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Infectious Disease in Wellington-Dufferin-Guelph



Health Analytics

Wellington-Dufferin-Guelph Public Health

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AN OVERVIEW OF WELLINGTON-DUFFERIN GUELPH

Wellington-Dufferin-Guelph Public Health (WDGPH) is one of 36 local health departments in Ontario, with a mandate to improve the health of the population through activities that promote health, protect health, and prevent disease and injury. WDGPH is an essential community health service with dedicated staff that focus on promoting and protecting the health of our community. We offer programs and services and advocate for healthy public policies that:

- Promote healthy infant and child development, responsive parenting, healthy lifestyles, and positive mental, reproductive, sexual, and dental health.
- Protect our communities from communicable and infectious diseases, and environmental hazards such as contaminated food and water.
- Prevent disease and injuries.

The area served by WDGPH is located in southwestern Ontario approximately 100 km west of Toronto, and comprises two counties: Wellington County and Dufferin County. The municipality of the City of Guelph is geographically located within Wellington County (see Figure 1 – next page). In this report, the area served by WDGPH is referred to as Wellington-Dufferin-Guelph (WDG).

Figure 1: Municipalities in Wellington-Dufferin-Guelph, southwestern Ontario



Table 1 summarizes the sociodemographic details of WDG, the service area of WDGPH, and Figure 2 illustrates the age and sex distribution of the WDG population in comparison to that of the Ontario population.

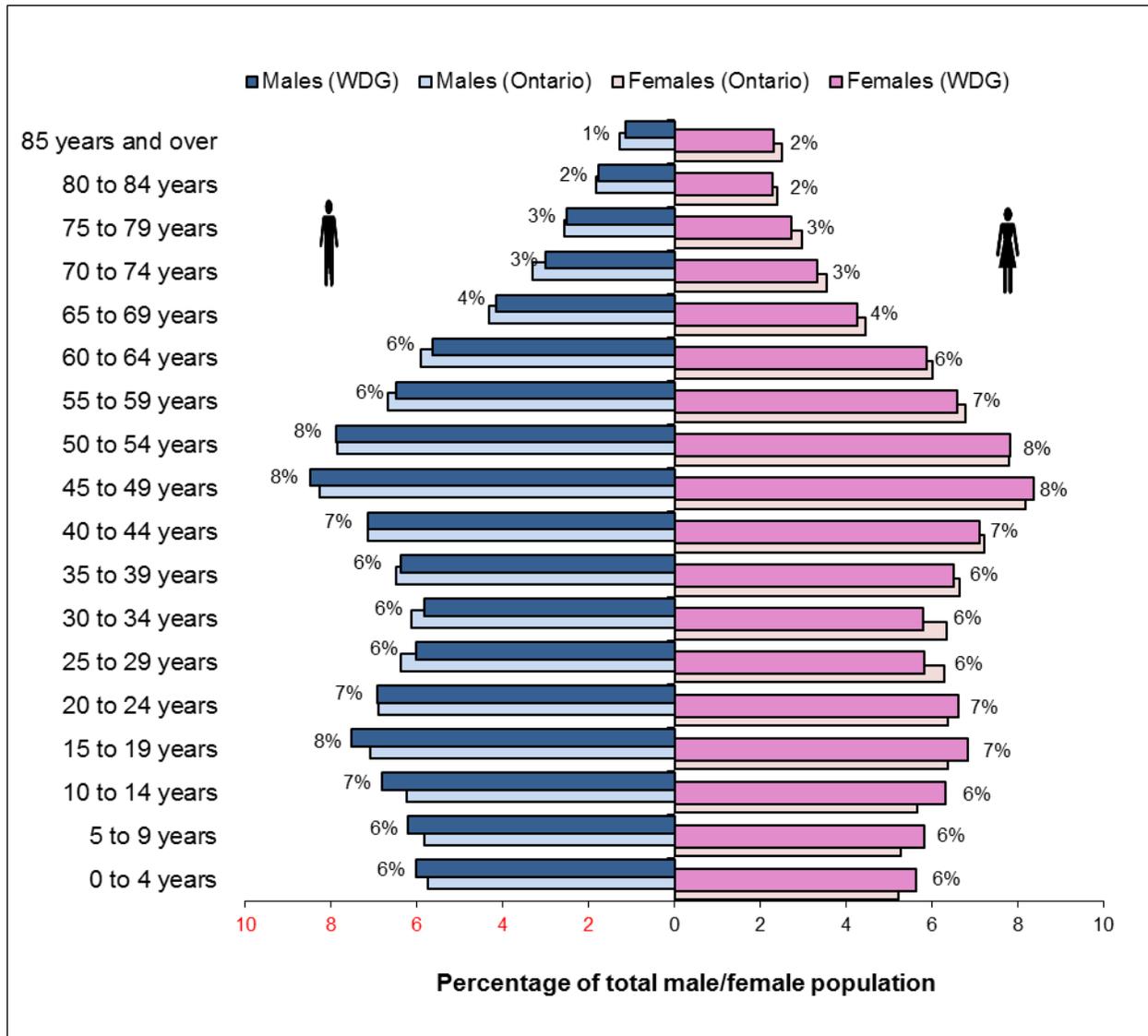
Table 1: Socioeconomic profile of Wellington-Dufferin-Guelph, compared to Ontario

Indicator	Wellington-Dufferin-Guelph	Ontario
Population (Census 2011, Statistics Canada)	265,241	12,851,821
Geographical Profile:		
<i>Percentage of geographical area that is rural</i> (Census 2011, Statistics Canada)	98% (97.53%)	N/A
<i>Percentage of geographical area that is urban</i> (Census 2011, Statistics Canada)	2% (2.47%)	N/A
Population Profile (Census 2011, Statistics Canada)	56% of the population lives in urban areas	N/A
Population Growth (from 2006-2011) (Census 2011, Statistics Canada)	4.1% increase	5.7% increase
Projected Population Growth from 2011 to 2016 (Census 2006, Statistics Canada)	6.1% increase to 295,000 residents.	N/A
Diversity:		
<i>Immigrant Status</i> (National Household Survey 2011, Statistics Canada)	15.7%	28.5%
<i>Percentage increase of new immigrants from 2001-2006 compared with 1996-2001</i> (Census 2006, Statistics Canada)	24%	N/A
<i>Visible minority population</i> (National Household Survey 2011, Statistics Canada)	9.0%	25.9%
<i>Largest visible minority groups</i> (National Household Survey 2011, Statistics Canada)	South Asian, Chinese, Southeast Asian, Black, Filipino	South Asian, Chinese, Black, Filipino, and Latin American
Education (Census 2006, Statistics Canada)	47.7% of the population aged 15 years and older has completed post-secondary education*.	52.7% of the population aged 15 years and older has completed post-secondary education*
Percentage of Population With No Knowledge of Official	0.8%	2.3%

Languages (Census 2011, Statistics Canada)		
Median 2005 Family Income After Tax (Census 2006, Statistics Canada)	\$65,284	\$63,441
Unemployment Rate (2012, 15yr+) (CANSIM Table 109-5304, Statistics Canada 2013)	5.1%	7.8%
Percentage of Children <6 years of age Living in Low-income Households (Census 2006, Statistics Canada)	6.8%	14.8%

*Post-secondary education includes apprenticeship degrees/certificates, college degrees, and university degrees

Figure 2: Age-sex distribution of Wellington-Dufferin-Guelph (WDG) population compared to Ontario population, 2011 census



Source: Statistics Canada; 2011 Census. Data labels (WDG percentages) rounded to zero decimal places

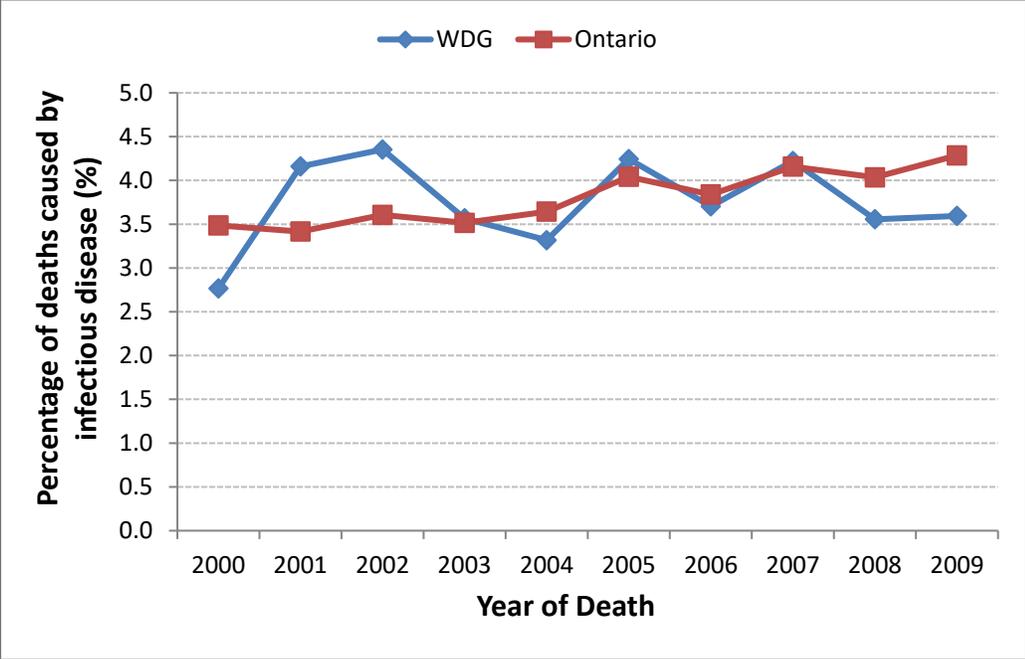
INTRODUCTION

Infectious diseases are a significant cause of illness and death in Canada, and, in addition to the sporadic cases of disease that usually occur on an ongoing basis, several outbreaks of these diseases occur each year. In a study carried out in Ontario using disease data for the years 2005 to 2007, 51 infections and infectious diseases were found to result in 729 lost health-adjusted life years (HALYs), over 44 deaths, and 58,987 cases of illness for every 100,000 people each year (Kwong et al, 2012). In another study, the number of cases of infections involving the blood-stream was estimated to be 79,000 to 94,000 per year, with 7,000 to 9,000 related deaths (Goto and Al-Hasan, 2013). Locally, infectious disease was identified as the primary cause of death in 2.4 to 4.4% of all deaths that occurred annually in the Wellington-Dufferin-Guelph area from 2000 to 2009 (Figure 1), fluctuating about the Ontario average of approximately 3.8%.

Several infectious diseases are reportable by law in Ontario, meaning that physicians and laboratories are required to report suspected and confirmed cases of these diseases to the local Medical Officer of Health. These include not only diseases with high mortality rates that do not usually occur in Canada such as hemorrhagic fevers, but also infectious diseases that commonly occur in Canada such as seasonal influenza and several sexually-transmitted infections. Reports of cases of reportable diseases are followed up by Public Health, usually by public health staff contacting each reported case to collect information about the case, to identify possible sources of the infection, to assess the risk posed by the case to others with whom the person may have come into contact and provide any necessary advice or education on preventing repeat infections and reducing the risk of spreading the infection to others. In 2011, WDGPH received and followed-up over 1500 reports of cases of illness, some outbreak-related, that occurred within the area served by the public health unit (the City of Guelph and the counties of Wellington and Dufferin).

This report summarizes the rates and trends of the reportable diseases most frequently reported to WDGPH over the five-year period 2007 to 2011. Each section of the report also provides an overview of each disease covered in that section, and highlight of the trends revealed by analysis of the data for that disease over the five-year period. This information can be used by public health staff and partners to review trends of the various diseases over the period in question, and to plan programs and services accordingly.

Figure 3: Percentage of Deaths in Wellington-Dufferin-Guelph and Ontario for which Infectious Disease was identified as the Primary Cause, 2007-2011



Data Source: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

DATA SOURCES AND METHODS

Data Sources

Data sources used in this report were the Canadian Community Health Survey (CCHS), IntelliHealth Ontario and the integrated Public Health Information System (iPHIS). Population estimates were obtained from IntelliHealth Ontario.

Sources of Other Information

Information used for disease overviews was obtained from the Infectious Disease Protocol of the Ontario Public Health Standards, and the Centres for Disease Control website (www.cdc.gov). Additional references are cited throughout the text and are listed in the References section at the end of the report.

Methods

iPHIS data

All iPHIS data used in this report were extracted from iPHIS using Cognos ReportNet and were imported into Microsoft Access and Microsoft Excel. Data analysis was carried out using Microsoft Excel and Stata 11.0 (College Station, TX), and charts were constructed in Microsoft Excel using age-specific and age-standardized rates computed in MS Excel. Age-specific rates for the 2007-2011 time period were calculated using the estimated population of WDG in 2009, and age-standardized rates of disease were calculated using the indirect method and using the 2006 Ontario population as the reference population.

CCHS data

CCHS estimates for 2007 to 2011 were computed using Stata 11.0 (College Station, TX), and confidence intervals for CCHS estimates were computed by bootstrapping in Stata 11.0. In accordance with CCHS guidelines, estimates based on sample sizes <30 were suppressed and are not included in this report.

IntelliHealth Ontario data

Data on population and infectious disease mortality were extracted from the IntelliHealth Ontario website. Population data were used for indirect age standardization and the calculation of age-specific rates of disease in Microsoft Excel.

Mapping of enteric diseases

Criteria for inclusion of cases in the dataset used for mapping included those with a confirmed address within WDGPH, where the case had been primarily investigated by WDGPH and diagnosed with a reportable enteric disease between 2007 and 2011. Only reportable enteric diseases, as defined by *Ontario Regulation 559/91 – Specification of Reportable Diseases*,

under the *Health Protection and Promotion Act* (HPPA) were eligible for inclusion. Cases were included in the dataset if they were classified as either 'confirmed', 'probable' or 'suspect' cases of disease as all such definitions are considered to be reportable. Cases associated with institutional outbreaks were not eligible for inclusion. Case addresses were collapsed into one of sixteen municipalities within WDG using Stata v.12.0. Rates of disease per municipality were calculated by dividing total counts of illness in each municipality by the overall population size of each municipality, according to the 2011 census of WDG. Crude rates were multiplied by 10,000 in order to obtain overall disease rates per 10,000 individuals within each municipality. Crude rates of disease were mapped by municipality using ArcGIS 9.0 (ESRI Canada).

Interpreting Data and Charts in this Report

For some CCHS indicators used in this report, percentages for Wellington-Dufferin-Guelph reported in the text and in charts are based on relatively low numbers of cases or respondents to surveys. Percentages may therefore be somewhat 'unstable', that is, they may not reflect true percentages within the population as accurately as those estimates that are based on larger numbers of cases or respondents (such as percentages reported for Ontario).

A useful indication of the degree of accuracy of an estimate or percentage is the confidence interval reported for that estimate. In this report, 95% confidence intervals are reported wherever possible. The 95% confidence interval (CI) is the range within which the true figure (e.g. percentage or rate) for the population (local or provincial as the case may be) is likely to lie, with a 95% degree of certainty. For example, 56.0% of respondents to the 2007 CCHS in the Wellington-Dufferin-Guelph area reported having had the flu shot. The 95% CI for this estimate was 50.6% (lower confidence level) and 61.3% (upper confidence level). This means that we can be 95% certain that for the whole population of Wellington-Dufferin-Guelph (as opposed to the sample of the population who were actually interviewed), the true percentage of people who had received the flu shot was between 50.6% and 61.3%. The estimate for Ontario reported for the same survey question was 62.6% (95% CI 61.6%, 63.7%). This estimate has a relatively narrow CI because of the much larger number of survey respondents used to derive the estimate.

Whether or not CIs overlap, and by how much, can be a rough indication of whether two estimates (for example percentages reported for two different populations) indicate a true difference between populations. While overlapping CIs does not in itself indicate that the two estimates are not significantly different, an overlap of less than 25% may indicate a significant difference. Confidence intervals that do not overlap at all indicate that the two estimates are significantly different.

SECTION 1: GASTROINTESTINAL (ENTERIC) DISEASES

Gastrointestinal (enteric) illness is usually characterized by symptoms such as vomiting, diarrhoea, abdominal pain and fever. Organisms that cause such diseases can be passed from person to person in several ways, most often by consuming food or water contaminated with the organisms, or by contact with an ill person. Thorough hand-washing and good food preparation practices are important in reducing the risk of gastrointestinal illness. Awareness of the importance of these infection-control practices is important; in a survey carried out by Statistics Canada in the Guelph area in 2008, 93.7% of those responding to the survey felt that thorough hand-washing was very important in the prevention of infectious disease, and 87.0% considered food preparation to be important in preventing disease. However, only 52.2% felt that the use of hand sanitizer was very important.

Wellington-Dufferin-Guelph Public Health follows up on all reported probable, suspect or confirmed cases of gastrointestinal disease. This includes reported food poisonings from all causes, and community outbreaks of gastroenteritis. Community outbreaks of enteric illness are often associated with a communal event such as a wedding, fair or other gathering. The Control of Infectious Disease (CID) team is responsible for follow-up of all reported gastrointestinal illness whether outbreak-related or not. Where a particular food premises is implicated as a possible source of illness, the CID team makes a referral to the appropriate Public Health Inspector on the Environmental Health Team or CID Team who is responsible for inspection of the food premises in question, regardless of whether this is a restaurant, caterer, institutional kitchen or other food premises.

