitations related to the IRIS application. Both immunization coverage reports of the 2011-12 school have demonstrated that the forecasting logic in IRIS is a problematic tool for assessing immunization coverage. Because it considers students who have initiated a vaccine series, but who are not yet overdue for their next dose as CFA, it does not report on what proportion of students have received an age-appropriate number of doses, based on the schedule ("up-to-date"). In addition, because the IRIS logic parameters are based on age-eligibility criteria, for antigens such as Hib and pneumococcal which have not been presented here, there is an inability to report on accurate coverage for students aged 5-years and older.

Although the future implementation of Panorama will solve some challenges with the IRIS application, a comprehensive population-based immunization registry that can accurately assess immunization coverage in a timely manner throughout the life span is desirable. As the implementation of Panorama continues, it is important not to lose sight of additional opportunities to strengthen the surveillance of

immunization programs, including monitoring coverage among non-school aged populations and measuring public confidence in immunization.

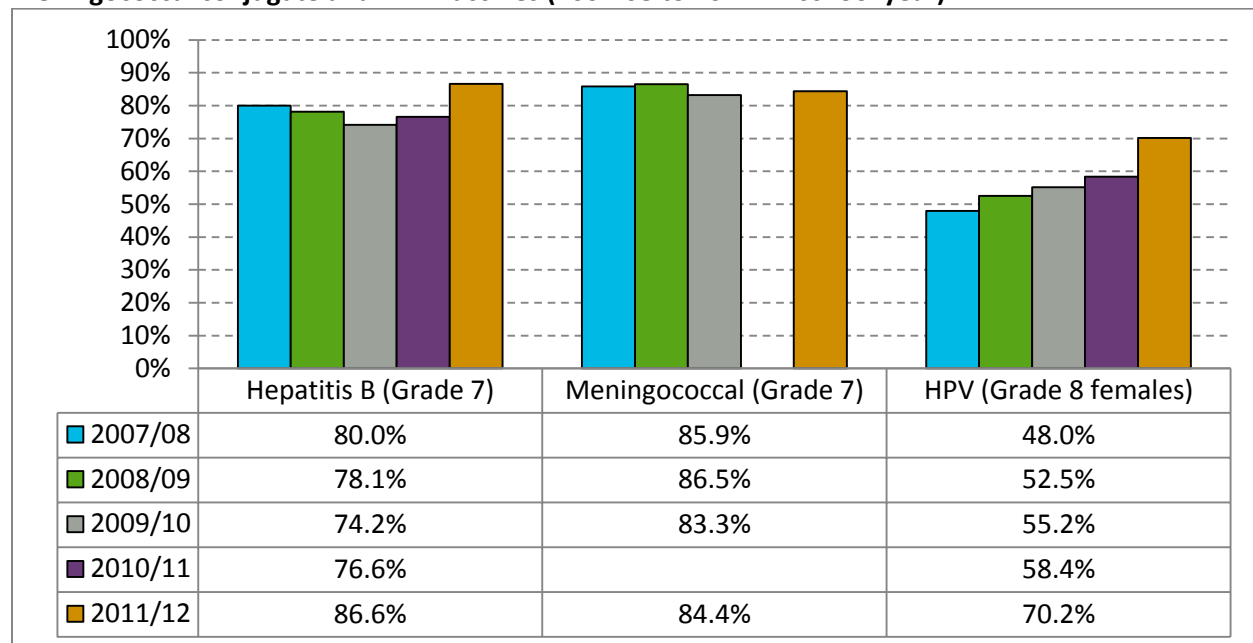
Table 1. Immunization coverage (%), among 7- and 17-year-old students, for select publicly-funded vaccines: Ontario, 2011/12 school year

Antigen	Cohort		Target ^{A/19,B/20}
	7-year-olds (2004 birth year)	17-year-olds (1994 birth year)	
Diphtheria	79.7	82.6	99
Tetanus	79.7	82.6	99
Polio	79.2	93.5	99
Measles ^C	89.1	94.8	99
Mumps ^D	88.6	92.9	99
Rubella ^D	95.1	96.8	97
Pertussis	76.0	67.7	85-95
Meningococcal	72.0	n/a	97
Varicella ^E	5.3	n/a	85

