

Infectious Diseases

in Waterloo Region



Surveillance Report 2017



Acknowledgements

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Introduction

Infectious diseases are illnesses caused by microorganisms such as bacteria, viruses, and parasites. Infectious diseases have the potential to cause serious illness and can have community-wide implications. As such, Region of Waterloo Public Health undertakes a number of activities to prevent or reduce the burden of infectious diseases in the community.

In Ontario, the Health Protection and Promotion Act (HPPA) outlines all infectious diseases of public health importance that must be reported to local public health units by physicians, hospitals, institutions, schools, laboratories, and other healthcare practitioners¹. In addition, the Infectious Diseases Protocol of the Ontario Public Health Standards (OPHS) mandates that local all public health units prevent, control, and manage infectious diseases of public health importance.²

In order to meet its HPPA and OPHS requirements, Region of Waterloo Public Health implements a variety of programs and services related to infectious disease prevention and control for residents and visitors of Waterloo Region. These programs and services include:

- 1) Case and contact management of cases and exposures of diseases of public health significance (see Appendix C for complete list);
- 2) Outbreak management, including community outbreaks and those in institutions;
- 3) Health promotion activities and services for community groups, including, but not limited to, primary care providers, emergency service workers, and childcare providers; and,
- 4) Clinic-based services for sexual health, immunization, tuberculosis screening, and management.

The Infectious Diseases in Waterloo Region Report for 2017 provides an update to the community on the local status of infectious diseases of public health significance. The findings from this report will be used to inform local public health programming in the prevention and transmission of reportable, infectious diseases in Waterloo Region.

¹ Health Protection and Promotion Act, R.S.O. 1990, c. H.7. Available from: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm

² Population and Public Health Division, Ministry of Health and Long Term Care, Infectious Disease Protocol, Ontario Public Health Standards, 2018. Available from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Infectious_Diseases_Protocol_2018_en.pdf

2017 Infectious Disease Highlights

This section highlights notable infectious disease trends in Waterloo Region in 2017. Highlights are meant to provide an overview of disease trends, to identify if there have been increasing or decreasing trends, to highlight local rates that were significantly different than provincial rates, and to explore emerging trends or issues.

Please see Appendix A for information on all infectious diseases of public health significance and Appendix B for information on respiratory and enteric outbreaks.

Enteric Diseases

Approximately one-third of enteric disease cases in Waterloo Region in 2017 were travel-related

- 34.1% of all enteric disease cases in Waterloo Region were travel-related.
- Travel outside of the province was the most common risk factor reported for amebiasis, salmonellosis, yersiniosis, and typhoid/paratyphoid.
- Local rates of yersiniosis, which is largely travel-related, have been experiencing increasing trends over the last 6 years, but case counts are still low (15 yersiniosis cases in 2017). Provincially, rates of yersiniosis are also gradually increasing (162 cases in 2012 compared to 279 cases in 2017).

Most enteric disease rates in Waterloo Region were lower or similar to those of Ontario in 2017

- The exception is the local rate of campylobacteriosis in 2017 (29.4 per 100,000) which was higher than that of the province (24.3 per 100,000). The higher rate in Waterloo Region in 2017 was associated with several local cases in 2017 which were confirmed to be linked to an outbreak that occurred at a private event outside Waterloo Region, with undercooked pork as the probable source.
- Region of Waterloo Public Health manages and controls enteric diseases by following up with reported cases and their contacts and providing education regarding risk factors and prevention.

Rates of salmonellosis in Waterloo Region have been decreasing

- Local rates of salmonellosis have been decreasing in recent years and the 2017 local rate (16.2 per 100,000) is lower than the province (19.4 per 100,000).
- Reasons for the decreasing trend are unknown.

Vectorborne Diseases

Lyme disease rates remain low in Waterloo Region in 2017

- Local Lyme disease rates in 2017 remain low and have been relatively stable over the last 5 years (7 cases in 2017, rate of 1.2 per 100,000).
- Ontario experienced an increase in Lyme disease activity in 2017 (7.0 per 100,000 in 2017 compared to the past 5-year average of 2.3 per 100,000).
- All local cases were acquired during travel outside of Waterloo Region.
- The black-legged tick is not currently established in Waterloo Region, however several areas in Ontario have been identified as endemic including: Pinery Provincial Park, Hamilton, Wainfleet Bog in Niagara Region, Kenora/Rainy River, and the north shores of Lake Erie, Lake Ontario, and Lake Huron.
- The latest 2018 map of Lyme disease risk areas in Ontario (produced by Public Health Ontario) can be found at:
https://www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf
- Region of Waterloo Public Health continues to reduce exposure to Lyme disease through public education, investigation of suspect human cases, and identification and testing of ticks that are found on humans for tick population surveillance purposes.