Follow-up of reported enteric cases or suspected outbreaks entails CID Public Health Inspectors and Public Health Nurses interviewing cases to identify suspect exposures and determine how illness may have been contracted. Where possible, Public Health encourages affected individuals to submit appropriate samples for testing to help identify the source of illness.

Gastrointestinal disease can be transmitted person-to-person, via animal contact, or indirectly via food or water that is contaminated with bacteria, viruses or parasites. The following reportable gastrointestinal diseases are covered in this chapter:

- Amebiasis
- Campylobacteriosis
- Cryptosporidiosis
- Cyclosporiasis
- Giardiasis
- Hepatitis A
- Listeriosis
- Salmonellosis

- Shigellosis
- Verotoxin-producing *Escherichia coli* (VTEC)
- Yersinosis

AMEBIASIS

What is amebiasis?

Amebiasis is a gastrointestinal illness caused by a parasite known as *Entamoeba histolytica* (*E. histolytica*). This organism is shed in the stool (feces) of infected individuals in 2 forms: the active form and cysts. Only cysts are able to survive in the environment and go on to cause illness in other individuals.

Can the organism infect animals as well as people?

This organism is only found in humans.

How is the organism transmitted?

People can become infected with *E. histolytica* when they swallow *E. histolytica* cysts, usually in food, water or other material that has been contaminated by cysts excreted in the feces of an infected person. Cysts of *E. histolytica* are relatively resistant to chlorine and will not necessarily be killed by chlorination of contaminated drinking or recreational water.

Amebiasis may also be transmitted via the fecal-oral route, or by contact between the mouth and anus during sexual activity. The risk of infection appears to be increased among men having sex with men (MSM) (James et al., 2010).

What are the symptoms of amebiasis?

A person who has swallowed *E. histolytica* cysts can develop symptoms within a few days of exposure and up to several months or years after exposure, although most people develop symptoms within 2-4 weeks. Most infected people show no symptoms, although some people may experience symptoms such as diarrhoea, weight loss and fever.

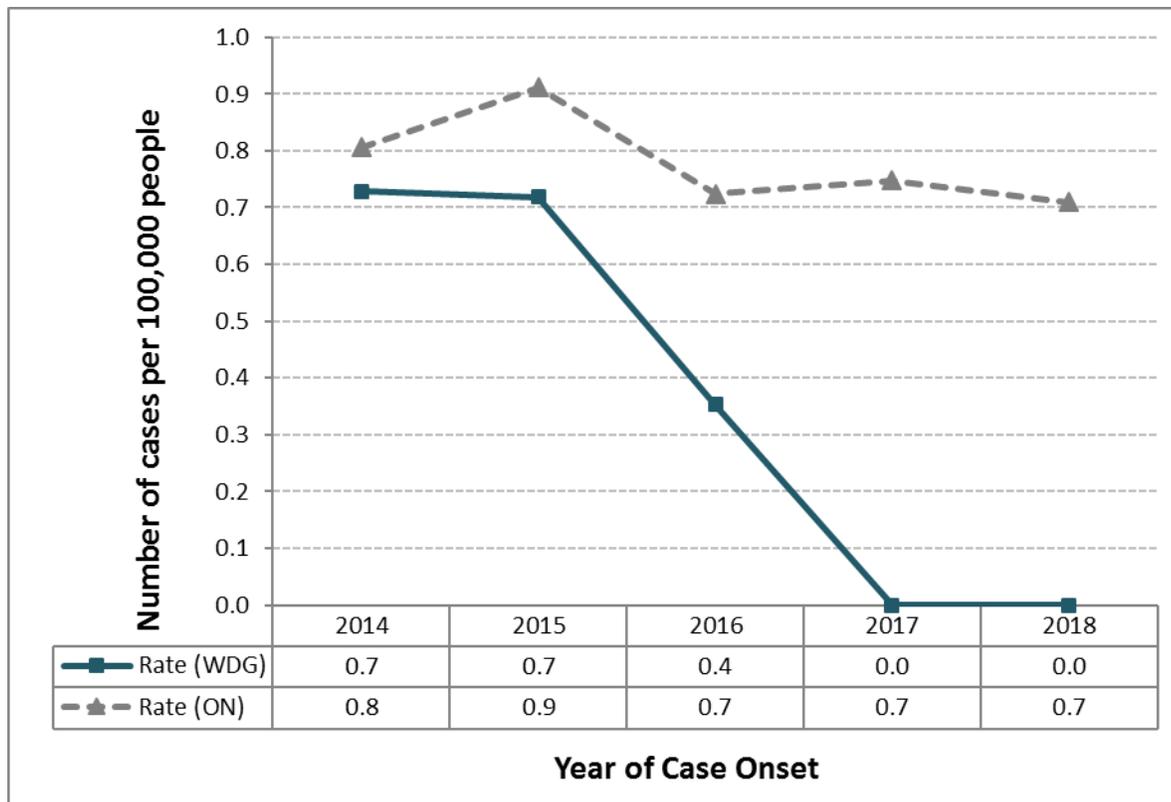
How can someone avoid getting amebiasis?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom and before preparing food.
- Sanitary disposal of fecal waste (including diapers).
- Sanitation of drinking water, particularly when travelling or hiking/camping. Water should be treated by boiling, chemical disinfection or filtration prior to drinking.

Amebiasis in Wellington-Dufferin-Guelph

Figure 4: Age-Standardized Incidence Rates of Laboratory-Confirmed Amebiasis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

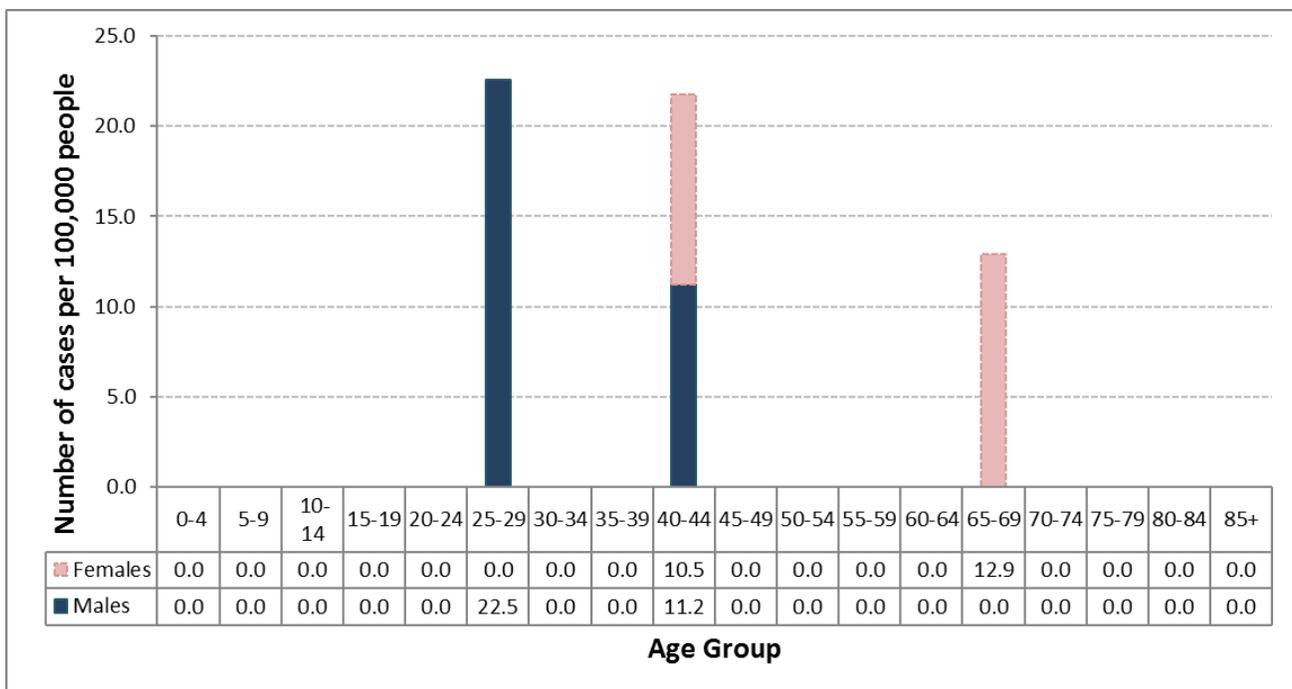
Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of amebiasis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of amebiasis in WDG was highest in 2007 and 2008 at 0.7 cases per 100,000 people, No cases were reported to WDGPH in 2017 or 2018.
- Throughout the five-year period, the incidence in WDG was lower than the provincial rate, which also declined over the years from 0.9 in 2015 to 0.7 cases per 100,000 people over the same time period. This could possibly be explained by the fact that amebiasis in developed countries occurs most frequently in immigrants from and travellers to endemic areas; the proportion of travellers in WDG may have been significantly lower than it is in highly-populated areas of Ontario with a high proportion

of people who have immigrated from, or travelled to, areas of the world where the disease is endemic.

- Most cases of amebiasis reported to Public Health had travelled abroad during the incubation period. This is consistent with the finding that amebiasis in developed countries most commonly occurs in people who have travelled abroad (CDC amebiasis fact sheet). The MSM population is also known to be at increased risk for amebiasis (James et al., 2010; CDC); however, it is unknown whether this factor played a role in the predominance of male cases in WDG over the period described here.

Figure 5: Incidence Rates of Laboratory-Confirmed Amebiasis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall the number of cases of amebiasis in WDG over the past five years was slightly higher in males than in females. Although the reason for this is unknown, many enteric diseases are more prevalent in males than females. One reason for this could be the higher awareness of the importance of hand-washing in females. In a survey carried out by Statistics Canada in the Guelph area in 2008, 97.8% of females surveyed considered thorough hand-washing to be important in the prevention of infectious disease, while only 89.3% of males considered it to be very important (Statistics Canada, 2008).

CAMPYLOBACTERIOSIS

What is campylobacteriosis?

Campylobacteriosis, also called Campylobacter enteritis, is a gastrointestinal disease caused by bacteria known as *Campylobacter*. Two strains of the bacteria commonly cause illness: *Campylobacter jejuni* and *Campylobacter coli*.

Can the organism infect animals as well as people?

This organism is normally found in animals, particularly poultry (including chickens, turkeys and other fowl) and cattle. Pigs, sheep, rodents and pets such as cats and dogs can also carry this organism. Infected animals excrete *Campylobacter* in their feces.

How is the organism transmitted?

People can become infected with *Campylobacter* when they swallow the organism, usually in undercooked contaminated food (such as meat and poultry), or contaminated water, raw (unpasteurized) milk or other dairy products. People can also become infected by handling or touching infected animals or contaminated surfaces (such as cutting boards or utensils) and then touching their mouth without first practising proper hand washing. This organism is not usually spread from person to person.

What are the symptoms of campylobacteriosis?

Someone who has eaten contaminated food or water can develop symptoms within 1-10 days of exposure, although most people develop symptoms within 2-5 days. Symptoms can last up to 7 days and may include diarrhoea (which may contain blood and/or mucous), abdominal pain, fever, nausea and vomiting. Some people may show no symptoms.

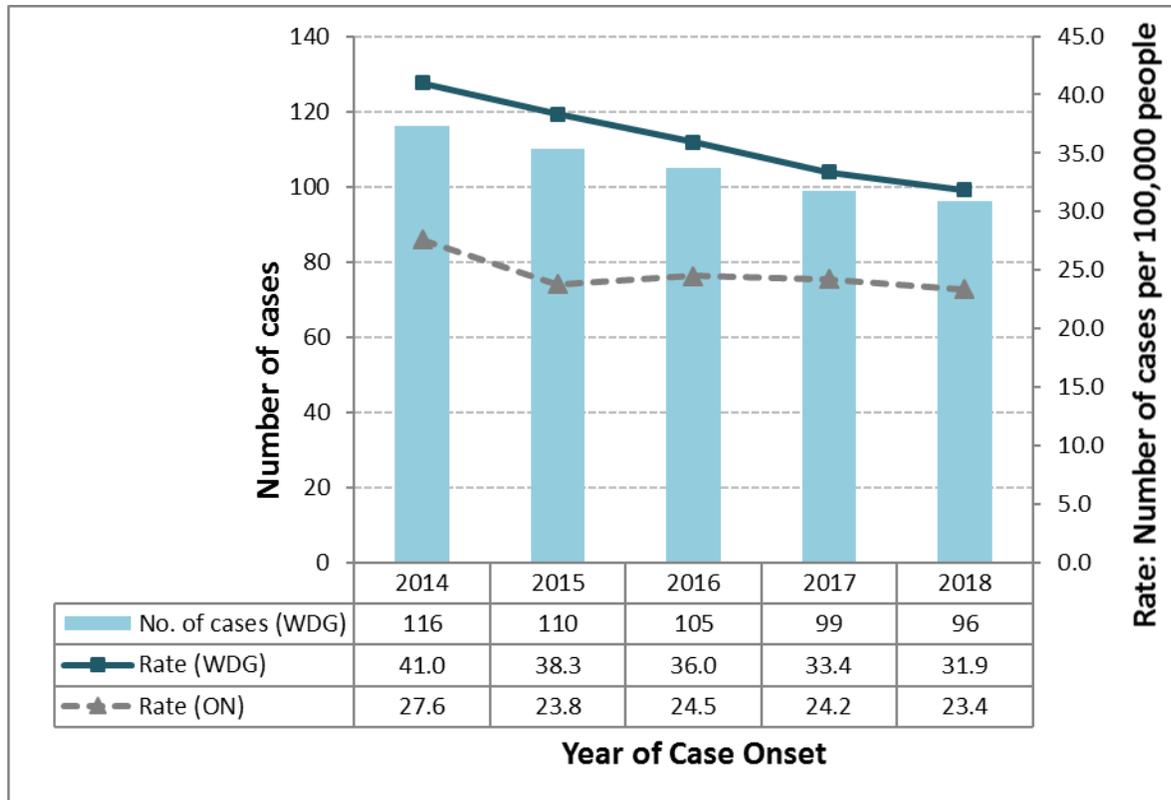
How can someone avoid getting campylobacteriosis?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after handling raw poultry, after contact with animals or animal feces (including pet waste) and before preparing food.
- Avoiding cross-contamination when preparing food, e.g. by using separate cutting boards for raw and ready to eat foods, and avoiding contamination of other foods (such as produce) with the juices of raw poultry.
- Cooking all food from animal sources thoroughly, especially poultry, and using a probe thermometer to verify cooking temperatures.
- Treating or boiling all water used for drinking, cooking etc., if travelling or if using water from a well.
- Avoiding the use of unpasteurized milk.

Campylobacteriosis in Wellington-Dufferin-Guelph

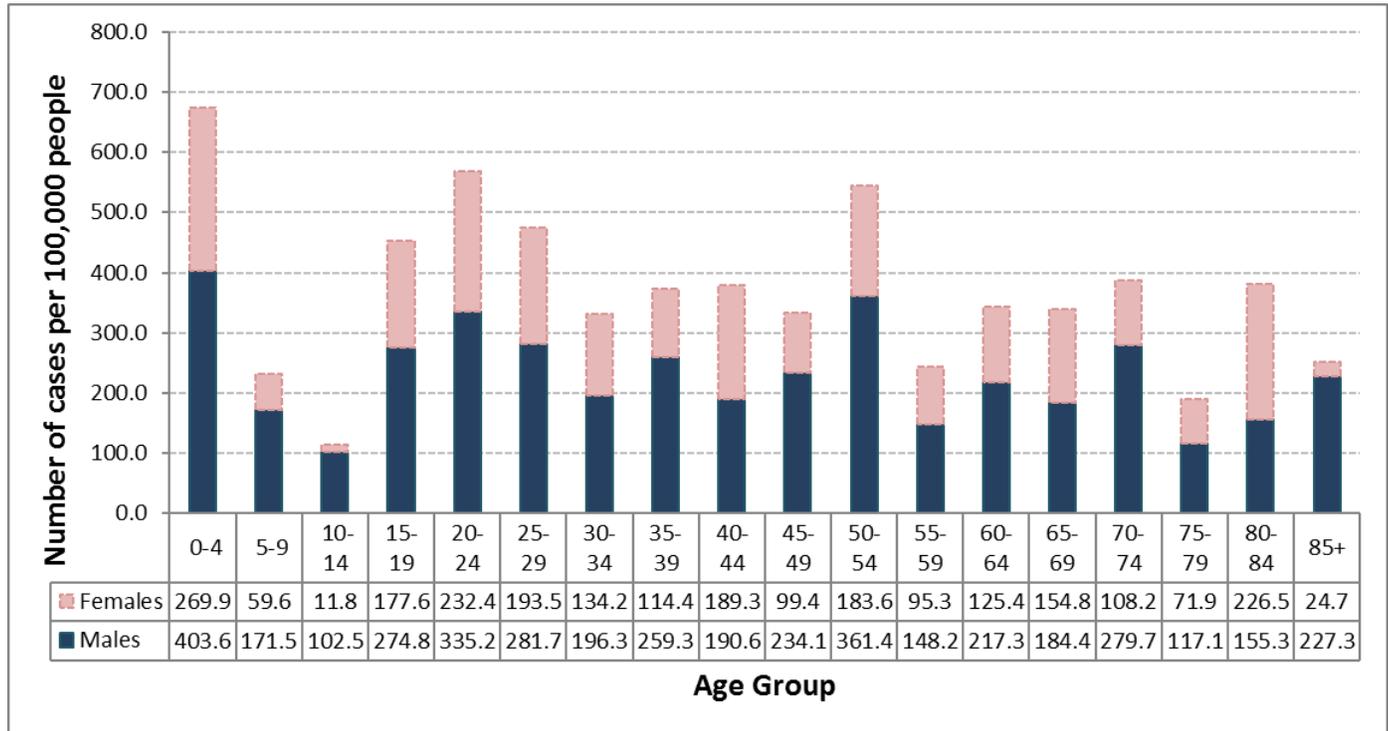
Figure 6: Age-Standardized Incidence Rates of Laboratory-Confirmed Campylobacter Enteritis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- The incidence of Campylobacter enteritis (campylobacteriosis) in WDG was highest in 2014, with 116 reported cases. The number of cases reported per year ranged between 96 and 116. The incidence was lowest in 2018, with 96 reported cases or 31.9 cases per 100,000 people in WDG.
- Throughout the five-year period, the rate of laboratory-confirmed campylobacteriosis in WDG was higher than the provincial rate of the disease, which ranged from 23.4 to 27.6 cases per 100,000 people per year. The relatively high incidence of the disease in WDG could be due to the high proportion of WDG residents that live in rural areas (44%), which could possibly have contributed to an increased risk of people coming into contact with bacteria from infected animals.