Notes:

- A. Public Health Agency of Canada. Final Report of Outcomes from the National Consensus Conference for Vaccine-Preventable Diseases in Canada. CDR 2007;33S3:1-56.
- B. Health Canada. Canadian National Report on Immunization, 1996. CDR 1997;23S4.
- C. Coverage for two doses of measles and mumps-containing vaccines is presented as per the publicly funded schedule for Ontario and recommendations from the National Advisory Committee on Immunizations (NACI).
- D. Coverage for at least one dose of rubella-containing vaccine, as per NACI recommendations, is presented.
- E. National target for varicella reflects 1-dose coverage, whereas 2-dose coverage among 7-year olds is presented.

Figure 3: School-based immunization coverage among grades 7 and 8 students in Ontario: Hepatitis B, meningococcal conjugate and HPV vaccines (2007-08 to 2011-12 school year)^{F-I}



Notes:

- F. Coverage estimates for 2007-08 to 2010-11 are derived from IRIS data generated for the annual immunization coverage report for school pupils. The 2010-11 report was created by PHO and by MOHLTC in previous years.
- G. Between 2007-08 and 2008-09, Men-C-C vaccine was used in the school-based meningococcal vaccine program. Since 2009-10, MCV4 has replaced Men-C-C vaccine.
- H. The 2007-08 coverage estimate excludes Peel and the 2008-09 coverage estimate exclude Peel and Toronto.
- I. Meningococcal vaccine coverage was not assessed in the 2010-11 school year.

SIGNIFICANT REPORTABLE DISEASE ACTIVITY

Table 2 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 2. Summary of significant increases in reportable disease incidence: Ontario, January 1 to October 31, 2013

Reportable disease	2013				Historical comparisons						5-year avg annual count (2008-2012)
	Oct	Oct 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 ¹	3,073	224.5	29,212	2133.8	2,865	216.7	3.6	27,041	2045.5	4.3	32,299
Food Poisoning, All Causes ¹	5	0.4	178	13.0	4	0.3	20.7	108	8.2	58.9	122
Gonorrhoea (All Types) ^{1,2}	449	32.8	3,711	271.1	338	25.6	28.3	3,299	249.6	8.6	3,936
Legionellosis ¹	28	2.0	242	17.7	16	1.2	73.3	106	8.0	119.6	124
Lyme Disease ¹	5	0.4	276	20.2	6	0.5	-19.5	120	9.1	121.4	127

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/11/20].

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

‡ 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.

¹Statistically significant difference ($p < 0.05$) in incidence reported in year-to-month (January to October 2013) compared to the five-year historical average (January to October 2008-2012).

²Statistically significant difference ($p < 0.05$) in incidence reported in current month (October 2013) compared to the five-year historical average (October 2008-2012).

CHLAMYDIA

The YTM incidence rate of reported laboratory-confirmed chlamydial infections for January 1 to October 31, 2013 was significantly higher than the historical five-year (2008-2012) average YTM rate for the same period. The significantly higher YTM rate has been noted since March 2013, as reported in each edition of the [Monthly Infectious Diseases Surveillance Report](#) since [May 2013](#) (Volume 2, Issues 6-11). The rate may be higher than the historical five-year average in part due to increased screening for chlamydial infections in recent years, as summarized in the [May 2013](#) (Volume 2, Issue 5) edition of the monthly report. The [July 2012](#) (Volume 1, Issue 8) edition further describes the epidemiology of chlamydia in Ontario.

While the January 1 to October 31, 2013 incidence rate of chlamydia is higher compared to the 5-year historical five-year average (2008-2012), it is lower than the reported comparable YTM incidence for 2012 (data not shown). The reasons for this decrease are unclear, and PHO continues to investigate potential reasons for the decline.

FOOD POISONING, ALL CAUSES

From January 1 to October 31, 2013, the YTM incidence rate for food poisoning was significantly higher than expected compared to the five-year average YTM rate for the same period from 2008 to 2012. Of the 178 food poisoning cases reported to date in 2013, 83% (148/178) were reported in the month of August. The increase in August was first described in the [October 2013](#) edition of this report (Volume 2, Issue 10), and was driven by a large outbreak caused by *Staphylococcus aureus*. The outbreak was investigated by Toronto Public Health and included cases from a total of nine public health units in Ontario. These cases were linked to the consumption of contaminated maple bacon jam topping on a specialty burger purchased at a food kiosk from August 16 to August 20 at the 2013 Canadian National Exhibition.