West Nile Virus activity in Ontario increased in 2017

- Local rates of West Nile Virus (WNV) remained low in 2017 (three confirmed cases in 2017), but there was more WNV activity in the province overall in 2017 compared to previous years (Ontario had 159 cases provincially which is the highest it has seen since 2012).
- Higher levels of precipitation in 2017 resulted in conditions that were favourable for increases in the mosquito population which also caused WNV activity to increase across the province.
- Region of Waterloo Public Health implements mosquito prevention and control programs which monitor the presence of WNV in mosquitos, control mosquito populations by removing standing water and/or applying control treatment (mosquito larviciding) where mosquitos breed, and investigate suspect human cases.

Sexually Transmitted Infections

Increased rates of chlamydia and gonorrhoea among young adults similar to provincial trends

- Rates of chlamydia have been increasing both locally and provincially since 2007.
- The highest rates of chlamydia are among 20-24 year-olds, followed by 15-19 year olds and 25-29 year olds; chlamydia rates are higher among females in all age groups.
- Rates of gonorrhoea have also been increasing both locally and provincially in recent years (since 2013), particularly among males. Although local rates have been similar to the province, the 2017 Waterloo Region rate was higher than that of Ontario.
- The highest rates of gonorrhoea were observed among 20-24 year olds, followed by 20-29 and 30-34 years olds; gonorrhoea rates are higher among males than females overall and in all age groups (except for 15-19 year olds where rates among females were higher than males).
- The most commonly reported risk factors for local cases include unprotected sex and having multiple sexual partners. Research also suggests that social determinants of health, in particular, low socioeconomic status as well as stigmatization, contribute to a higher incidence in young people.
- To address high sexually transmitted infection (STI) rates amongst 19-24 year-olds, Region of Waterloo Public Health has initiated a situational assessment with community partners and local universities and colleges. From this assessment and evidence, this committee will develop a strategy along with measureable objectives.
- Public Health offers enhanced services to youth, including offering a specific youth clinic and as well as public health nurse availability at Waterloo Region District School Board secondary schools on a weekly basis.
- Public Health also continues to offer free and confidential sexual health clinics, at both the public health offices and at community sites.

Other Infectious Diseases

Increased number of active tuberculosis cases in Waterloo Region in 2017

- The local rate of active tuberculosis (TB) increased significantly in 2017 (5.4 per 100,000 in 2017 compared to 2.0 per 100,000 in 2016) and was higher than that of the province in 2017 (4.7 per 100,000).
- Local active TB cases consist primarily of those who recently lived or travelled to tuberculosis endemic areas. The higher number of cases in our region is not

unexpected due to increased immigration to Waterloo Region, as well as increased patterns of travel and mobility among Waterloo Region residents overall.

- Treatment for active TB requires taking medication for six to nine months or longer. Active TB treatment is mandatory, and all cases are followed until treatment has been completed. Three cases demonstrated resistance to one or more TB drugs which requires more specialized treatment. Region of Waterloo nurses manage all active TB cases together with local physicians and specialists, and investigate and follow-up on contacts of cases.
- Health promotion projects are being implemented to focus outreach in priority populations (i.e. populations at higher risk of TB).

A very busy influenza season in 2017-2018

- A high number of confirmed influenza cases were reported in Waterloo Region in the 2017-2018 season, the highest number of cases on record (492 cases) compared to previous years. While not unusual, it illustrates the variation that can be expected in influenza activity from year to year.
- Provincial influenza rates were also higher than previous seasons (118.8 per 100,000 compared to the previous 5-season average of 82.0 per 100,000).
- As is often the case, influenza rates were the highest among the 60-64 and 65+ age groups.
- Although the majority of cases were Influenza A (61%), there was more Influenza B circulating in 2017-2018 compared to previous seasons.
- There were 46 influenza institutional outbreaks in 2017-2018, the majority of which were influenza A.
- Region of Waterloo Public Health promotes the immunization of health care staff through the “Big Shot Challenge”; 80% of public health nurses and 76.7% of long term-care and retirement home health care staff were immunized.
- Public Health also coordinates the distribution of vaccines through Public Health Clinics and by redistribution of vaccine to health care providers; there were 348 distributors in 2017-2018 which included physician offices, pharmacies, long-term care homes, and other agencies. In total, 147,901 influenza vaccines were distributed in the 2017-2018 season. The amount of vaccine distributed over the past few years has remained stable.
- The 2017-2018 influenza vaccine was a good match for the Influenza B strain contained within the quadrivalent (four strain) vaccines but was not as effective

for the A strain. Those persons who received the trivalent (three strain) vaccine were not protected against the predominant circulating B strain of influenza.²

² In 2017-2018, the province of Ontario funded vaccines that were either trivalent or quadrivalent. The trivalent vaccines protected against two strains of Influenza A and one strain of Influenza B, and were publicly funded for adults. The quadrivalent vaccine protected against the 3 strains contained in the trivalent vaccine plus an additional B strain, and was primarily funded for children and adolescents less than 18 years of age.

Future Considerations

Reporting requirement changes implemented in 2018 will affect the reporting of infectious disease trends in future reports.

Changes to Diseases of Public Health Significance

As of May 1, 2018, the list of Diseases of Public Health Significance (previously known as Reportable Diseases) came into effect under Ontario Regulations 135/18 which outline the diseases that must be reported to the local Medical Officer of Health.