Figure 7: Incidence Rates of Laboratory-Confirmed Campylobacter Enteritis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases in WDG has been higher in males than in females, with the highest number of cases seen in those aged 0-4 years. The relatively high rate of cases in children under 5 years old is consistent with previously published findings (CDC 2013). The gender differences in rates could be explained by the fact that most cases appear to have acquired infection from direct or indirect contact with animals, and that the majority of farm workers are male and therefore more males than females are exposed to the risk of infection from animal contact. In addition, males may be less aware of the importance of hand-washing in the prevention of infectious disease (Statistics Canada, 2008).

CRYPTOSPORIDIOSIS

What is cryptosporidiosis?

Cryptosporidiosis is a gastrointestinal illness caused by a parasite known as *Cryptosporidium*. Two strains of the parasite commonly cause illness in humans, *Cryptosporidium parvum* and *Cryptosporidium hominis*.

Can the organism infect animals as well as people?

Cryptosporidium hominis is only found in humans. *Cryptosporidium parvum* is found in cattle and other warm blooded animals (mammals) in addition to humans.

How is the organism transmitted?

People can become infected with *Cryptosporidium* when they swallow food or water that has been contaminated with *Cryptosporidium* cysts excreted by an infected person, or cysts that have contaminated the hands through contact with infected people or animals. Cysts, the form of the organism which is able to cause illness, are very resistant and can survive in soil for up to several months. The cysts can also survive in chlorinated drinking water, so that contamination of water sources used for municipal water supplies, or recreational water such as swimming pools and lakes, can result in people becoming infected.

What are the symptoms of cryptosporidiosis?

A person who has swallowed *Cryptosporidium* cysts can develop symptoms within 1-12 days of exposure, although most people develop symptoms after about 7 days. The main symptom of cryptosporidiosis is diarrhoea, which may be profuse and watery and is usually accompanied by abdominal pain and cramping. Children may experience vomiting and a lack of appetite before developing diarrhoea. Many people infected with this organism show no symptoms, but can still go on to infect others.

How can someone avoid getting cryptosporidiosis?

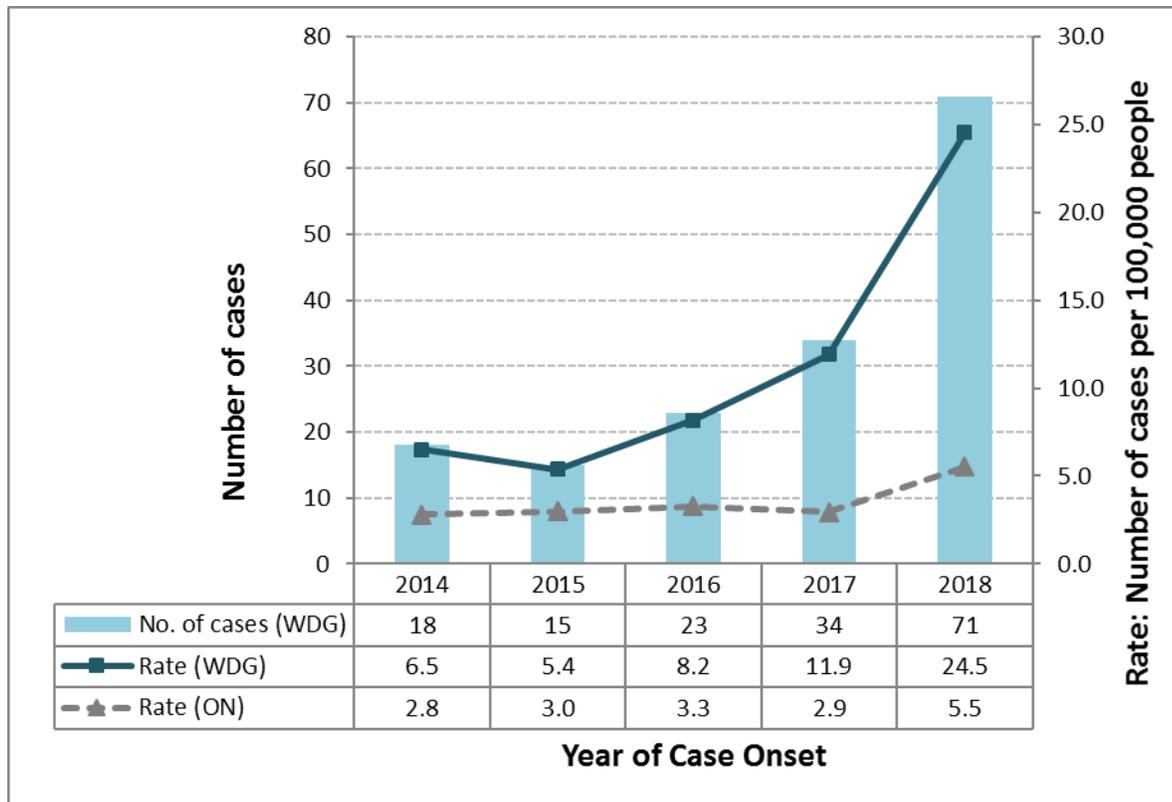
Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, changing a diaper or assisting someone else with toileting, after contact with animals or animal feces (including pet waste) and before and after preparing food.
- Cooking all food from animal sources thoroughly, and using a probe thermometer to verify cooking temperatures.
- Boiling all water used for drinking, cooking etc., if travelling or if using water from a well. Chemical disinfectants will not kill the cysts of this organism.

In addition, if a person has been ill, they can prevent spreading this illness to others by avoiding the use of public recreational bodies of water (such as swimming pools, hot tubs and splash pads), for two weeks after symptoms have stopped.

Cryptosporidiosis in Wellington-Dufferin-Guelph

Figure 8: Age-Standardized Incidence Rates of Laboratory-Confirmed Cryptosporidiosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

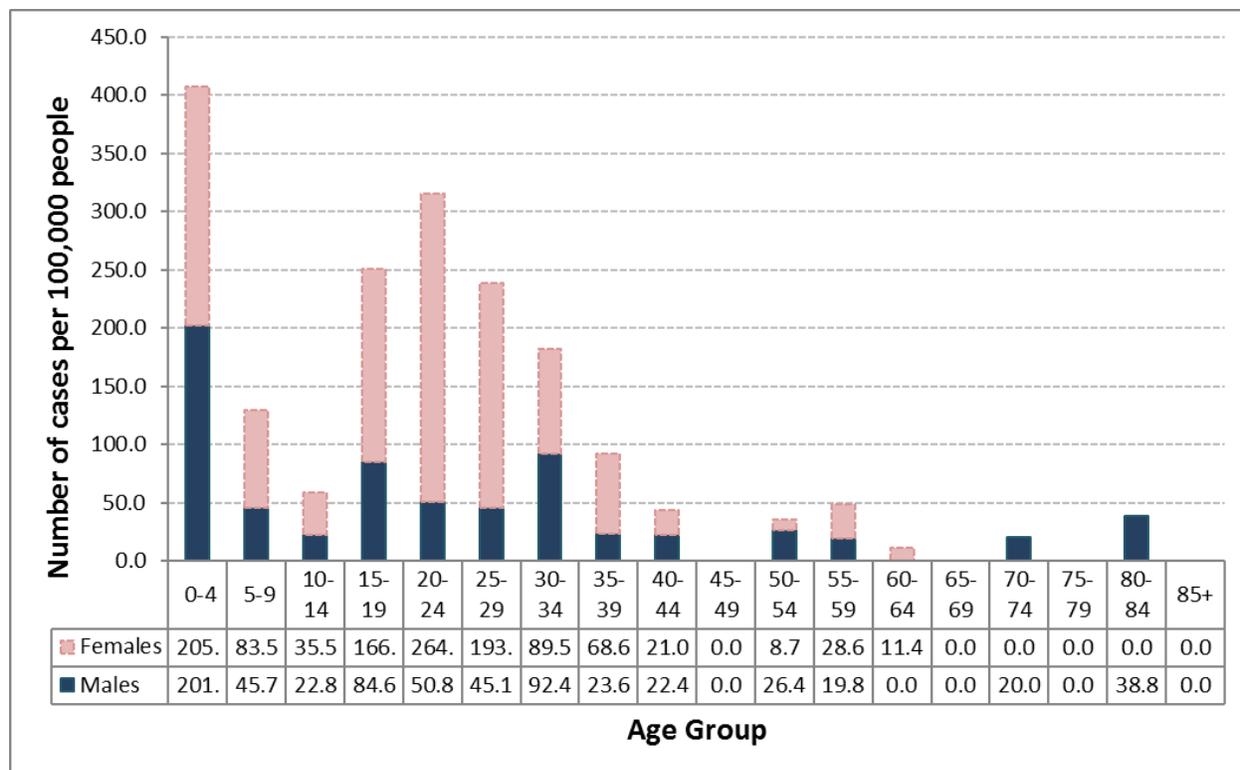


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Of the five year period 2014 to 2018, the incidence of cryptosporidiosis in WDG was highest in 2018, with 71 reported cases or 24.5 cases per 100,000 people. The provincial incidence of cryptosporidiosis was also at its highest in that year, at 5.5 cases per 100,000 people. The recent increase in the number of reported cases both provincially and locally can be explained at least in part by the increased use in 2018 of a more sensitive diagnostic test at the provincial public health laboratory.
- The incidence of the disease in WDG was lowest in 2015, with 13 reported cases or 4.7 cases per 100,000 people.
- The annual number of cases per year in WDG ranged over the five-year period from 15 to 71 cases per year, or 5.4-24.5 cases per 100,000 people. In most years, this

was more than twice as high, and in 2018 almost five times as high, as the provincial rate (2.8-5.5 cases per 100,000 people). The relatively high incidence of the disease in WDG in comparison to Ontario could be due to the high proportion of WDG residents that live in rural areas (44%), which could contribute to an increased risk of people within the region coming into contact with cysts excreted by infected animals.

Figure 9: Incidence Rates of Laboratory-Confirmed Cryptosporidiosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Over the five-year period, the number of female cases of cryptosporidiosis reported to WDGPH was almost twice that of male cases reported, with the highest number of cases seen in individuals under 40, particularly those aged 0-4 years. The relatively high rate of cases in children under 5 years old is consistent with previously published findings (CDC 2013).

CYCLOSPORIASIS

What is cyclosporiasis?

Cyclosporiasis is a gastrointestinal illness caused by a parasite known as *Cyclospora cayetanensis*.

Can the organism infect animals as well as people?

This organism usually causes infection only in humans. *Cyclospora* is not normally found in Canada, and most cases of infection occur in people who have travelled or have consumed imported produce contaminated with the organism.

How is the organism transmitted?

People can become infected with *Cyclospora* when they ingest food or water that has been contaminated with the organism, which is excreted as cysts in the feces of infected people. Fresh fruits and vegetables that have become contaminated with cysts of the organism are a common source of infection. These foods may become contaminated during growth, harvest, packaging or transport, via irrigation with water contaminated with cysts, or via handling by an infected person.

Cyclospora cysts are most likely to cause infection if swallowed several days or weeks after they have been excreted; freshly excreted cysts are not thought to be infectious. Therefore, close contact with an infected person is unlikely to cause someone to become ill.

What are the symptoms of cyclosporiasis?

A person who has swallowed *Cyclospora* cysts can develop symptoms within 1-14 days of exposure, although most people develop symptoms after 7 days. The main symptom is profuse, watery diarrhoea. Other symptoms include nausea, vomiting, anorexia, weight loss, fatigue and abdominal bloating or cramping. Without treatment of the infection, diarrhoea may continue for several weeks.

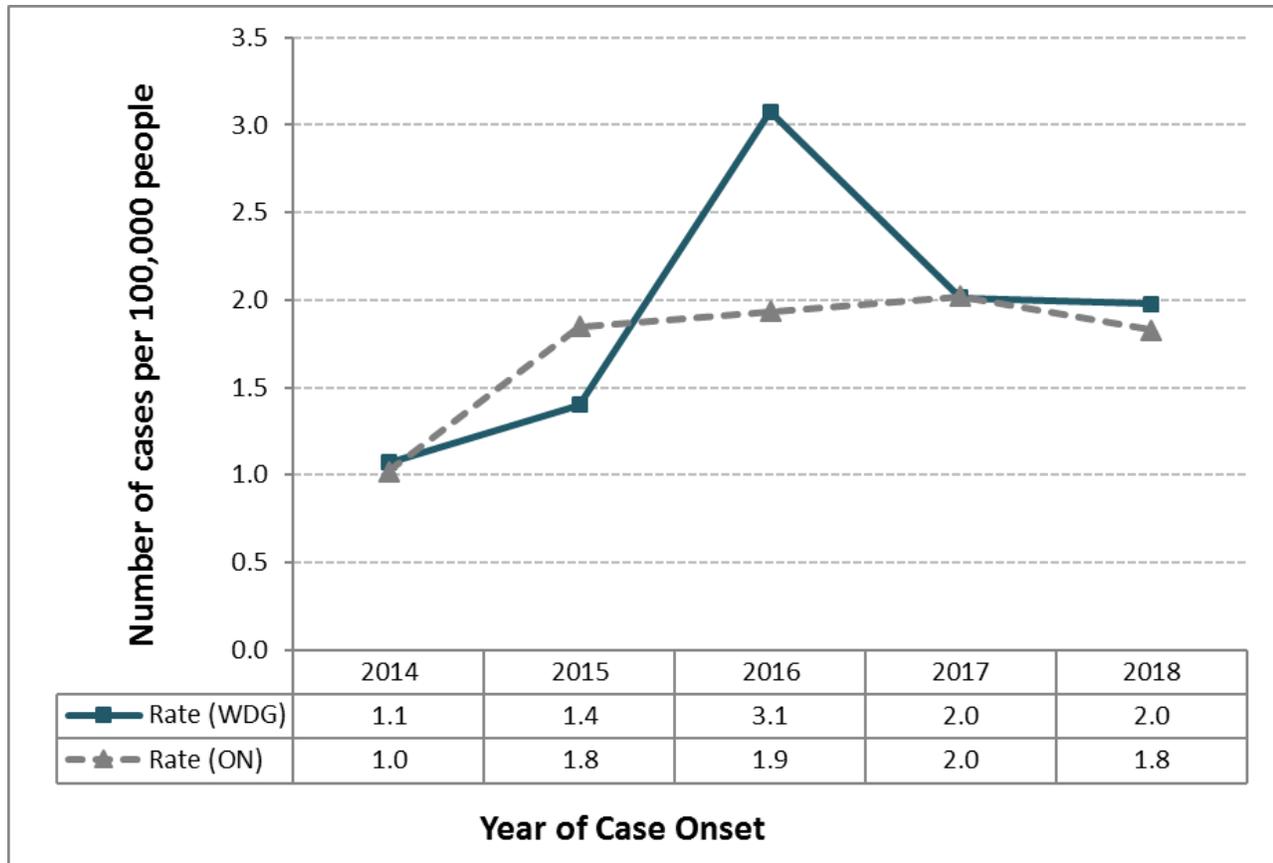
How can someone avoid getting cyclosporiasis?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom and before preparing food.
- Sanitary disposal of fecal waste (including diapers).
- Thorough washing of all produce (including pre-washed produce) prior to consumption.
- When abroad, avoiding food, juices and water (including ice) from questionable sources such as roadside vendors, and thoroughly washing and peeling fresh fruits.