GONORRHEA

The incidence rate of reported laboratory-confirmed gonorrhea cases for October and YTM (January 1 to October 31, 2013) was significantly higher than the corresponding historical five-year (2008-2012) average rates. The number of cases was higher than expected in a number of public health units, and in men between the ages of 20 and 34 years. While definitive reasons for the increase are not yet known, increased diagnostic testing may be partly responsible. In addition, reduced susceptibility to gonorrhea treatment regimens is a growing concern, and may also play a role in greater disease transmission. New [guidelines](#) for testing and treatment of gonorrhea in Ontario were released in April 2013 and evaluation of their impact will be ongoing. The [November 2012](#) (Volume 1, Issue 12) edition of this report describes the epidemiology of gonorrhea in Ontario. Further analysis of the current increase will be required to determine whether the epidemiology of gonorrhea in Ontario has changed.

LEGIONELLOSIS

The YTM incidence rate of reported laboratory-confirmed legionellosis for January 1 to October 31, 2013 was significantly higher than the historical five-year (2008-2012) average YTM rate for the same period. The significantly higher YTM rate has been noted since March 2013, as reported in each edition of this report since [May 2013](#) (Volume 2, Issues 6-11). Please refer to the legionellosis summary in the [‘Enhanced Surveillance Directives \(ESD\) Discontinued in November’](#) section below.

LYME DISEASE

The incidence rate of Lyme disease for January 1 to October 31, 2013 was significantly higher than the historical five-year (2008-2012) average YTM rate for the same period. An increase in the current YTM rate in comparison to the historical average YTM rate was also noted in the [October 2013](#) and [November 2013](#) editions of this report (Volume 2, Issues 10 and 11). Consistent with the expected seasonality of Lyme disease, 82% (226/276) of cases to date in 2013 were reported from June to August. The highest incidence rate to date in 2013 was observed in the Eastern region public health units including Leeds, Grenville and Lanark District; Kingston-Frontenac, Lennox and Addington; Eastern Ontario; Hastings and Prince Edward Counties; and the City of Ottawa. The Lyme disease in focus article in the [September 2013](#) (Volume 2, Issue 9) edition of this report and the [Vector-Borne Disease 2012 Summary Report](#) contain detailed descriptions of the epidemiology of Lyme disease in Ontario, including factors associated with the increasing trend in activity. In February 2012, PHO released the [Technical Report: Update on Lyme Disease Prevention and Control](#), which contains information on human and tick surveillance, as well as a discussion on diagnosis and laboratory testing.

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.

INVASIVE MENINGOCOCCAL DISEASE

Summary:

As of November 29, 2013, there have been eight confirmed cases of invasive meningococcal disease (IMD) associated with Princeton University occurring between March 22 and November 20, 2013. All cases are serogroup B, the only serogroup that is not yet vaccine preventable in North America. Of the eight cases, five (63%) were male and all but one occurred among Princeton University students. The latter case was a visitor to the university. The New Jersey Department of Health designated this incident as an outbreak after the fourth case was reported in May 2013. No direct link has been found between the eight cases, although individuals in college settings are at an increased risk of meningococcal disease.

The meningococcal B vaccine (Bexsero®) has been recommended to all Princeton University students to control the outbreak. This vaccine, although not licensed in Canada or the United States (US), is licensed in Europe and Australia. The US Food and Drug Administration has allowed the use of this vaccine under an Investigational New Drug application. The Centers for Disease Control and Prevention have obtained Institutional Review Board approval to use this vaccine at Princeton University for undergraduate students (those who live in dormitories or off-campus), as well as graduate students who live in dormitories.