Two diseases were removed:-

- Malaria
- Yellow fever

Three diseases were added:

- Blastomycosis
- Carbapenemase-producing enterobacteriaceae (CPE) infection or colonization
- *Echinococcus multilocularis* infection

And *Haemophilus influenzae* b disease, invasive was changed to:

- *Haemophilus influenzae* disease, all types, invasive

Changes to the Hepatitis C Case Definition

Starting in January 2018, the Ministry of Health and Long-Term Care updated the Hepatitis C case definition to distinguish:

- Newly acquired cases from those who previously acquired Hepatitis C; and,
- Cases that can transmit infections to others from those whose infections have resolved and are no longer infectious.

One result of such changes will be that the number of Hepatitis C cases in Waterloo Region going forward will not be comparable to previous trends.

Release of Future Infectious Disease Reports

Region of Waterloo Public Health typically releases its annual infectious disease report in the fall with data from the previous calendar year due to the timing of data cleaning initiatives at the provincial level, as well as the timing of the influenza season which usually slows down in late spring and early summer.

In the future, Public Health will aim to disseminate infectious disease trends in a timelier manner by releasing preliminary data for Ontario and reporting on seasonal trends for influenza and enteric and respiratory outbreaks separately.

Appendix A – Infectious Disease Summary Table

Counts and age-standardized incidence rates for diseases of public health significance, Waterloo Region and Ontario, 2017, 2007-2016¹

Disease	Waterloo				Waterloo compared to Ontario (2017)*	Ontario			
	Number of cases (2017)	Rate per 100,000 (2017)	Five year average (2012-2016)	Trend in rate per 100,000 (2007-2017)		Rate per 100,000 (2017)	Five year average (2012-2016)	Trend in rate per 100,000 (2007-2017)	
Chlamydia	1,760	312.1	235.9			323.1	275.3		
Influenza ²	492	87.7	73.3		↓	118.8	82.9		
Gonorrhea	370	65.7	33.8		↑	56.6	39.9		
Campylobacteriosis	163	29.4	27.0		↑	24.3	26.8		
Hepatitis C	140	25.2	21.4		↓	33.3	31.3		
Salmonellosis	90	16.2	22.6			19.4	21.4		
Invasive pneumococcal disease	53	9.5	11.9			7.6	7.8		
Giardiasis	42	7.7	9.9			9.7	9.7		
Tuberculosis (active)	31	5.4	1.9			4.7	4.4		
Group A streptococcal disease, invasive (IGAS)	27	4.8	5.0			6.4	4.7		
Syphilis, infectious ³	23	4.1	4.2		↓	11.5	7.4		
Encephalitis/meningitis	22	4.0	2.8		↑	1.5	1.3		
Syphilis, other ⁴	19	3.4	4.2		↓	5.2	4.8		
Pertussis (whooping cough) ⁵	15	2.7 ⁶	5.0		↓	4.3	4.1		
Yersiniosis	15	2.6 ⁶	1.2			2.0	1.4		
Amebiasis ⁵	14	2.6 ⁶	5.6		↓	5.0	6.0		
Legionellosis	13	2.3 ⁶	2.0			1.4	1.2		
HIV/AIDS	12	2.1 ⁶	2.2			6.6	6.3		
Malaria	10	1.8 ⁶	1.0			1.6	1.5		
Cryptosporidiosis	10	1.8 ⁶	2.6			2.8	2.6		
Mumps ⁵	10	1.7 ⁶	0.2			1.9	0.2		
Lyme disease ⁵	7	1.3 ⁶	0.8		↓	7.0	2.3		
Cyclosporiasis	7	1.2 ⁶	1.2			2.1	1.2		
Typhoid/paratyphoid fever	6	1.1 ⁶	0.6			0.8	0.5		
Verotoxin-producing Escherichia coli (VTEC)	6	1.1 ⁶	2.0			0.9	1.5		
Shigellosis	6	1.1 ⁶	1.5		↓	2.2	2.1		
Group B streptococcal disease, neonatal	4	0.7 ⁶	0.3			0.4	0.4		
West Nile virus (WNV) ⁵	3	0.6 ⁶	0.1			1.1	0.6		

Disease	Waterloo				Ontario			
	Number of cases (2017)	Rate per 100,000 (2017)	Five year average (2012-2016)	Trend in rate per 100,000 (2007-2017)	Waterloo compared to Ontario (2017)*	Rate per 100,000 (2017)	Five year average (2012-2016)	Trend in rate per 100,000 (2007-2017)
Hepatitis A	3	0.5 ⁶	1.0			0.9	0.7	
Hepatitis B	2	0.4 ⁶	0.3			0.8	0.7	
Invasive meningococcal disease	1	0.2 ⁶	0.1			0.2	0.2	
Q Fever	1	0.2 ⁶	0.2			0.1 ⁶	0.1	
Botulism	0	0.0	0.0			0.0	0.0	
Brucellosis	0	0.0	0.0			0.0 ⁶	0.0	
Creutzfeldt-Jakob disease	0	0.0	0.0			0.0 ⁶	0.1	
Haemophilus influenzae B (Hib)	0	0.0	0.0			0.0 ⁶	0.0	
Listeriosis	0	0.0	0.4			0.4	0.4	
Measles	0	0.0	0.0			0.1 ⁶	0.1	
Rabies	0	0.0	0.0			0.0	0.0	