Cyclosporiasis in Wellington-Dufferin-Guelph

Figure 10: Age-Standardized Incidence Rates of Laboratory-Confirmed Cyclosporiasis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

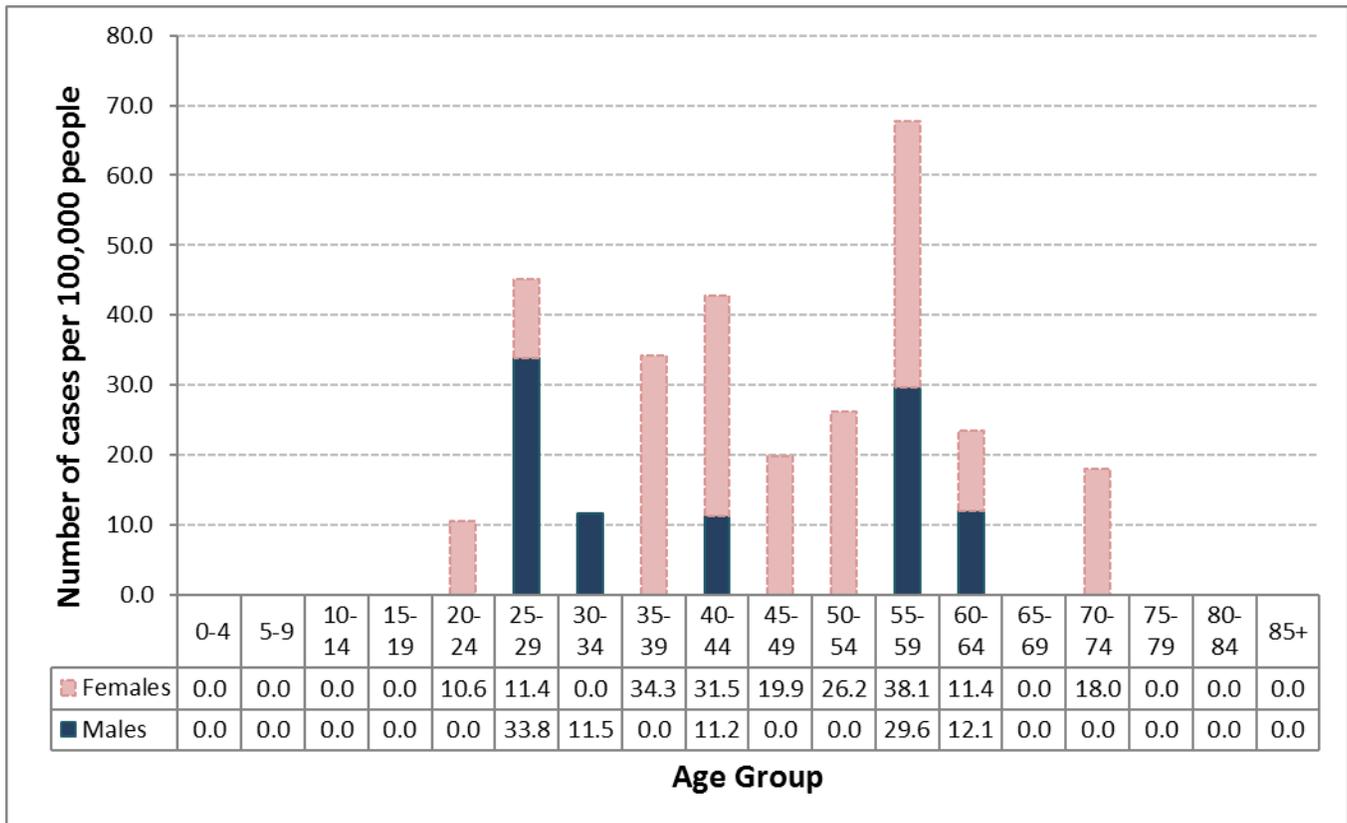


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of cyclosporiasis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of cyclosporiasis in WDG was highest in 2016, with 3.1 cases per 100,000 people. The provincial incidence of cyclosporiasis was at its highest in 2017, with 2.0 cases per 100,000 people. In that year, provincial and local incidence rates were the same.
- Over the five-year period, the annual rate in WDG ranged from 1.1 to 3.1 cases per 100,000 people, which was comparable to the provincial rate over the same time period (1.0-2.0 cases per 100,000 people in Ontario) in all years except 2016.

Figure 11: Incidence Rates of Laboratory-Confirmed Cyclosporiasis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, approximately twice the number of female than male cases of cyclosporiasis were reported to WDGPH, with the highest number of cases seen in individuals aged 55-59 years. The reason for this difference was unknown.

GIARDIASIS

What is giardiasis?

Giardiasis is a gastrointestinal illness caused by a parasite known as *Giardia lamblia*. Giardiasis is also commonly known as “Beaver fever”. This organism is excreted as cysts in the stool (feces) of infected people and animals. Like cysts of other microscopic parasites such as *Cryptosporidium* and *Cyclospora*, *Giardia* cysts are able to survive in the environment and go on to cause illness in other animals or people.

Can the organism infect animals as well as people?

Besides people, this organism can also infect some pets and farm animals, as well as beavers and other wild animals.

How is the organism transmitted?

People can become infected when they ingest food or water that has been contaminated with the cysts excreted by an infected person or animal, such as while swimming in an outdoor body of water, or after contact with an infected person.

What are the symptoms of giardiasis?

Someone who has swallowed *Giardia* cysts can develop symptoms within 3-25 days, but most people develop symptoms after 7-10 days. Symptoms include diarrhoea, abdominal cramping and bloating, pale, greasy stool, weight loss and fatigue. Some people may show no symptoms.

How can someone avoid getting giardiasis?

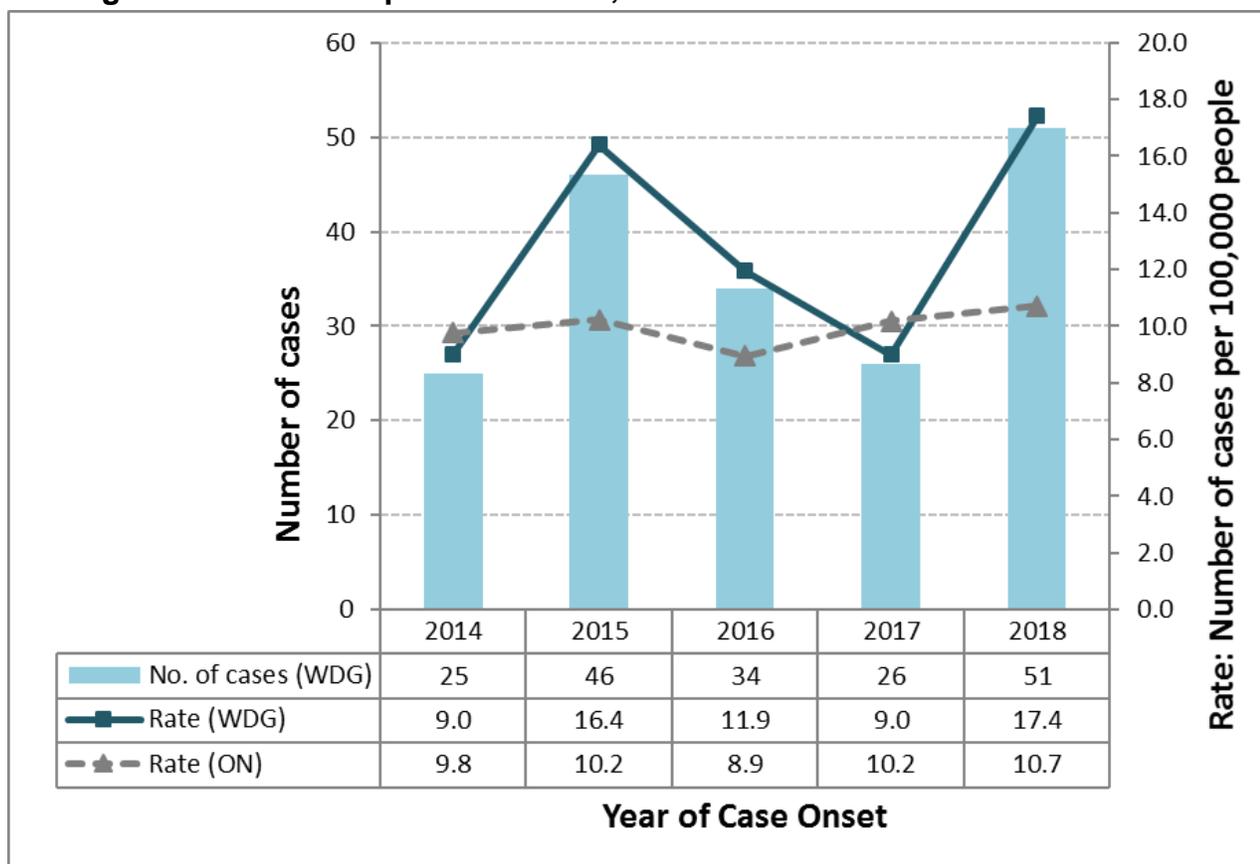
Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after changing a diaper and before preparing food.
- Thorough washing of all produce (including pre-washed produce) prior to consumption.
- Treating or boiling all water used for drinking, cooking etc. when travelling or if using water from a well.
- Having well water tested annually as recommended, to ensure that it is safe to drink.

If a person has been ill, they can prevent spreading this illness to others by avoiding the use of public recreational bodies of water (such as swimming pools, hot tubs and splash pads), for two weeks after symptoms have stopped.

Giardiasis in Wellington-Dufferin-Guelph

Figure 12: Age-Standardized Incidence Rates of Laboratory-Confirmed Giardiasis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

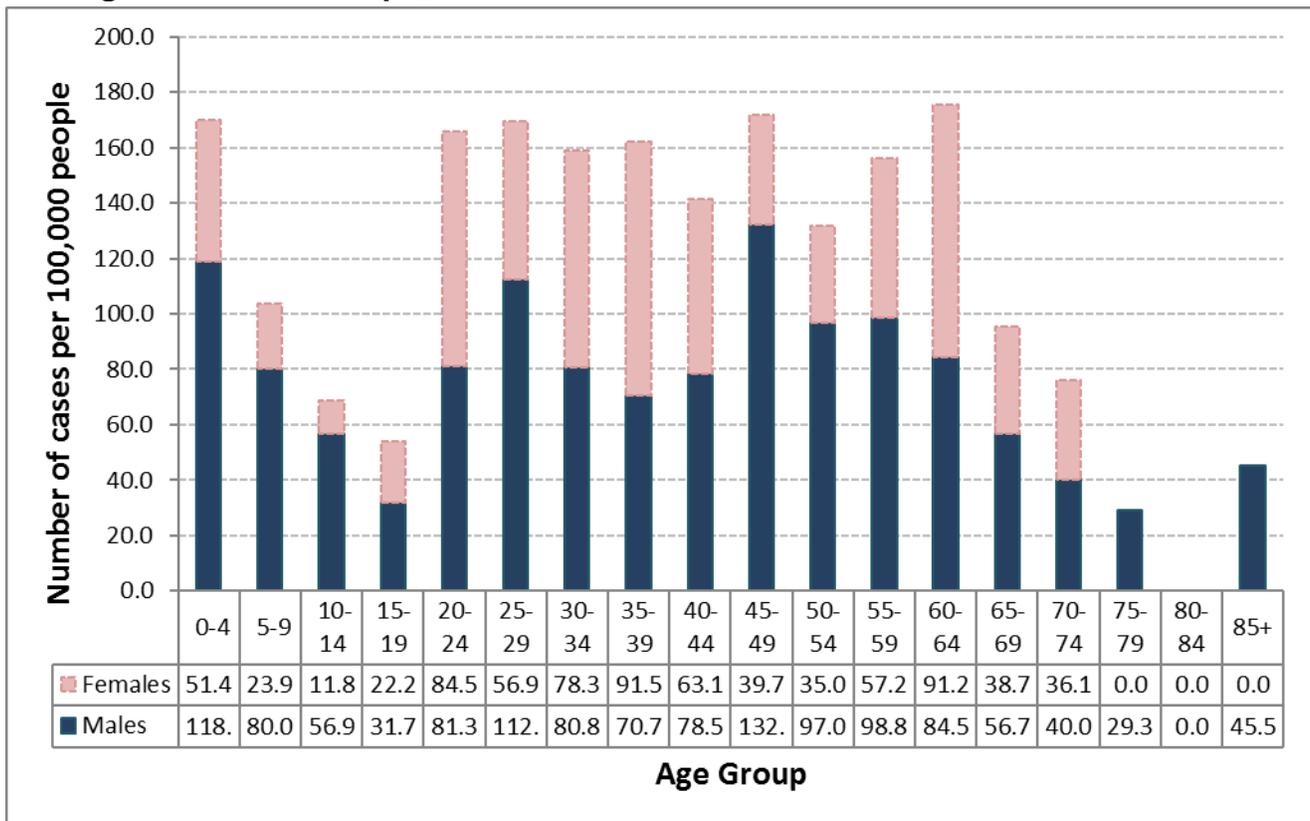


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- The incidence of giardiasis in WDG was highest in 2018, with 51 reported cases or 17.4 cases per 100,000 people. The provincial incidence of giardiasis was also highest in 2018, at 10.7 cases per 100,000 people.
- During the period 2014 to 2018, the annual average in WDG ranged between 25 and 51 cases reported per year, or 8.0-17.0 cases per 100,000 people. In most years, this was higher than the provincial rate, which fluctuated over the same time period between 8.9 and 10.7 cases per 100,000 people.
- The incidence of giardiasis in WDG was lowest in 2014, with 25 reported cases or 9.0 cases per 100,000 people.

Figure 13: Incidence Rates of Laboratory-Confirmed Giardiasis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases of giardiasis in WDG has been higher in males than in females, with a wide age distribution of cases across age groups. This could have resulted from greater exposure of males to the outdoor environment, where contact with the organism is more likely.

HEPATITIS A

What is hepatitis A?

Hepatitis A is a disease caused by the hepatitis A virus. This virus affects the liver.

Can the organism infect animals as well as people?

The hepatitis A virus is usually found only in humans, although chimpanzees and other primates may also be experimentally infected (Purcell et al, 2002).

How is the organism transmitted?

Like most organisms that cause gastrointestinal illness, the hepatitis A virus is excreted in the stool of infected people. Other people can become infected by consuming food or water that has been contaminated with virus excreted by an infected person, or by contact with an infected person. Food can be contaminated during handling by an infected food handler. Consumption of food harvested from or irrigated with contaminated water (i.e. seafood harvested from water contaminated with human sewage) can also cause illness.

The virus may also be transmitted by the fecal-oral route during sexual activity; the risk of infection appears to be increased among men having sex with men (MSM) (CDC Hepatitis A factsheet; Bialek et al., 2011).

What are the symptoms of hepatitis A?

After consuming contaminated food or water, or contact with someone who is ill with hepatitis A, a person can develop symptoms within 15 to 50 days, although most people develop symptoms after 28-30 days. Symptoms include sudden onset of fever, a feeling of being unwell, lack of appetite, nausea and abdominal pain. These symptoms are usually followed by jaundice (a yellowing of the skin and whites of the eyes) in adults, although fewer than 10% of children 6 years of age and younger develop jaundice, and young children may show no symptoms.

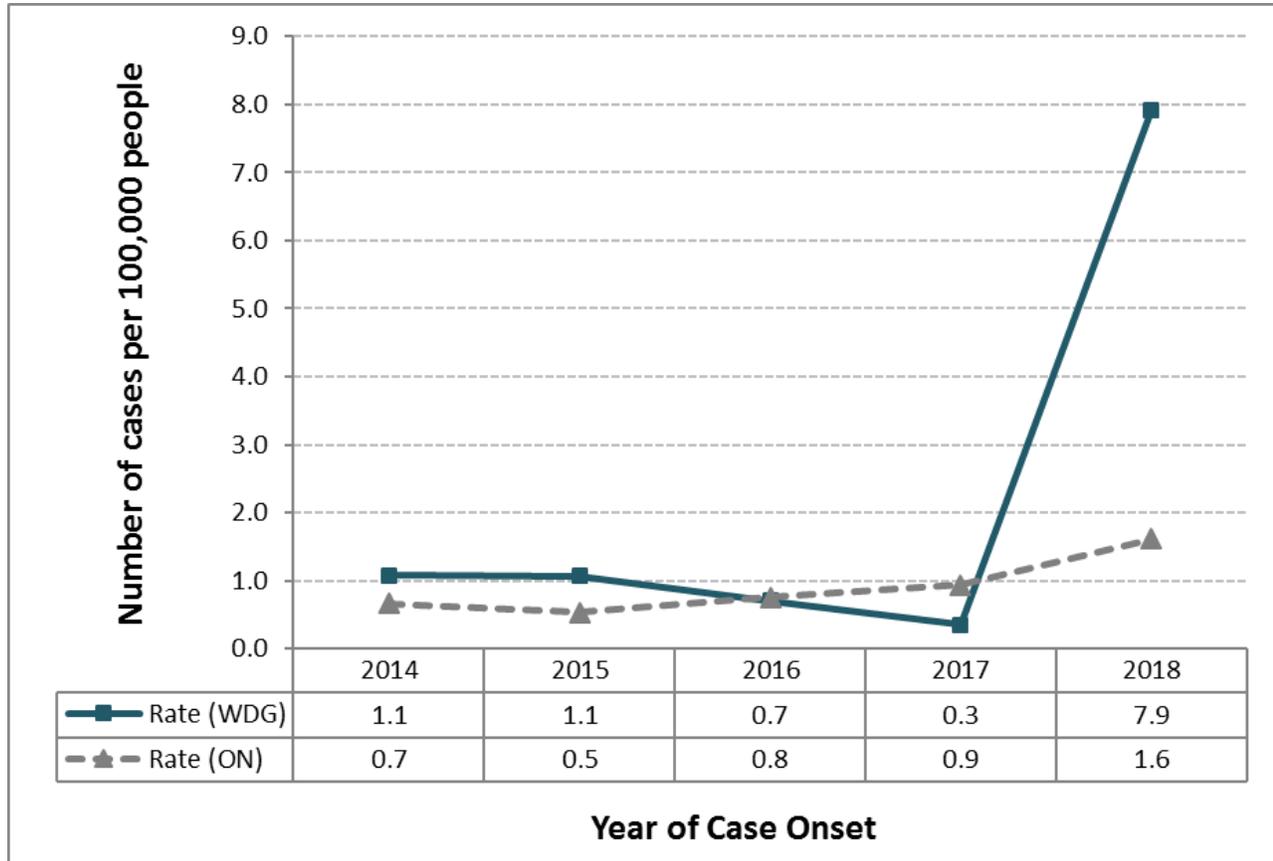
How can someone avoid getting hepatitis A?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after changing a diaper and before preparing food.
- When abroad, avoiding food, juices and water (including ice) from questionable sources such as roadside vendors, and thoroughly washing and peeling fresh fruits.
- Vaccination for hepatitis A should be considered for individuals at high risk of infection (i.e. due to high risk behaviours, nature of employment or MSM activity), and for travellers to areas of the world where the incidence of hepatitis A is high.