Implications:

IMD is an endemic but rare disease in Ontario. The current publicly funded vaccination program includes a dose of meningococcal C vaccine at 12 months of age and a dose of quadrivalent vaccine, which protects against serogroups A, C, W135 and Y, in grade 7. As of November 29, 2013, there have been 20 confirmed IMD cases reported in Ontario in 2013. Of these, seven were serogroup B and none were related to the Princeton outbreak. Between 2009 and 2012, serogroup B disease was responsible for 48.9% of IMD in the province with an annualized rate of 0.16 per 100,000 per year. Disease incidence is highest in infants under one year of age (annualized rate of 2.67 per 100,000 infants per year between 2009 and 2012) and is uncommon in adolescents and young adults (annualized rate of 0.22 per 100,000 persons between 15-24 years of age between 2009 and 2012).

Sources:

http://www.state.nj.us/health/cd/meningo/documents/meningococcal_faq.pdf

<http://www.cdc.gov/meningococcal/vaccine-serogroupB.html#investigating>

<http://emergency.cdc.gov/HAN/han00357.asp>

<http://web.princeton.edu/sites/emergency/meningitis.html>

Jamieson FB, Rawte P, Deeks SL, Zhou J, Law DK, Deng S, Tsang RSW. Genetic and antigenic characterization of invasive endemic serogroup B *Neisseria meningitidis* from Ontario, Canada, in 2001-2010. *J Med Microbiol* 2013, 62:46-55.

Zhou J, Lefebvre B, Deng S, Gilca R, Deceuninck G, Law KC, De Wals P, Tsang RSW. Invasive serogroup B *Neisseria meningitidis* in Quebec, Canada, 2003 to 2010: persistence of ST-269 clone since it first emerged in 2003. *J Clin Microbiol* 2012, 50(5):1545-51.

ENHANCED SURVEILLANCE DIRECTIVES (ESD) DISCONTINUED IN NOVEMBER

VEROTOXIN-PRODUCING *E. COLI*

On September 30, 2013, an Ontario Outbreak Investigation Coordinating Committee (ON-OICC) was established for confirmed cases of *E. coli* O157:H7 with two closely related pulsed-field gel electrophoresis (PFGE) pattern combinations, all of whom reported consumption of frozen beef hamburgers. An additional PFGE pattern combination of interest was identified on October 11 as part of the food safety investigation.

As of November 20, 12 outbreak cases (nine confirmed, two probable, and one suspect case) were reported in Ontario. Two additional outbreak confirmed cases were reported nationally. Outbreak confirmed cases in Ontario originated from Middlesex-London (four cases), Durham Region (two cases), Eastern Ontario (one case), Peel Region (one case), and Simcoe Muskoka District (one case). Of the nine outbreak confirmed cases in Ontario, six were male and the cases ranged in age from two to 20 years. Symptom onset dates for outbreak confirmed cases in Ontario ranged from June 5 to September 30. Five outbreak confirmed cases provincially were hospitalized, including one case with haemolytic uremic syndrome.

Beef hamburgers were implicated as the source of the outbreak. On October 2, the manufacturer of the beef burgers issued a [voluntary recall](#) of certain brands of burgers due to potential contamination with *E. coli* O157:H7. The recall was expanded on October 8 and October 20 to include additional products from the same manufacturer. The Canadian Food Inspection Agency monitored the effectiveness of the recall. The ON-OICC was deactivated on November 19 following the recall of the implicated products and no further cases identified with PFGE pattern combinations of interest. The ESD was discontinued on November 22.

LEGIONELLOSIS

On June 28, 2013, PHO issued an ESD for legionellosis and provided public health units with a Case Report Form to identify possible exposure types and locations among laboratory-confirmed cases of legionellosis in Ontario. The ESD was discontinued on November 1, 2013.

During the period that the ESD was in effect, 170 laboratory-confirmed cases of legionellosis were reported in Ontario (as of December 2, 2013). This year's seasonal peak occurred earlier than in previous years. The number of laboratory confirmed legionellosis cases reported in June (n=33) and July (n=67) was three and six times higher, respectively, than their corresponding historical five-year (2008-2012) monthly averages, and considerably higher than expected. The number of reported legionellosis cases decreased and was within expected ranges in August (n=36), September (n=37), and October (n=28), but remained above the corresponding historical five-year monthly averages. Case counts dropped considerably in November, with only nine cases reported, which is slightly above the historical five-year monthly average but within the expected range for this time of year.