Source: iPHIS 2007-2017, Ministry of Health and Long-Term Care), extracted June 6, 2018; Public Health Ontario Infectious Diseases Query 2007-2018, extracted June 6, 2018; Population estimates [2007-2015], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, extracted April 26, 2016; Population projections [2016,2017], Ontario Ministry of Health and Long-Term Care, extracted June 3, 2017.

* An up arrow indicates that Waterloo Region rates is higher than that of Ontario and that this difference is statistically significant; a down arrow indicates that the Waterloo Region rate is lower than that of Ontario and that this difference is statistically significant; a blank space (no arrow) indicates that there was no statistical difference between Waterloo and Ontario rates. Statistical comparisons were determined by Standardized Rate Ratios (the ratio of age-standardized rates of cases observed in Waterloo Region compared to the age-standardized rate of cases that occurred in Ontario).

¹ Disease ranking does not include latent TB or varicella infections.
² Influenza data is reported for the 2007-2008 season to the 2017-2018 season which runs from September 1st through August 31st each year.
³ Primary, secondary and early latent syphilis are all considered infectious (includes early latent; primary genital; primary other sites; secondary of skin and mucous membranes; secondary, other; infectious neurosyphilis and primary anal).
⁴ Other syphilis includes all other types of syphilis such as late latent or unspecified (the other category excludes early congenital syphilis).
⁵ Includes both confirmed and probable cases of amebiasis, mumps, Lyme disease, pertussis and WNV due to case definition changes in 2009 (see Appendix C for more information).
⁶ Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

NOTE: More information on local and provincial infectious disease counts and rates by age and sex can be found at the Public Health Ontario Reportable Disease Trends in Ontario Tool:

<https://www.publichealthontario.ca/en/DataAndAnalytics/Pages/RDTO.aspx>

Appendix B – Infectious Disease Outbreaks Summary

Enteric Disease Outbreaks

Number of enteric outbreaks¹ by season, Waterloo Region, 2012-2013 to 2017-2018 and previous 5-season average²

Season	Number of Outbreaks
2012-2013	42
2013-2014	68
2014-2015	75
2015-2016	51
2016-2017	67
2017-2018 ¹	69
Previous 5-season average ²	60.6

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹Enteric outbreaks include outbreaks of all enteric diseases, excluding Hepatitis A.

²Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Proportion of enteric outbreaks¹ by exposure setting, Waterloo Region, 2017-2018 and previous five-season average²