Hepatitis A in Wellington-Dufferin-Guelph

Figure 14: Age-Standardized Incidence Rates of Laboratory-Confirmed Hepatitis A in Wellington-Dufferin-Guelph and Ontario, 2014-2018

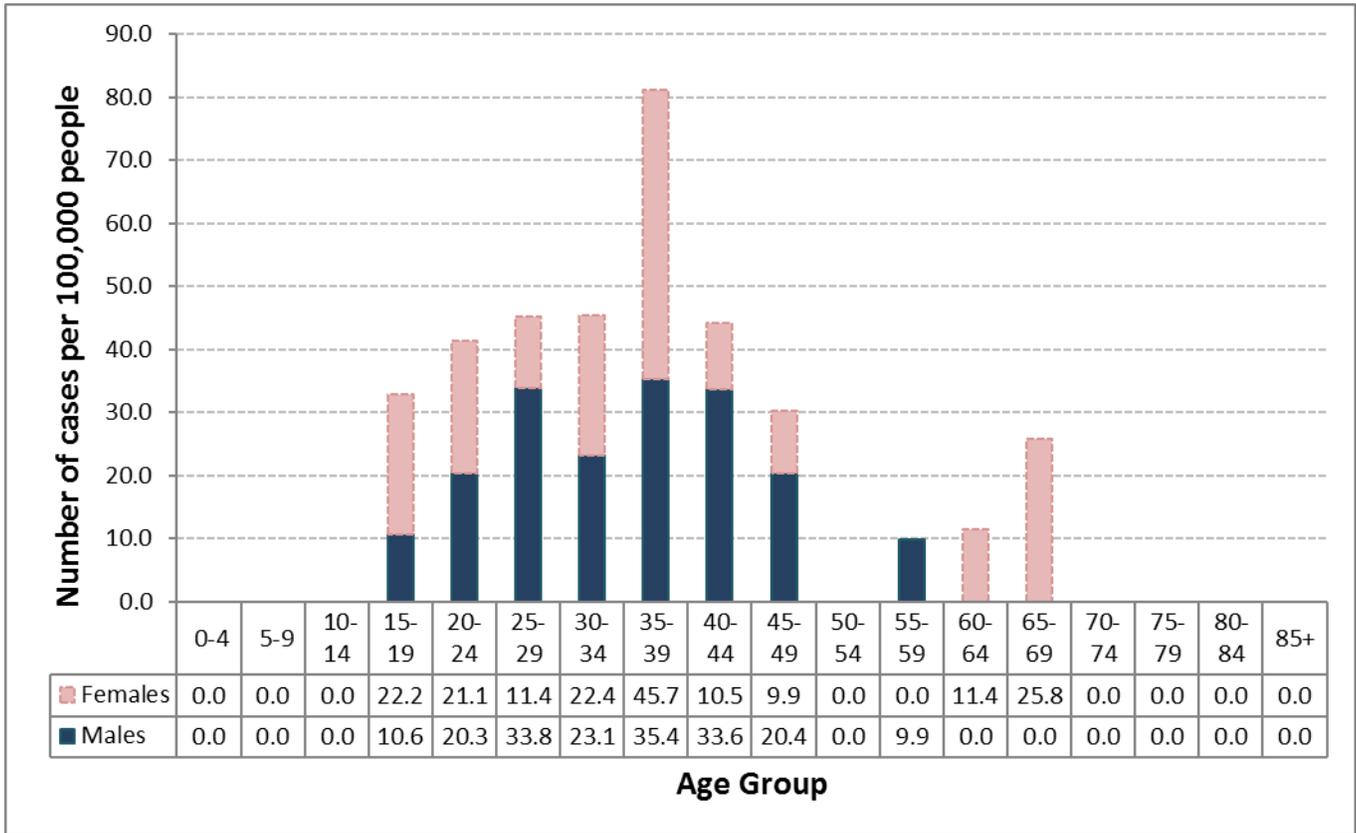


*Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario*

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- From 2014 to 2017, the annual rate of hepatitis A in WDG ranged from 0.3 to 1.1 cases per 100,000 people. This was comparable to the provincial rate, which stayed fairly consistent over the same time period (0.5 to 0.9 cases per 100,000 people).
- Within the five-year period shown, the incidence of hepatitis A in WDG was highest in 2018, at 7.9 cases per 100,000 people. The provincial incidence of hepatitis A was also highest in that year, at 1.6 cases per 100,000 people. The increased incidence in 2018 could be explained by an outbreak of the infection in several areas of the province among the homeless population and men who have sex with men in late 2017 and in 2018; several of the outbreak cases were from WDG, and of the local health units, WDGPH had the second highest number of cases.

Figure 15: Incidence Rates of Laboratory-Confirmed Hepatitis A by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases in of Hepatitis A in WDG in males and females were not significantly different over the period 2014 to 2018, with rates only slightly higher in males.
- The highest number of cases was seen in individuals aged 35-39 years.
- The age and sex distribution of cases was mostly representative of that of the cases occurring during the 2018 hepatitis A outbreak.

LISTERIOSIS

What is listeriosis?

Listeriosis is a gastrointestinal illness caused by bacteria known as *Listeria monocytogenes*.

Can the organism infect animals as well as people?

Listeria bacteria are naturally found in soil and water, and can also infect animals and people. A person can be infected by the bacteria without showing any symptoms.

How is the organism transmitted?

People can become infected when they ingest food contaminated with the bacteria. Foods that are commonly contaminated with *Listeria* include ready-to-eat meats (such as hot dogs, salami etc), unpasteurized milk and soft cheeses, and vegetables. Vegetables can become contaminated from soil or manure. *Listeria* can grow under refrigeration temperatures, i.e. if a food item contaminated with *Listeria* is stored in the fridge, the bacteria can still grow and increase in number.

What are the symptoms of listeriosis?

Symptoms can develop within 3-70 days of consuming contaminated food, although most people develop symptoms after 3 weeks. Symptoms of listeriosis include fever, muscle aches and diarrhoea, and may also include nausea and vomiting. It is possible for humans to carry the bacteria without showing any symptoms. Infection during pregnancy can lead to stillbirth, spontaneous delivery, premature birth or meningitis in the unborn infant. This disease can be fatal in 30% of infected infants.

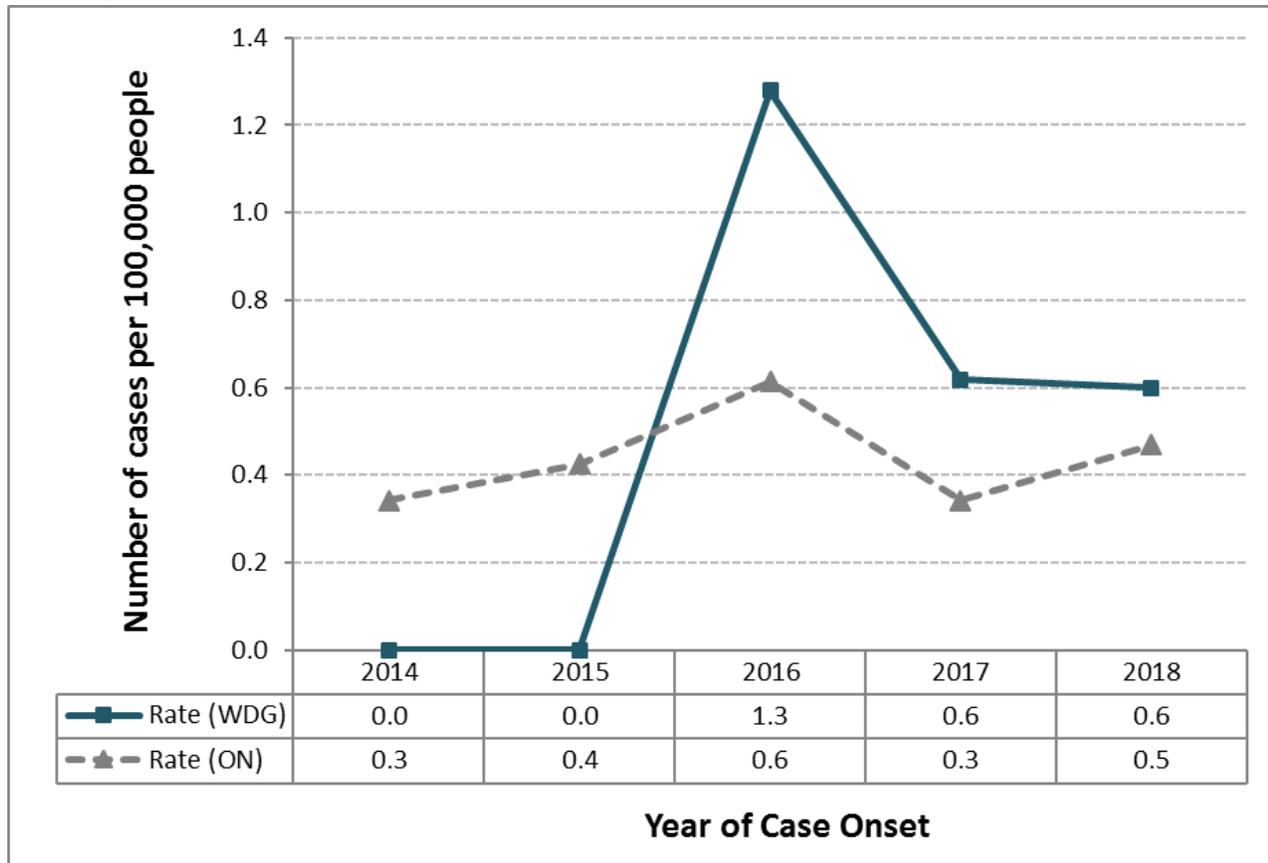
How can someone avoid getting listeriosis?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom and before preparing food. Hands, utensils and food contact surfaces should be washed after contact with raw (uncooked) foods.
- Pregnant women and immunocompromised individuals should avoid high risk foods such as unpasteurized milk and other dairy products, ready-to-eat foods, smoked fish and soft cheeses.
- Thorough washing of all produce (including pre-washed produce) prior to consumption.
- Thorough cooking of all food from animal sources. A probe thermometer should be used to verify cooking temperatures.
- Avoiding cross-contamination between raw and ready-to-eat or cooked foods during storage and food preparation, i.e. use of separate cutting boards and utensils for raw and cooked food items.

Listeriosis in Wellington-Dufferin-Guelph

Figure 16: Age-Standardized Incidence Rates of Laboratory-Confirmed Listeriosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



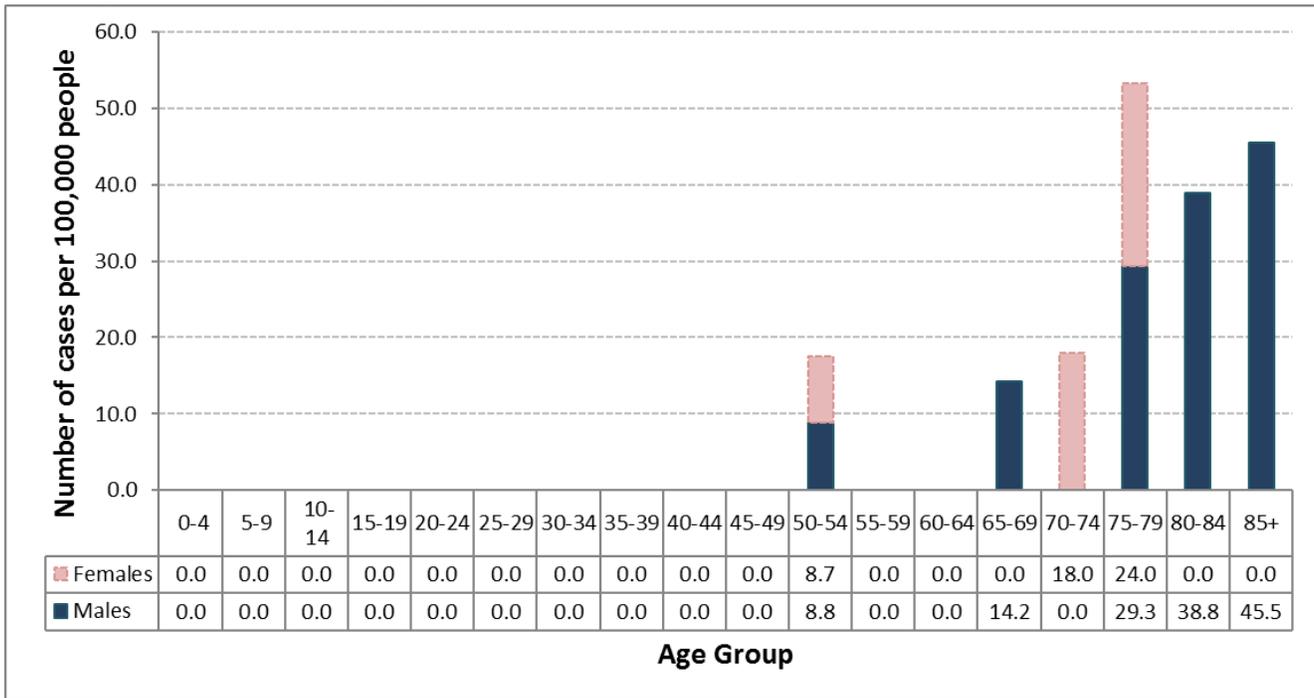
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of listeriosis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of listeriosis in WDG was highest in 2016, at approximately 1.3 cases per 100,000 people in each of those years. The provincial incidence was highest in the same year, at 0.6 cases per 100,000 people.
- From 2014 to 2018, the annual rate in WDG ranged from 0.0 to 1.3 cases per 100,000 people in WDG. From 2016 to 2018, this was than the provincial rate, which stayed fairly consistent over the same time period at 0.3 to 0.6 cases per 100,000 people in Ontario.
- No cases of lab-confirmed listeriosis occurred in WDG in 2014 or 2015.

Figure 17: Incidence Rates of Laboratory-Confirmed Listeriosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases reported to WDG over the 5-year period was higher in males than in females, with the highest number of cases seen in individuals aged 75 years and older. Immunocompromised and older people, and pregnant women, are more susceptible to serious illness when infected with *Listeria* (CDC Listeria factsheet) and may therefore be more likely to seek medical attention and be tested for listeriosis; this is a possible explanation for these findings.

SALMONELLOSIS

What is salmonellosis?

Salmonellosis is a gastrointestinal illness caused by bacteria known as *Salmonella*. There are many different strains of *Salmonella*.

Can the organism infect animals as well as people?

Salmonella bacteria are naturally found in a variety of animals, including poultry, cattle, pigs and rodents as well as in various animals normally kept as pets, such as cats, dogs, iguanas, lizards, snakes and turtles.

How is the organism transmitted?

People can become infected when they consume food or water that has been contaminated with the bacteria excreted in the feces of an infected person or animal, or after they have had contact with an infected person or animal. Foods that are commonly associated with illness include unpasteurized (raw) milk and other raw milk products, raw and undercooked poultry and poultry products, raw and undercooked eggs and egg products, and raw (uncooked) fruits and vegetables. People can also become infected by contact (direct or indirect) with infected reptiles and amphibians (including iguanas, snakes, lizards and turtles). Infected food handlers can also spread their illness to others if they handle food while ill.