From June 1 to October 31, 201 cases were reported from 24 public health units, largely from those in and around the Golden Horseshoe area. The majority of cases (54%, 109/201) were reported from Toronto, Peel Region, and Niagara Region. Among cases reported during this period, 67% (135/201) were male and 77% (155/201) were over the age of 50; the average age among cases was 62 years. This is similar to the age and sex distribution among legionellosis cases in previous years. Two statistically significant geographical clusters were identified, but there were no common exposures reported within these clusters. Only one common laboratory-confirmed exposure was identified among two cases in a northern public health unit.

PHO will be distributing an epidemiological summary of the 2013 legionellosis season, as well as additional surveillance materials for health units, in the Spring of 2014.

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In Focus - Norovirus

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Appendix – Reportable Diseases

Appendix 1. Confirmed cases of reportable diseases, and probable cases of select reportable diseases, by month: Ontario, 2008-2013*

Reportable disease	2013														Historical comparisons						5-year avg (2008-2012) annual count
	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)†	
AIDS	13	6	12	4	13	7	4	6	6	7	0	0	78	5.7	9	0.7	-27	101	7.6	-25	118
Amebiasis	65	66	64	95	64	70	81	80	55	58	0	0	698	51.0	59	4.5	-6	678	51.3	-1	796
Botulism	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-	2	0.2	-100	3
Brucellosis	0	1	0	1	0	1	3	1	0	0	0	0	7	0.5	0	0.0	-100	4	0.3	61	4
Campylobacter Enteritis	154	201	248	218	305	424	509	591	386	358	0	0	3,394	247.9	328	24.8	5	3,139	237.5	4	3,565
Chlamydial Infections	3,148	2,753	2,874	3,118	2,838	2,741	2,790	2,862	3,015	3,073	0	0	29,212	2133.8	2,865	216.7	4	27,041	2,045.5	4	32,299
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-100	1	0.0	-100	1
Cryptosporidiosis	12	15	19	12	6	16	57	64	48	24	0	0	273	19.9	20	1.5	16	288	21.8	-9	316
Cyclosporiasis	1	3	5	15	13	17	18	4	6	2	0	0	84	6.1	6	0.4	-67	111	8.4	-27	119
Cytomegalovirus Infection, Congenital	2	1	1	1	0	0	1	0	0	1	0	0	7	0.5	0	0.0	383	6	0.4	21	6
Encephalitis	1	2	4	0	0	1	0	1	1	5	0	0	15	1.1	1	0.1	302	14	1.1	1	18
Encephalitis/Meningitis	4	14	7	7	8	18	24	26	17	29	0	0	154	11.2	15	1.2	82	135	10.2	10	154
Food Poisoning, All Causes	6	2	4	4	5	1	3	148	0	5	0	0	178	13.0	4	0.3	21	108	8.2	59	122
Giardiasis	128	107	89	80	99	97	117	154	151	101	0	0	1,123	82.0	110	8.4	-12	1,229	92.9	-12	1,434
Gonorrhoea (All Types)	448	296	339	348	316	335	374	374	432	449	0	0	3,711	271.1	338	25.6	28	3,299	249.6	9	3,936
Group A Streptococcal Disease, Invasive	50	59	51	55	54	49	42	56	30	42	0	0	488	35.6	33	2.5	24	471	35.6	0	565
Group B Streptococcal Disease, Neonatal	5	3	7	5	4	6	5	3	5	9	0	0	52	3.8	5	0.4	74	43	3.3	16	55
Haemophilus Influenzae B Disease, Invasive	2	0	0	1	1	1	0	0	0	2	0	0	7	0.5	0	0.0	-	3	0.3	99	4
Hepatitis A	16	6	8	5	15	10	7	7	7	10	0	0	91	6.6	9	0.7	10	101	7.6	-13	120
Hepatitis B	10	9	9	9	8	7	13	10	7	7	0	0	89	6.5	11	0.9	-41	105	7.9	-18	122