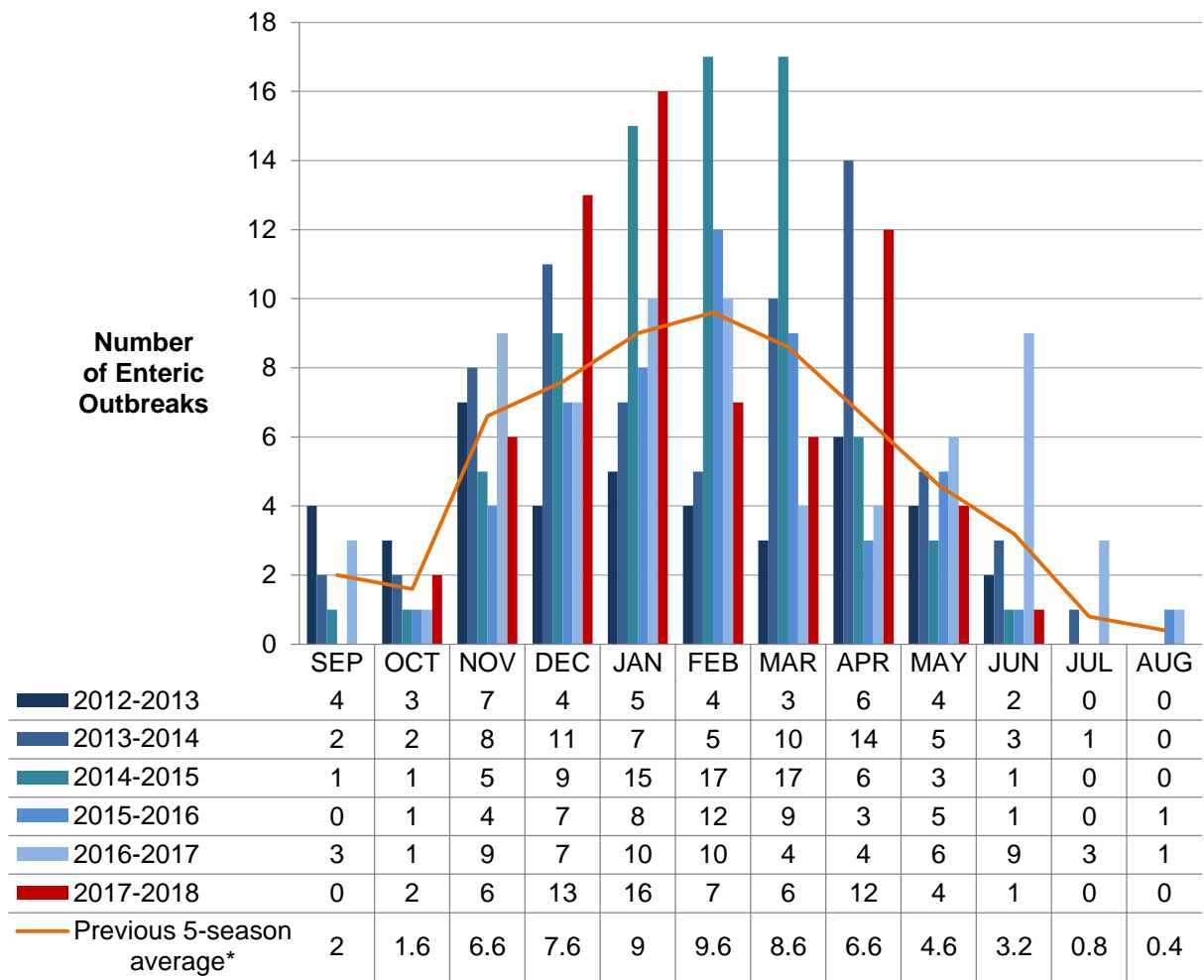
Exposure Setting	2017-2018 ¹		Previous 5-season average ²	
	Number of Outbreaks	Per cent of Total	Number of Outbreaks	Per cent of Total
Child Care Facility	33	47.8%	28.2	46.5%
Long Term Care Home	13	18.8%	13.8	22.8%
Group Home	9	13.0%	4.6	7.6%
Retirement Home	6	8.7%	9.2	15.2%
Hospital	4	5.8%	3.5	5.8%
Other	4	5.8%	2	3.3%
Total	69	100.0%	60.6	100.0%

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹Enteric outbreaks include outbreaks of all enteric diseases, excluding Hepatitis A.

²Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Number of enteric outbreaks by month and year, Waterloo Region, 2012-2013 to 2017-2018 and previous five-season average¹



Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹Enteric outbreaks include outbreaks of all enteric diseases, excluding Hepatitis A.

²Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Influenza Outbreaks

Number of influenza outbreaks by season, Waterloo Region, 2012-2013 to 2017-2018 and previous 5-season average¹

Season	Number of Outbreaks
2012-2013	34
2013-2014	6
2014-2015	37
2015-2016	8
2016-2017	24
2017-2018 ¹	46
Previous 5-season average ²	21.8

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

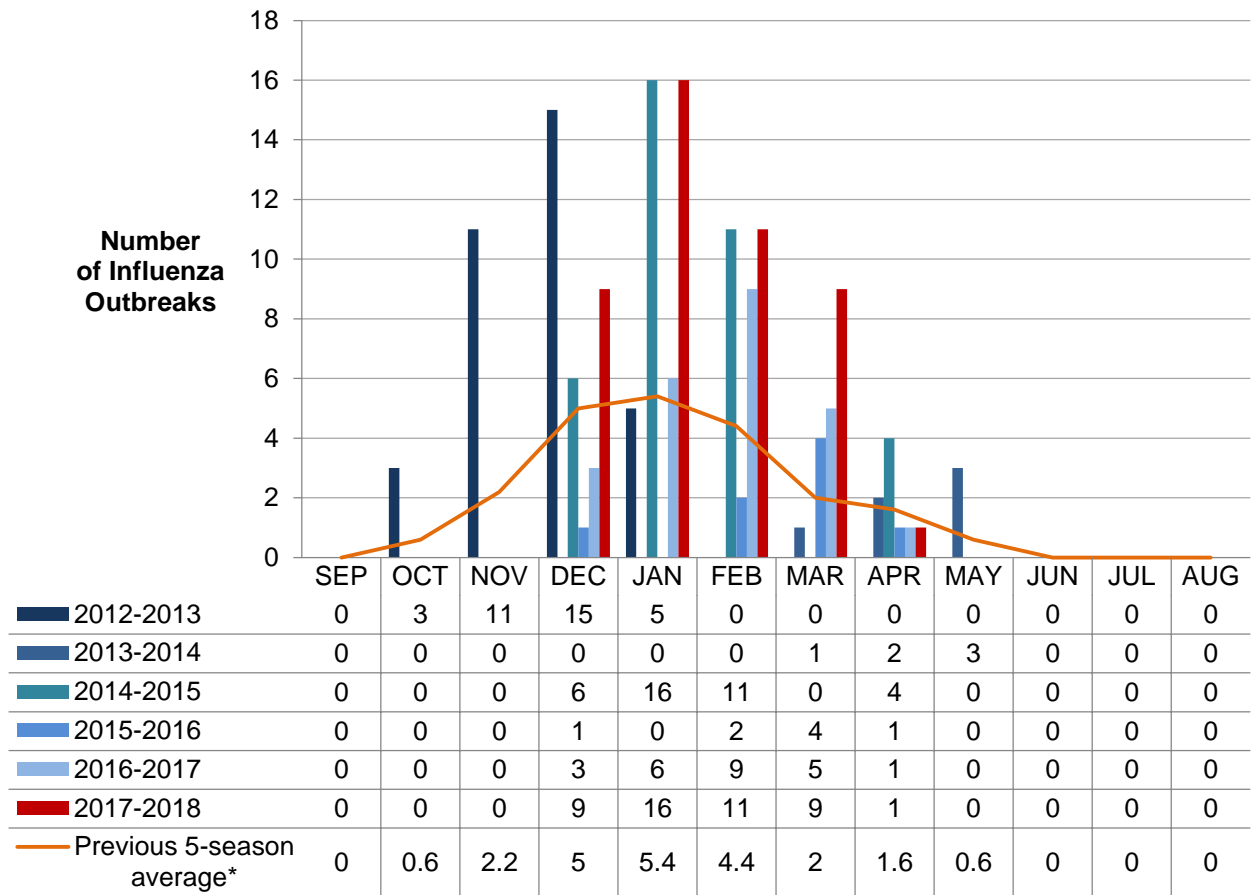
Proportion of influenza outbreaks by exposure setting, Waterloo Region, 2017-2018 and previous five-season average¹