What are the symptoms of salmonellosis?

Someone who has become infected can develop symptoms within 6-72 hours, although most people develop symptoms within 12-36 hours. Symptoms may include headache, fever, abdominal pain, diarrhoea, nausea and vomiting. Some people may also develop dehydration as a result of diarrhoea and vomiting.

How can someone avoid getting salmonellosis?

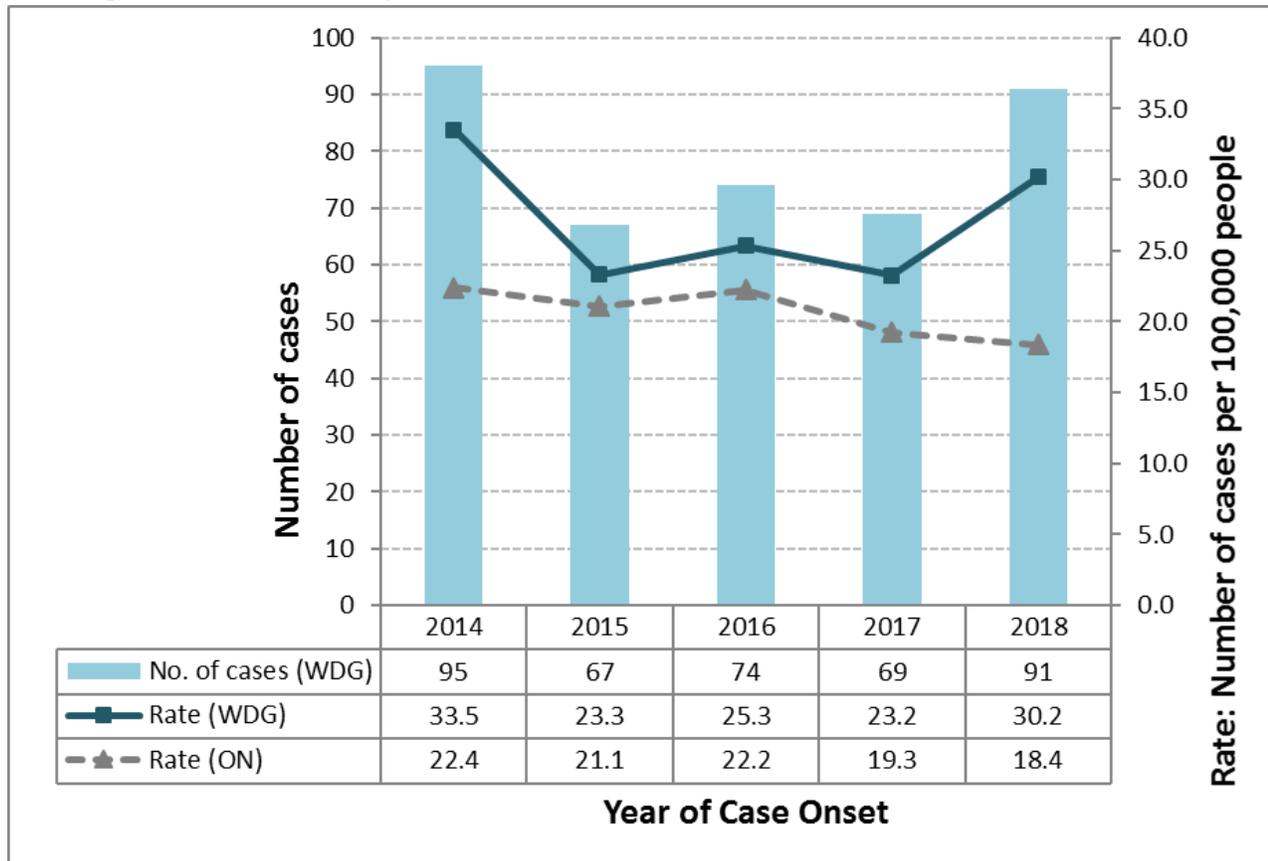
Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after handling raw poultry, after contact with animals or animal feces (including pet waste) and before preparing food.
- Avoiding cross-contamination when preparing food, e.g. by using separate cutting boards for raw and ready to eat foods, and avoiding contamination of other foods (such as produce) with the juices of raw poultry.
- Thorough cooking of all food from animal sources, especially poultry, and using a probe thermometer to verify cooking temperatures.
- Treating or boiling all water used for drinking, cooking etc. when travelling or if using water from a well.

- Avoiding drinking unpasteurized milk.
- Thorough washing of all produce (including pre-washed produce) prior to consumption.
- Avoiding handling food while ill.

Salmonellosis in Wellington-Dufferin-Guelph

Figure 18: Age-Standardized Incidence Rates of Laboratory-Confirmed Salmonellosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

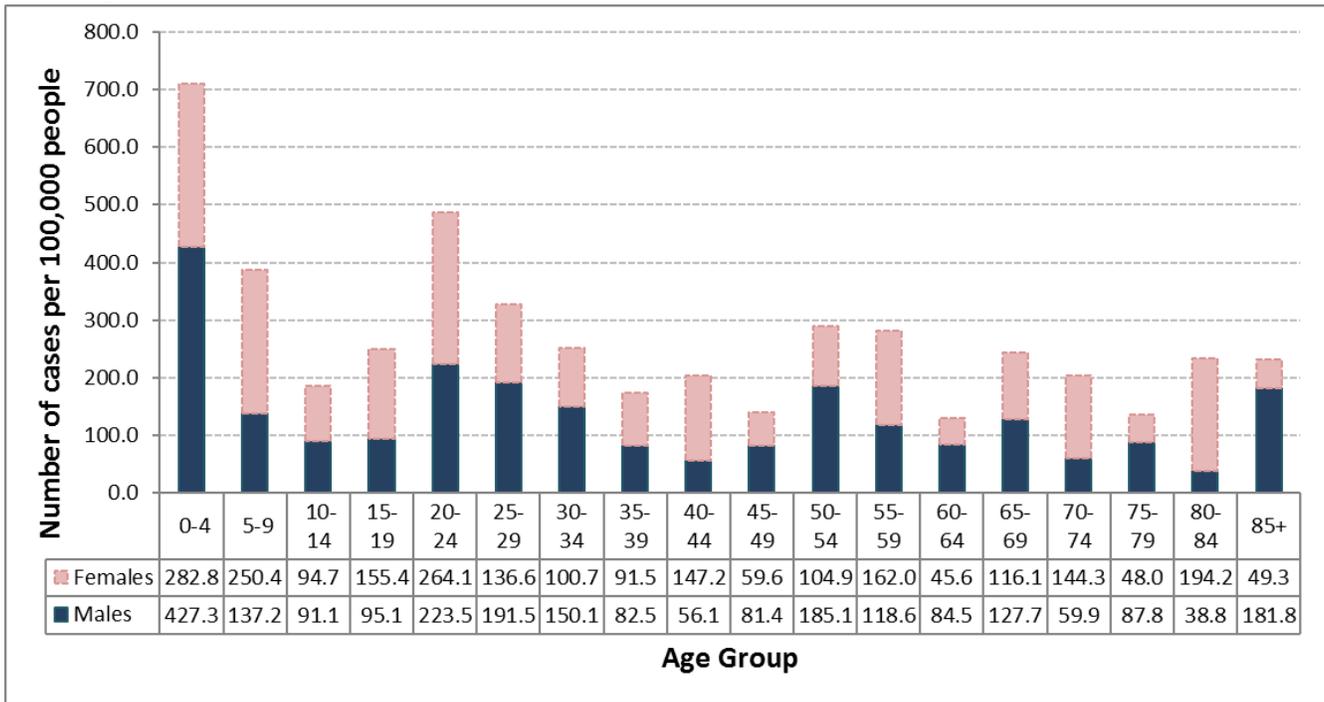


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Of the five years, the incidence of salmonellosis in WDG was highest in 2014, with 95 reported cases or 33.5 cases per 100,000 people. The provincial incidence of salmonellosis was also at its highest in that year, at 22.4 cases per 100,000 people.
- During this period, the annual number of cases reported in WDG ranged between 67 and 95 cases per year or 23.2-33.5 cases per 100,000 people. This was slightly higher than the provincial rate over the same time period (18.4 to 22.4 cases per 100,000 people).
- The incidence of salmonellosis in WDG was lowest in 2015, with 67 reported cases or 23.3 cases per 100,000 people.

Figure 19: Incidence Rates of Laboratory-Confirmed Salmonellosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases of salmonellosis in WDG over the five-year period was higher in females than in males, with the highest number of cases seen in individuals aged 0-4 years. The relatively high rate of cases in children under 5 years old is consistent with previously published findings (CDC 2013).

SHIGELLOSIS

What is shigellosis?

Shigellosis is a gastrointestinal illness caused by bacteria known as *Shigella*. Only a very small number of the bacteria can make someone ill. There are 4 different strains of *Shigella*.

Can the organism infect animals as well as people?

This organism only infects humans.

How is the organism transmitted?

People can become infected when they ingest food or water that has been contaminated with the bacteria, which are excreted in the stools (feces) of an infected person, or after touching contaminated surfaces or items. Infected persons with poor personal hygiene (especially after using the washroom) can also cause illness in others if they have direct contact with other people without first practising good hand washing.

What are the symptoms of shigellosis?

A person can develop symptoms within 12 hours to 1 week after becoming infected by *Shigella*, although most people develop symptoms within 1-3 days. Symptoms include loose, watery stools, fever, nausea and vomiting. Some people may develop more severe symptoms, including abdominal pain, painful passing of stools, and mucous and/or blood in the stools.

How can someone avoid getting shigellosis?

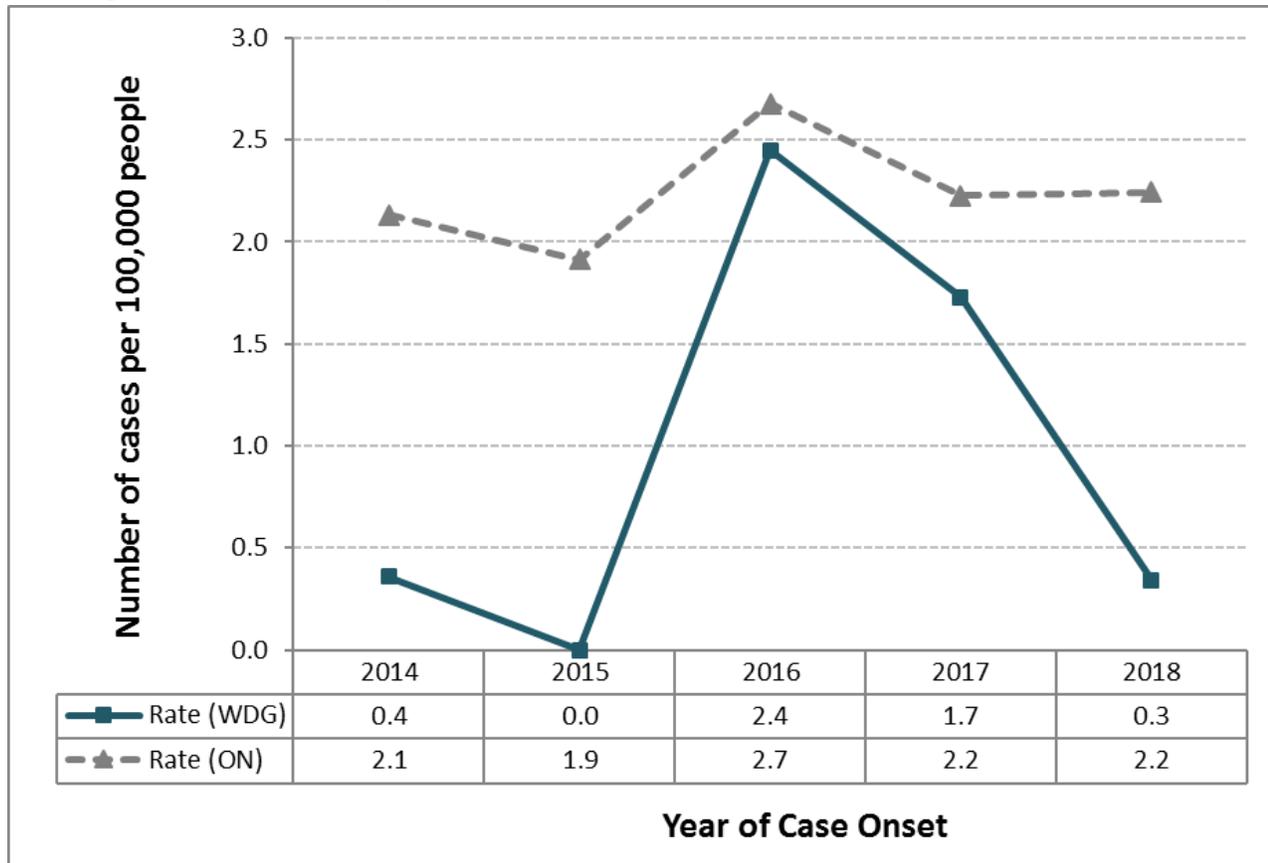
Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, and before and after handling food. Hand hygiene should include thorough cleaning of hands and under fingernails, particularly after using the washroom.
- Thorough washing of all produce (including pre-washed produce) prior to consumption.
- Avoiding handling food while ill.

In addition, if a person is ill, they can prevent spreading this illness to others by avoiding direct contact with others until all symptoms of illness have resolved.

Shigellosis in Wellington-Dufferin-Guelph

Figure 20: Age-Standardized Incidence Rates of Laboratory-Confirmed Shigellosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



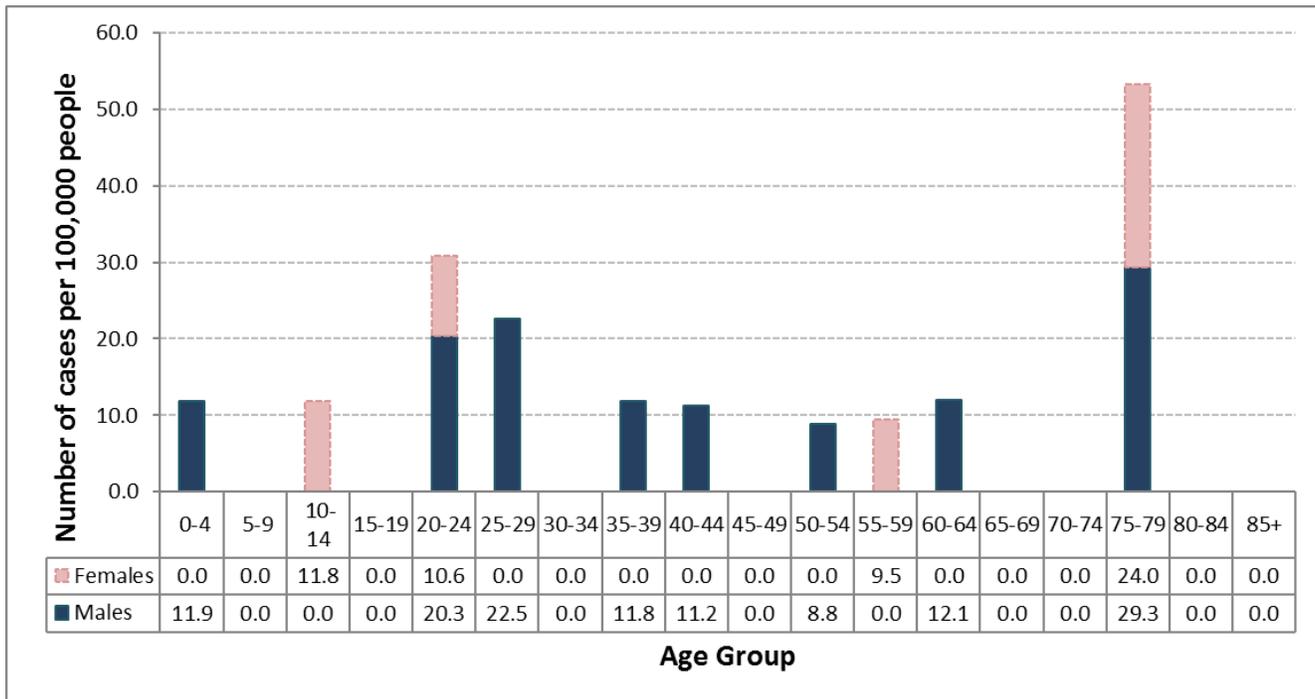
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of shigellosis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of shigellosis in WDG was highest in 2016, at 2.4 cases per 100,000 people. The provincial incidence of shigellosis was also at its highest in that year, at 2.7 cases per 100,000 people.
- During the period 2014-2018, the annual rate in WDG ranged from 0.0 to 2.4 cases per 100,000 people. This was consistently lower than the provincial rate over the same time period (1.9 to 2.7 cases per 100,000 people in Ontario).
- The incidence of shigellosis in WDG was lowest in 2015; no cases were reported in that year.

Figure 21: Incidence Rates of Laboratory-Confirmed Shigellosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of cases in WDG over 2014-2018 was higher in males than in females, with the highest number of cases seen in individuals aged 75-79 years. Because of the low number of cases represented in this chart, any differences shown in the chart may not be significant.