Hepatitis C	327	285	351	368	376	330	362	338	329	342	0	0	3,408	248.9	375	28.3	-12	3,753	283.9	-12	4,444
Hepatitis D	0	0	0	0	0	1	1	0	0	0	0	0	2	0.1	0	0.0	-100	3	0.2	-31	3
Herpes, Neonatal	0	0	0	0	0	0	0	0	0	2	0	0	2	0.1	0	0.0	383	5	0.4	-64	7
HIV	50	41	56	65	64	68	51	60	67	68	0	0	590	43.1	71	5.4	-8	724	54.8	-21	859
Influenza	3,321	801	512	359	116	14	4	8	3	30	0	0	5,168	377.5	741	56.0	-96	4,906	371.1	2	6,844
Legionellosis	9	9	7	6	10	33	67	36	37	28	0	0	242	17.7	16	1.2	73	106	8.0	120	124
Leprosy	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-100	2	0.2	-100	3
Listeriosis	0	1	1	1	1	3	9	15	4	2	0	0	37	2.7	5	0.4	-60	56	4.2	-36	62
Lyme Disease	2	0	3	4	21	60	120	46	15	5	0	0	276	20.2	6	0.5	-20	120	9.1	121	127
Malaria	14	10	11	16	16	34	27	24	18	11	0	0	181	13.2	14	1.0	-23	187	14.2	-7	214
Measles	1	1	5	1	0	4	2	1	0	0	0	0	15	1.1	0	0.0	-100	16	1.2	-7	17
Meningitis	8	4	10	10	4	15	12	12	10	14	0	0	99	7.2	12	0.9	9	101	7.7	-6	119
Meningococcal Disease, Invasive	3	2	0	1	1	3	2	1	1	4	0	0	18	1.3	3	0.2	29	38	2.9	-55	45
Mumps	2	1	1	2	2	0	0	7	3	0	0	0	18	1.3	6	0.5	-100	116	8.8	-85	130
Ophthalmia Neonatorum	0	1	0	0	0	0	0	0	1	0	0	0	2	0.1	0	0.0	-	2	0.2	-20	3
Paratyphoid Fever	3	9	9	5	2	0	1	5	3	2	0	0	39	2.8	2	0.1	7	45	3.4	-16	52
Pertussis (Whooping Cough)	19	17	14	13	24	24	32	46	24	22	0	0	235	17.2	42	3.1	-49	455	34.4	-50	535
Q Fever	1	0	0	4	2	0	2	1	0	0	0	0	10	0.7	2	0.1	-100	10	0.7	-1	11
Rabies	0	0	0	0	0	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	0	0	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	0.0	0	0.0	-	0	0.0	-100	0
Salmonellosis	151	185	212	186	197	196	326	285	211	165	0	0	2,114	154.4	191	14.5	-17	2,286	172.9	-11	2,608
Shigellosis	21	23	28	22	28	16	27	24	11	11	0	0	211	15.4	14	1.1	-25	221	16.7	-8	254
Streptococcus Pneumoniae, Invasive	142	100	93	117	79	61	43	37	42	97	0	0	811	59.2	124	9.4	-25	941	71.2	-17	1,213
Syphilis, Early Congenital	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-100	1	0.1	-100	1
Syphilis, Infectious	69	52	48	52	72	60	51	40	35	26	0	0	505	36.9	62	4.7	-59	607	45.9	-20	721
Syphilis, Other	55	45	48	49	40	45	44	32	29	38	0	0	425	31.0	73	5.6	-50	745	56.4	-45	884
Tetanus	1	1	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0.0	-	1	0.1	93	1
Tuberculosis	40	47	48	65	53	37	65	48	53	42	0	0	498	36.4	47	3.6	-14	536	40.6	-10	636
Tularemia	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-	1	0.0	-100	1
Typhoid Fever	6	7	7	5	5	1	2	9	2	3	0	0	47	3.4	7	0.5	-56	81	6.1	-44	90
Verotoxin Producing E. Coli Including HUS	15	2	8	20	9	10	26	13	19	5	0	0	127	9.3	30	2.3	-84	189	14.3	-35	208
West Nile Virus Illness	0	0	0	1	1	1	10	17	25	1	0	0	56	4.1	2	0.1	-40	73	5.5	-26	74
Yellow Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	-	0	0.0	-100	0
Yersiniosis	15	17	12	22	16	12	8	19	17	9	0	0	147	10.7	17	1.3	-48	190	14.4	-25	216

Ontario Cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [2013/11/20].

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

* 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: 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 16 measles cases between January and September 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.