Exposure Setting	2017-2018 ¹		Previous 5-season average ²	
	Number of Outbreaks	Per cent of Total	Number of Outbreaks	Per cent of Total
Long-Term Care Home	21	45.7%	13.8	63.3%
Retirement Home	19	41.3%	7.5	34.4%
Hospital	5	10.9%	2	9.2%
Other	1	2.2%	2	9.2%
Total	46	100.0%	21.8	100.0%

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Number of influenza outbreaks by month and year, Waterloo Region, 2012-2013 to 2017-2018 and previous five-season average¹



Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Respiratory Outbreaks (non-influenza)

Number of respiratory (non-influenza) outbreaks by season, Waterloo Region, 2012-2013 to 2017-2018¹ and previous 5-season average²

Season	Number of Outbreaks
2012-2013	27
2013-2014	17
2014-2015	16
2015-2016	27
2016-2017	30
2017-2018 ¹	20
Previous 5-season average ²	23.4

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

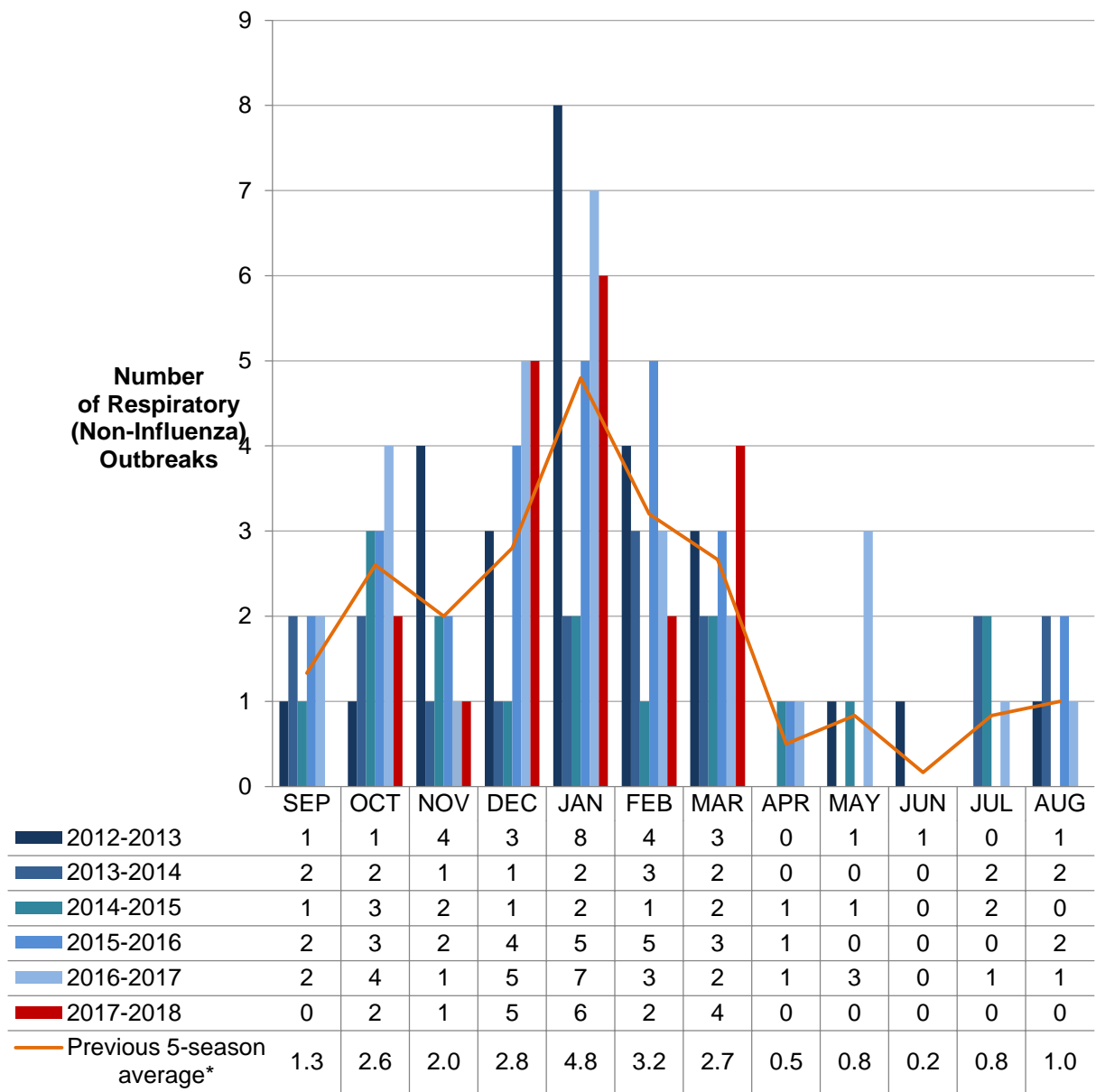
Proportion of respiratory (non-influenza) outbreaks by exposure setting, Waterloo Region, 2017-2018 and previous five-season average¹