VEROTOXIN PRODUCING ESCHERICHIA COLI (VTEC)

What is VTEC?

Verotoxin producing *Escherichia coli* (VTEC) infection is a gastrointestinal illness caused by a toxin-producing type of the bacteria known as *Escherichia coli* (commonly known as *E. coli*). There are many different strains of Verotoxin producing *E. coli* (VTEC), but *E. coli* O157:H7 is the type most commonly known to cause severe illness in humans.

Can the organism infect animals as well as people?

VTEC infections occur in various animals, especially cattle, which are considered the most common source of illness in people. Other farm animals such as sheep, pigs and goats can also be infected (Keen et al., 2006; Doane et al., 2007).

How is the organism transmitted?

People can become infected with *E. coli* O157:H7 when they ingest the organism in raw or undercooked food or produce (such as ground beef, other meats, milk or other dairy products, or produce), that has been contaminated by VTEC bacteria excreted in the feces of an infected person or animal. Illness can also be caused by consuming drinking water or recreational water that has been contaminated by the bacteria. People can also become infected by handling or touching infected animals and then touching the mouth without first practising proper hand washing. Infected humans can spread the illness to other people, for example, by preparing food for another person while ill and without first practicing good hand hygiene, especially after using the washroom.

What are the symptoms of VTEC infection?

A person can develop symptoms within 2-10 days of becoming infected; most people develop symptoms within 3-4 days. Symptoms include diarrhoea (which may become bloody), abdominal cramps, vomiting and dehydration. Most infected persons do not develop a fever.

How can someone avoid becoming infected by VTEC?

Steps that can be taken to prevent becoming ill with this disease include:

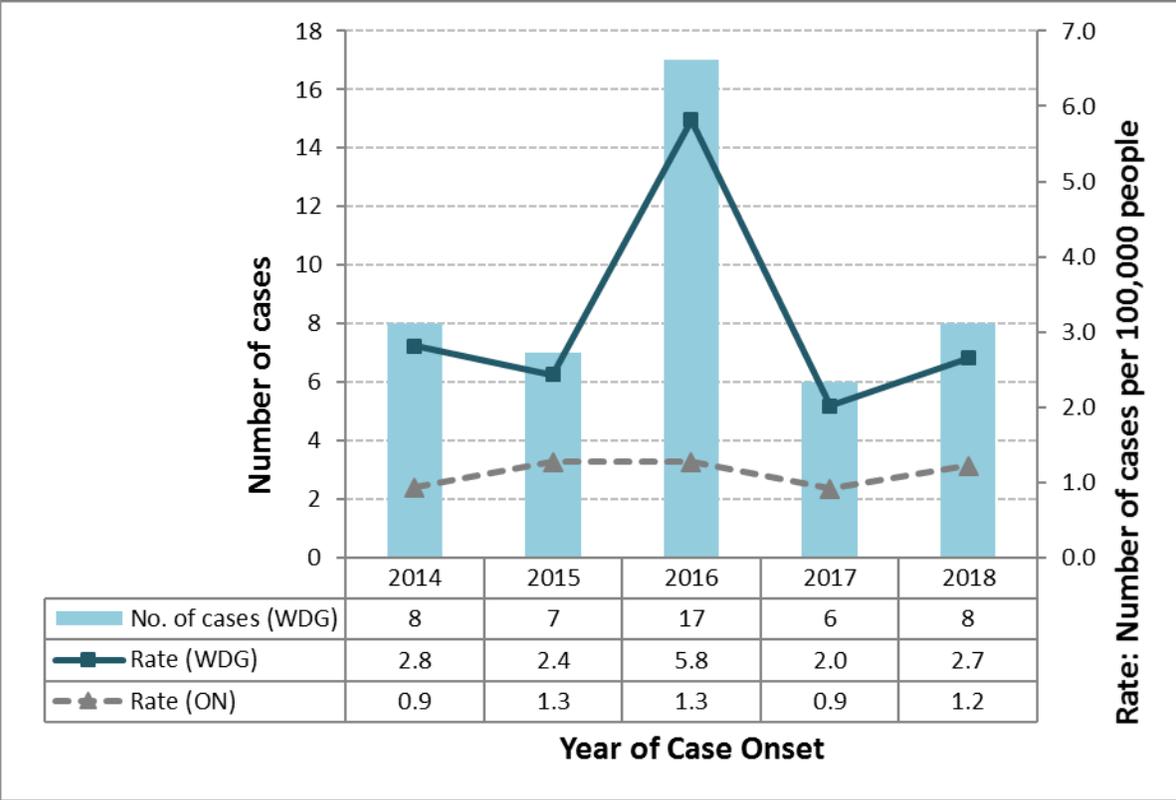
- Frequent and thorough hand washing, especially after using the washroom, after handling raw ground beef, after contact with animals or animal feces (including pet waste) and before preparing food.
- Avoiding cross-contamination when preparing food, e.g. by using separate cutting boards for raw and ready to eat foods.
- Thoroughly cooking all food from animal sources, especially ground beef and tenderized steaks, and using a probe thermometer to verify cooking temperatures.

- Treating or boiling all water used for drinking, cooking etc. when travelling or if using water from a well.
- Having well water tested regularly, to ensure that it is safe to drink.
- Avoiding drinking unpasteurized milk, apple cider and other juices.
- Thorough washing of all produce (including pre-washed produce) prior to consumption.

In addition, if a person is ill, they can prevent spreading this illness to others by avoiding handling food while ill.

VTEC (*E. coli*) in Wellington-Dufferin-Guelph

Figure 22: Age-Standardized Incidence Rates of Laboratory-Confirmed Verotoxin-Producing *E. coli* infection in Wellington-Dufferin-Guelph and Ontario, 2014-2018

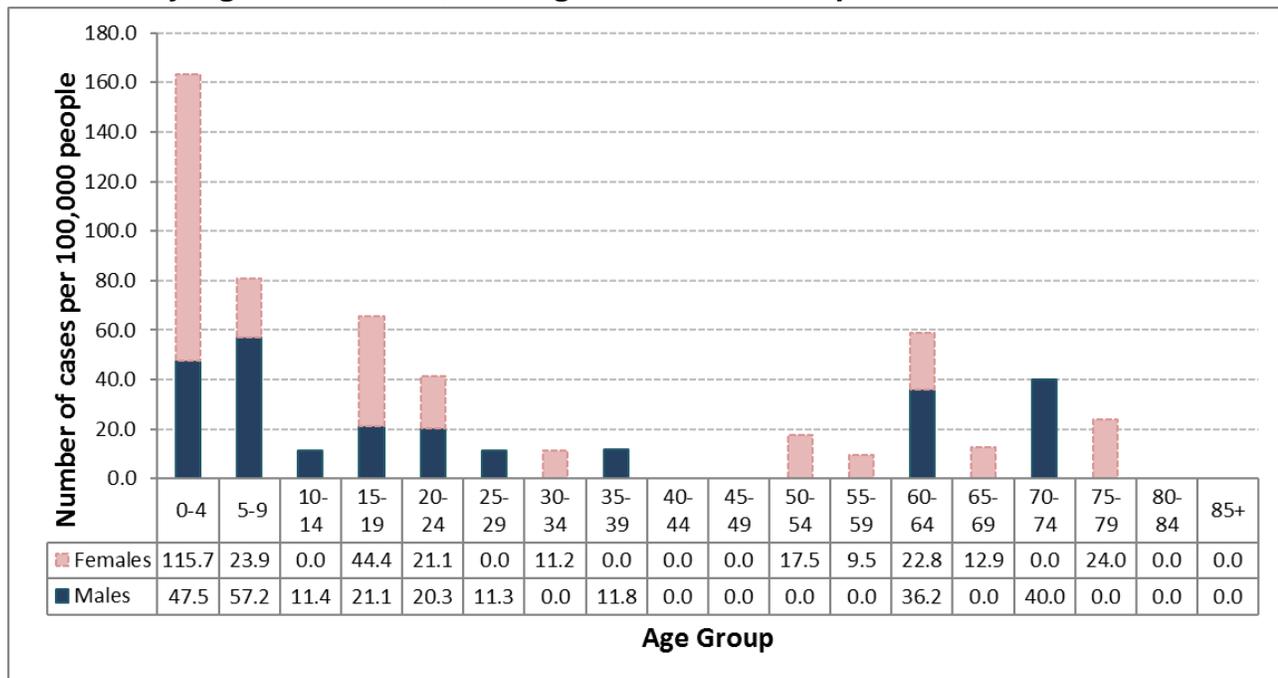


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Over the period 2014-2018, the incidence of VTEC in WDG was highest in 2016, with 17 reported cases or 5.8 cases per 100,000 people. The increase in cases in 2016 was due to a cluster of cases that occurred in that year.

- The provincial incidence of VTEC was highest in 2015 and 2016, at 1.3 cases per 100,000 people.
- Over the five-year period, the annual average in WDG ranged between 6 and 17 lab-confirmed cases per year, or 2.0-5.8 cases per 100,000 people. This was higher than the provincial rate (0.9 to 1.3 cases per 100,000 people) in every year over the period, even in the years when no local outbreak or cluster had occurred. The consistently higher rate in WDG could possibly be explained by an increased risk of contact with infected animals because of a relatively high proportion of the population living and working in rural areas and on farms.
- The incidence of VTEC in WDG was lowest in 2009 and 2010, with 9 reported cases each year, or 3.2 cases per 100,000 people.

Figure 23: Incidence Rates of Laboratory-Confirmed Verotoxin-Producing *E. coli* infection by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of VTEC cases in WDG was slightly higher in females than in males, with the highest number of cases seen in children under 10 years old. The high number of cases in the younger age group may reflect the higher likelihood of contact with farm animals and contaminated water in rural areas. In addition, young children are more likely to become seriously ill from VTEC infections, and are therefore more likely to be seen by a doctor and diagnosed.

YERSINIOSIS

What is yersiniosis?

Yersiniosis is a gastrointestinal illness caused by bacteria known as *Yersinia*. There are 2 strains of *Yersinia* that cause food-borne illness in humans: *Yersinia enterocolitica* (*Y. enterocolitica*) and *Yersinia pseudotuberculosis* (*Y. pseudotuberculosis*). These are different from *Yersinia pestis*, the bacteria responsible for causing the plague.

Can the organism infect animals as well as people?

Y. enterocolitica bacteria often infect pigs, and *Y. pseudotuberculosis* bacteria are also found in various birds and mammals, including puppies, kittens and rodents.

How is the organism transmitted?

People can become infected with *Yersinia* when they swallow the organism - which is excreted in the feces of infected people and animals - in contaminated food (particularly contaminated pork and pork products) or contaminated drinking or recreational water. People can also become infected by handling or touching infected animals (including puppies and kittens) and then touching the mouth without first practising proper hand washing.

What are the symptoms of yersiniosis?

A person can develop symptoms within 10 days after swallowing the bacteria, although most people develop symptoms within 3-7 days after becoming infected. Symptoms of *Y. enterocolitica* infection in young children include fever and diarrhoea; in older children and adults symptoms may be similar to appendicitis, including fever, abdominal pain, and tenderness in the lower-right abdomen. Symptoms of *Y. pseudotuberculosis* infection include fever, a sandpaper-like rash, and symptoms similar to appendicitis.

How can someone avoid getting yersiniosis?

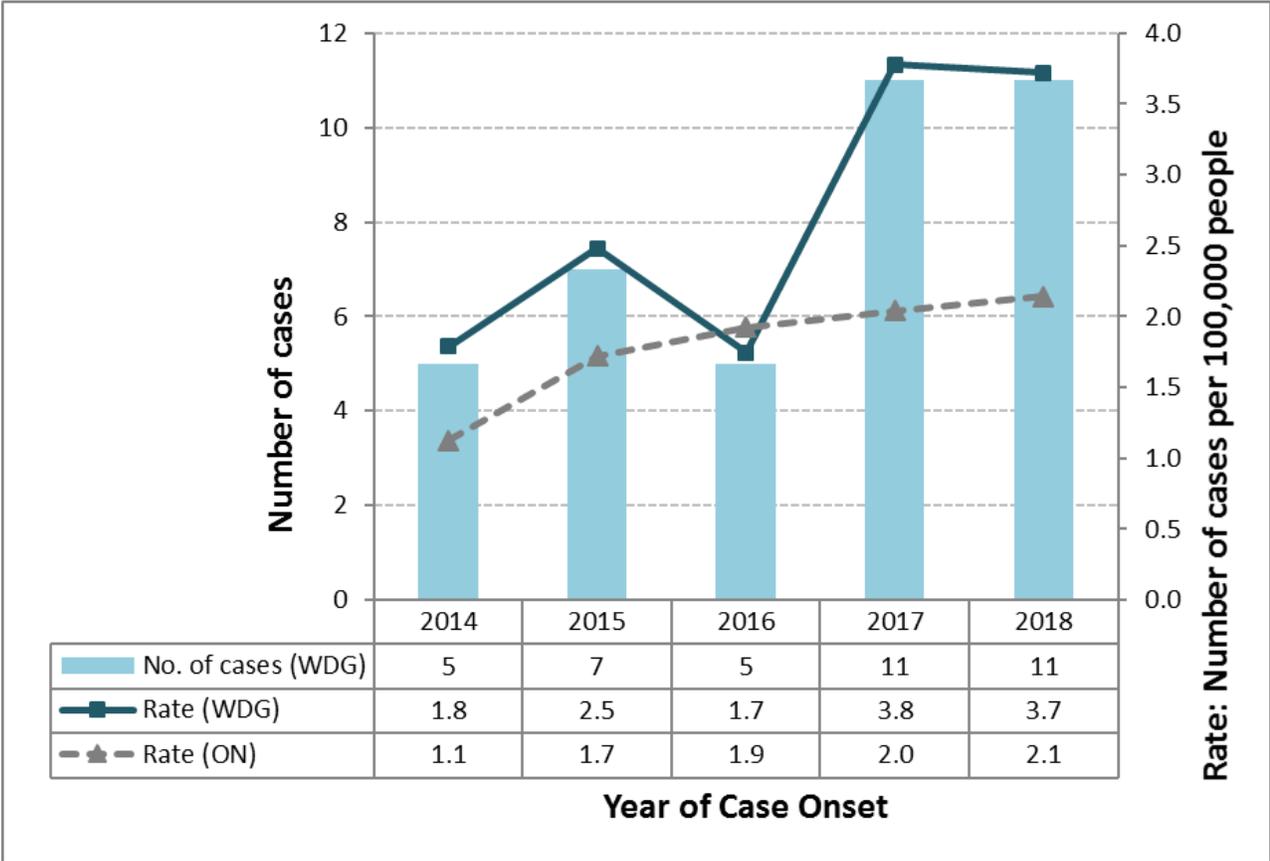
Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after handling raw meat (particularly pork), after contact with animals or animal feces (including pet waste) and before preparing food.
- Avoiding cross-contamination when preparing food, e.g. using separate cutting boards for raw and ready to eat foods.
- Thoroughly cooking all food from animal sources, especially pork, using a probe thermometer to verify cooking temperatures.
- Avoiding the consumption of unpasteurized milk or other unpasteurized dairy products.
- Thoroughly washing all produce (including pre-washed produce) prior to consumption.

In addition, if a person is ill, they can prevent spreading this illness to others by avoiding handling food while ill.

Yersiniosis in Wellington-Dufferin-Guelph

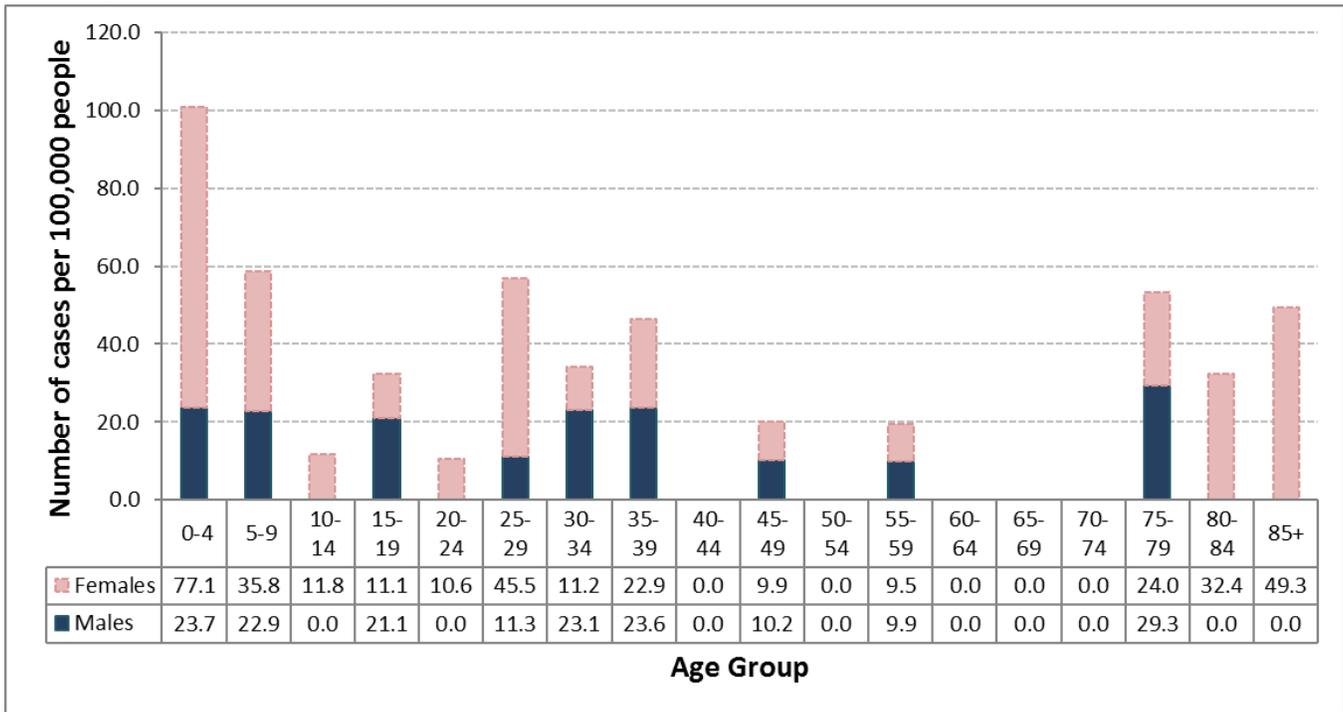
Figure 24: Age-Standardized Incidence Rates of Laboratory-Confirmed Yersiniosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Calculated rates of yersiniosis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of yersiniosis in WDG was highest in 2017 and 2018, at 3.8 and 3.7 cases per 100,000 people, respectively. The provincial incidence of yersiniosis was highest in 2018, at 2.1 cases per 100,000 people.
- The rate of yersiniosis in WDG was lower than that in the province overall (1.7 and 1.9 cases per 100,000 people, respectively) in only one year over the period; only 5 cases of the disease were reported in WDG in 2016.