Exposure Setting	2017-2018 ¹		Previous 5-season average ²	
	Number of Outbreaks	Per cent of Total	Number of Outbreaks	Per cent of Total
Long-Term Care Home	11	55.0%	15.4	65.8%
Retirement Home	6	30.0%	6.6	28.2%
Hospital	2	10.0%	0	0.0%
Other	1	5.0%	1.4	6.0%
Total	20	100.0%	23.4	100.0%

Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Number of respiratory (non-influenza) outbreaks by month and year, Waterloo Region, 2012-2013 to 2017-2018 and previous five-season average¹



Source: iPHIS, 2012-2018, Ministry of Health and Long-Term Care, extracted Sept. 17, 2018

¹ Previous 5-season average is the number of outbreaks for the previous 5 seasons (2012-2013 to 2016-2017 combined, September 1 to August 31st).

Appendix C – Reportable Disease List, 2017

Reportable Diseases 2017



The following specified Reportable Diseases (Ontario Regulations 559/91 and amendments under the Health Protection and Promotion Act) are to be reported to the local Medical Officer of Health:

Note: Diseases marked with an asterisk*, and respiratory and gastroenteritis outbreaks in institutions should be immediately reported to the Medical Officer of Health. Other diseases are to be reported by the next business day.

For the following diseases please contact the Infectious Disease and Tuberculosis Control Program at 519-883-2248 (fax) or 519-575-4400 ext. 5275:

- Acute Flaccid Paralysis
- Chancroid
- Chickenpox (Varicella)
- Diphtheria*
- Encephalitis*, including:
 1. primary, viral*
 2. post-infectious
 3. vaccine-related
 4. subacute sclerosing panencephalitis
 5. unspecified
- Group A Streptococcal Disease, invasive*
- Group B Streptococcal Disease, neonatal
- Haemophilus influenzae b Disease, invasive*
- Hemorrhagic Fever*, including:
 1. Ebola virus disease*
 2. Marburg virus disease*
 3. Other viral causes*
- Hepatitis A*
- Influenza
- Leprosy
- Lyme Disease
- Malaria
- Measles*
- Meningitis, acute*
 1. bacterial*
 2. viral
 3. other
- Meningococcal disease*
- Mumps*
- Ophthalmia neonatorum*
- Pertussis (Whooping Cough)*
- Pneumococcal disease, invasive
- Poliomyelitis, acute*
- Respiratory Infection Outbreaks in Institutions*
- Rubella*
- Rubella, congenital syndrome*
- Severe Acute Respiratory Syndrome (SARS)*
- Smallpox*
- Tetanus
- Transmissible Spongiform Encephalopathy including Creutzfeldt-Jakob Disease, all types
- Tuberculosis
 1. active infection*
 2. latent infection (positive TB skin test)
- West Nile Virus Illness (WNV)*
- Yellow Fever*

For the following diseases please contact Health Protection and Investigation at 519-575-4400 ext. 5147:

- Amebiasis
- Anthrax*
- Botulism*
- Brucellosis*
- Campylobacter Enteritis
- Cholera*
- Clostridium difficile infection (CDI) outbreaks in public hospitals
- Cryptosporidiosis*
- Cyclosporiasis*
- Food poisoning, all causes*
- Gastroenteritis, institutional outbreaks*
- Giardiasis, except asymptomatic cases*
- Hantavirus Pulmonary Syndrome*
- Lassa Fever*
- Legionellosis*
- Listeriosis*
- Paralytic Shellfish Poisoning*
- Paratyphoid Fever*
- Plague*
- Psittacosis/Ornithosis
- Q Fever*
- Rabies*
- Salmonellosis
- Shigellosis*
- Trichinosis
- Tularemia*
- Typhoid Fever*
- Verotoxin – producing E. coli infection indicator conditions include Hemolytic Uremic Syndrome (HUS)*
- Yersiniosis

For the following diseases please contact Sexual Health and Harm Reduction at 519-883-2267:

- Acquired Immunodeficiency Syndrome (AIDS)
- Chlamydia Trachomatis Infection
- Gonorrhoea
- Hepatitis B
- Hepatitis C
- Human Immunodeficiency Virus (HIV)
- Syphilis

Emergency after hours/weekends/holidays: 519-575-4400 (TTY: 519-575-4608)

Alternate formats of this document are available upon request.

Appendix D – Data Sources, Methodology and Limitations

Data Sources

iPHIS

All diseases and risk factors were extracted from integrated Public Health Information System (iPHIS) by Accurate Episode Date (except for HIV which was by encounter date, tuberculosis by diagnosis date). Accurate Episode Date corresponds to the earliest date on record for the case according to iPHIS hierarchy: Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date.

Outbreak data was also extracted from iPHIS. Outbreak records with a reportable enteric or respiratory disease identified as the aetiologic agent that met the provincial surveillance case definition were extracted from iPHIS by reported date.

Provincial data was downloaded from the Public Health Ontario Infectious Diseases Query tool.

IntelliHEALTH

Incidence rates were calculated using population estimates obtained from the Ontario Ministry of Health and Long-term Care. Queries on population data were completed via an online portal called IntelliHEALTH. Population estimates for 2007 to 2015 are post-censal estimates based on the 2006 and 2011 census counts, adjusted for net under-coverage and changes in the population between census day and July 1. The 2016 and 2017 population data are projections which are founded on assumptions about births, deaths and migration over the projection period. The population estimates and projections in this report may differ from those presented elsewhere due to differences in methodology.

Methodology

Incidence rates were calculated as the number of new cases per 100,000 persons in the population.

Age-standardization is a technique that minimizes the effect of differences in age between populations so that findings can be attributed to factors other than age. When comparisons between Waterloo Region and Ontario were made, rates were directly age-standardized using the July 1, 2011 Canadian Standard population from Statistics Canada.

Standardized Rate Ratios (SRR) with 95 per cent confidence intervals were calculated for all reportable diseases. The SRR reported is the ratio of the age-standardized rate of

cases observed in Waterloo Region compared to the age-standardized rate of cases that occurred in Ontario. The 95 per cent confidence interval indicates the statistical significance of the SRR. If the 95 per cent confidence interval contains the value 'one' in its range, the two rates are not statistically different from one another.

A relative standard error (RSE) was also calculated for each rate. The RSE is simply the standard error divided by the mean number of cases and expressed as a percentage. Rates with an RSE >23 per cent are considered unstable and should be interpreted with caution.

Annual average rates for 2012 to 2016 were also calculated which were defined as the average of the age-standardized rates for each year from 2012 to 2016.

Limitations

Information on past episodes of disease can be added or updated to the provincial reporting system at any time. The information summarized in this report represents what was known to Region of Waterloo Public Health and the Ministry of Health and Long-Term Care at the date of data extraction recorded with the stipulation that these data are provisional and subject to change.

When reporting exposure or risk factor proportions, those that were lost to follow-up and did not have risk factor information available were excluded from the denominator. Risk factors in iPHIS are self-reported and may not necessarily reflect the true exposure history of the individual.

Ambulatory care visits were used instead of iPHIS reportable disease counts because iPHIS reports varicella as aggregated case counts rather than individual cases. Ambulatory care visit rates are not comparable to the incidence rates reported for other reportable diseases.

The number of outbreaks does not necessarily reflect the magnitude of individual outbreak investigations or burden of outbreak-related illness. Institutional outbreaks are likely better reported compared with other outbreaks because institutions often have infection control staff on-site, there are usually a large number of persons affected, and as of 2012, both long-term care and retirement homes are required to report outbreaks to public health units. Community outbreaks are not required to be reported to public health units but Region of Waterloo Public Health may become aware of them due to (voluntary) reports if a number of people become ill (e.g., group of people who ate a common meal or attended a common event). Therefore, the data presented in this report would reflect an underestimation of the true burden of community outbreaks.

For some diseases, case definitions have changed over time. As of April 28, 2009, new provincial case definitions for reportable diseases came into effect to reflect the changing epidemiology of infectious diseases and the use of newer laboratory

technologies. These updates impacted the classification of cases for several diseases, and may influence the incidence of some diseases during the year 2009. Both confirmed and probable cases of amebiasis, Lyme disease, mumps, pertussis, and WNV were included to adjust for these changes. However, for other diseases, an observed increase or decrease in disease incidence during this period may not reflect a true change in incidence.