Figure 25: Incidence Rates of Laboratory-Confirmed Yersiniosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, almost twice as many female as male cases of yersiniosis were reported to WDGPH over the five-year period, with the highest number of cases seen in individuals aged 0-4 years. The reason for the differences between the genders is unknown; however, the relatively high rate of cases in children under 5 years old is consistent with previously published findings (CDC 2013).

SECTION 2: VECTOR BORNE DISEASES & RABIES

Vector borne diseases are those spread by the bites of infected animals, most often arthropods such as mosquitoes and ticks. Because these animals are capable of transmitting the disease to other types of animals, they are called vectors. Larger biting animals, such as mammals, can also spread (act as vectors for) some vector borne diseases. Symptoms of vector borne diseases can vary and may include chills, fever, a rash and respiratory or gastrointestinal symptoms. Some people may go on to develop more severe symptoms. Rabies is spread via contact with the saliva of an infected animal, usually via a bite or scratch from a fox, raccoon, bat or skunk. Cats, dogs, ferrets and other mammals (warm-blooded animals) can also be infected with the rabies virus and can transmit it. Symptoms of rabies include a headache, fever, malaise and sensory changes and the disease almost always leads to death.

The Control of Infectious Disease (CID) team at Wellington-Dufferin-Guelph Public Health is responsible for follow-up of all reported probable, suspect or confirmed cases of vector borne disease and rabies. CID Public Health Inspectors and Public Health Nurses interview cases in an attempt to identify suspect exposures and determine how illness may have been contracted, and provide education on how to prevent future illness. The Clinical Services team provides advice to travellers on which vaccinations should be received prior to travelling to countries or areas where certain diseases are known to be present and potentially pose a risk to travellers.

Public Health Inspectors of the Environmental Health team follow-up on all reported animal bite and scratch incidents and, where possible, will attempt to locate and observe the animal involved in the bite or scratch incident to determine whether the animal was infected with rabies at the time of the incident. Where the animal cannot be found (such as in incidents involving wild animals or animals that have subsequently died), inspectors will provide access to post-exposure treatment to the individual who was bitten or scratched, in order to minimize the risk of contracting rabies.

The following reportable vector borne diseases are covered in this chapter:

- Lyme Disease
- Malaria
- Rabies
- West Nile Virus

LYME DISEASE

What is Lyme Disease?

Lyme Disease is an illness caused by bacteria known as *Borrelia burgdorferi* (*B. burgdorferi*).

Can the organism infect animals as well as people?

The bacteria are carried and spread by species of ticks commonly known as deer ticks or blacklegged ticks. These ticks usually feed on the blood of animals, including deer, rodents and other small mammals, but will also bite people.

How is the organism transmitted?

People can become infected when they are bitten by an infected tick. Usually a person will only become infected if the tick has been attached to the person for at least 24 hours.

What are the symptoms of Lyme Disease?

A person can develop symptoms within 3 to 32 days after being bitten by an infected tick, although most people develop symptoms within 7-10 days after being bitten. Symptoms include a distinctive 'bull's eye' rash at the site of the tick bite, fever, malaise, headache and a stiff neck. Some people may go on to have a more widely spread rash and may experience more severe symptoms.

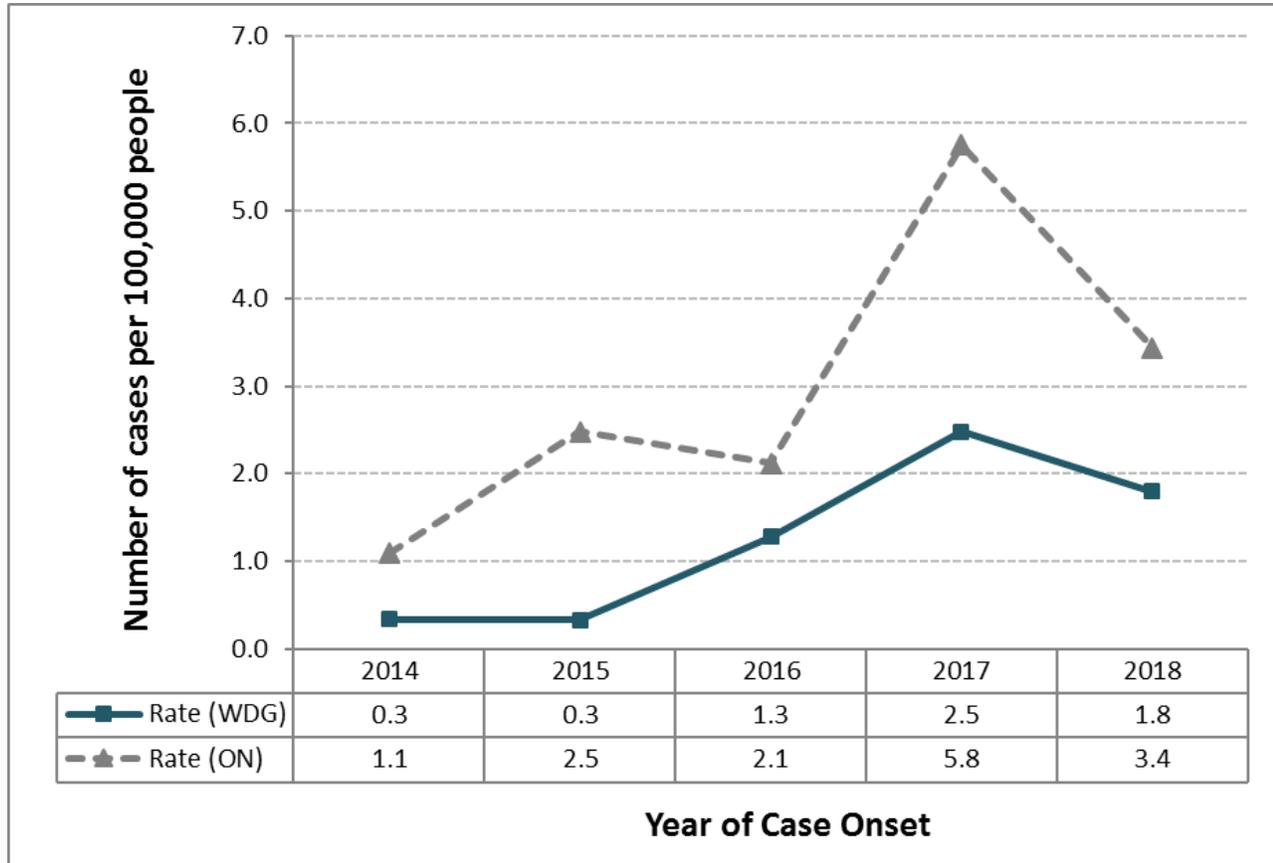
How can someone avoid getting Lyme Disease?

Steps that can be taken to prevent becoming ill with this disease include:

- Protecting oneself against tick bites when visiting wooded areas, include wearing light coloured clothing, tucking pant legs into socks, wearing long sleeves and pants and using an insect repellent containing DEET
- Avoiding areas with known tick infestation
- Checking oneself and one's pets for ticks, and promptly removing any ticks found

Lyme Disease in Wellington-Dufferin-Guelph

Figure 26: Age-Standardized Incidence Rates of Laboratory-Confirmed Lyme Disease in Wellington-Dufferin-Guelph and Ontario, 2014-2018

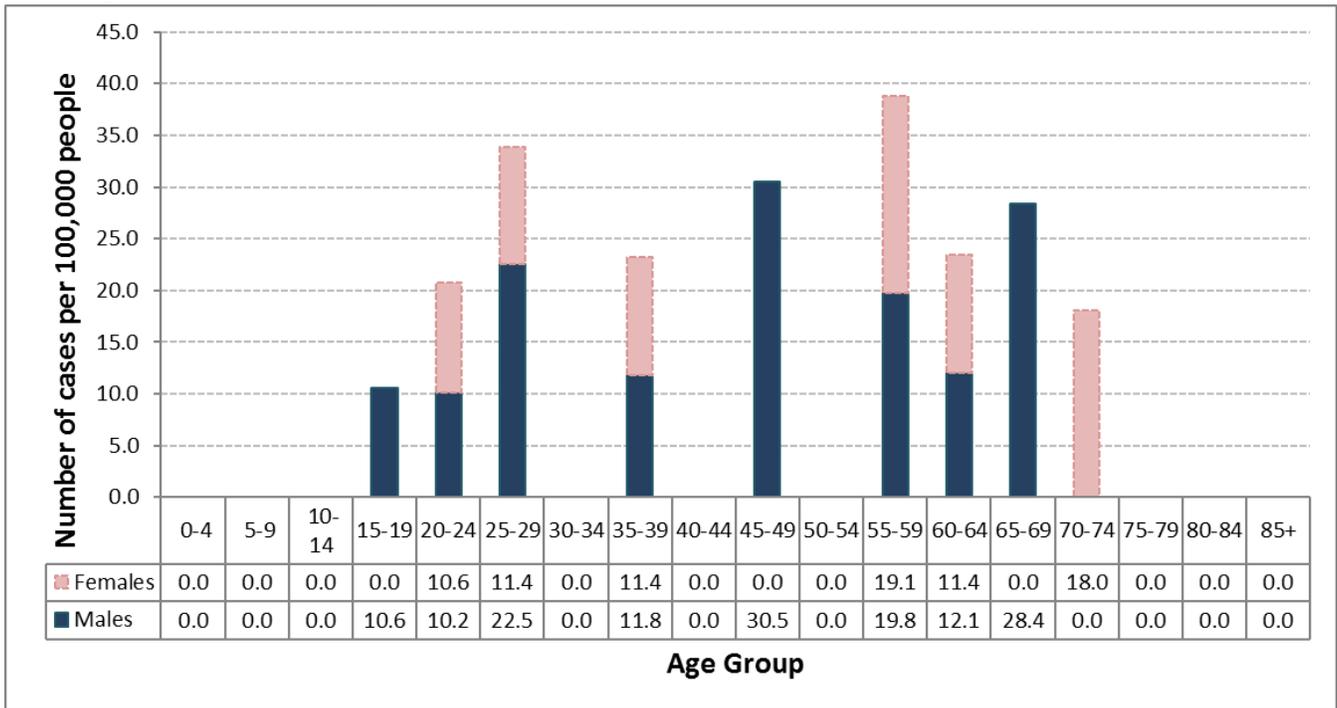


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- In some years, calculated rates of Lyme Disease in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- The incidence of Lyme Disease in WDG was highest in 2017, at 2.5 cases per 100,000 people, and of the five-year period, was second highest in 2018, at 1.8 cases per 100,000. The provincial incidence of the disease was also highest in 2017 and second highest in 2018, at 5.8 and 3.4 cases per 100,000 people, respectively.
- Throughout the years 2014 to 2018, the annual incidence of Lyme Disease was lower in WDG than the overall provincial rate.

Figure 27: Incidence Rates of Laboratory-Confirmed Lyme Disease by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, almost twice as many male as female cases of Lyme Disease were reported to WDGPH over the period 2014 to 2018. The reason for the differences between the genders may be the generally higher risk of exposure of males to ticks due to outdoor activities and occupations.
- Some of the confirmed cases reported to WDGPH had traveled outside Ontario shortly before the onset of their illness, while others had not travelled and therefore appeared to have contracted the disease in or near the Wellington-Dufferin-Guelph area.

MALARIA

What is malaria?

Malaria is a disease caused by microscopic parasites known as *Plasmodium*. There are four species of *Plasmodium* that cause malaria in humans: *Plasmodium vivax* (*P. vivax*), *Plasmodium ovale* (*P. ovale*), *Plasmodium malariae* (*P. malariae*) and *Plasmodium falciparum* (*P. falciparum*).

Can the organism infect animals as well as people?

The parasites are carried by infected mosquitoes. Only female mosquitoes of the type (group) *Anopheles* are able to carry the parasite and go on to infect humans. Mosquitoes carrying malaria parasites occur only in warmer countries of the world; any cases of malaria reported in Ontario therefore occur in people immigrating to Canada from endemic areas, or returning to Canada after travelling to endemic areas.

How is the organism transmitted?

People can become infected when they are bitten by an infected mosquito. People can also become infected if they receive an injection or blood transfusion using blood that is contaminated with the parasite, although this is rare.

What are the symptoms of malaria?

Depending on the species of malaria parasite (*Plasmodium*) causing the infection, a person can develop symptoms within 9 days to 12 months after being bitten by an infected mosquito. However, most people develop symptoms within 9-40 days after being bitten. Symptoms include a high fever, chills, rigor, sweating and headache. Symptoms may also include vomiting, diarrhoea and respiratory symptoms. Some people may go on to experience more severe symptoms, often resulting in death if the infection remains untreated.

How can someone avoid getting malaria?

Steps that can be taken to prevent becoming ill with this disease include:

- Visiting a travel clinic or tropical medicine clinic prior to travelling to obtain information on areas that are considered to be at high risk for malaria, and to find out about treatment that can be taken prior to travelling in order to minimize the risk of becoming ill.
- Protecting oneself against mosquito bites when visiting endemic areas, including wearing light-coloured clothing, using bed nets, and using an insect repellent containing DEET. The higher the percentage of DEET contained in repellent, the longer the time for which it will repel mosquitoes.

- Visiting a physician or hospital if symptoms of malaria develop during or after travelling to a high risk area.

Malaria in Wellington-Dufferin-Guelph

- From 2014 to 2018, there were fewer than five reported laboratory-confirmed cases of malaria each year in Wellington-Dufferin-Guelph (total 13 cases). All of the cases reported having traveled outside Ontario shortly before the onset of their illness, and were therefore considered to have contracted the disease abroad.

RABIES

What is rabies?

Rabies is a disease of the central nervous system (brain and spinal cord) caused by the Rabies virus.

Can the organism infect animals as well as people?

All mammals (warm blooded animals) are susceptible to rabies. The virus can infect wild animals such as raccoons, coyotes, skunks, foxes and bats, which can then act as vectors (animals that can spread the disease to other types of animals). Domestic animals such as horses, cattle, cats, dogs and ferrets can also become infected with rabies if they are bitten by an infected animal. Cats and dogs should be vaccinated for rabies every 1-3 years.

How is the organism transmitted?

People can become infected when they come into contact with the saliva of an infected animal, usually via a bite or scratch from an infected animal or if the saliva of the animal comes into contact with non-intact skin or a mucous membrane (such as the eyes or mouth).

What are the symptoms of rabies?

A person can develop symptoms of rabies from 9 days to 7 years after being bitten or scratched by an infected animal, although most people develop symptoms after 3-8 weeks after being bitten or scratched. How quickly symptoms develop also depends on how close the bite or scratch is to the head, how severe the injury is, and the amount of saliva that is introduced into the bite or scratch. Symptoms include a feeling of apprehension and excitability, with a headache, fever and malaise, and sensory changes at the site of the bite or scratch. These symptoms are followed by hypertension (high blood pressure), increased production of saliva, and difficulty in swallowing. Most human cases result in death if not promptly treated soon after contact with an infected animal.

How can someone avoid getting rabies?

Steps that can be taken to prevent becoming ill with this disease include:

- Avoiding contact with animals that are behaving strangely, as well as any wild, sick or dead animals.
- Immunizing all domestic cats and dogs against rabies and keeping immunizations up to date.
- Receiving pre-exposure immunization for rabies if one's usual occupation involves contact with animals, or if travelling to an endemic area.
- Washing all animal bites immediately with soap and water and quickly seeking medical attention.

- Reporting all bites to public health for follow-up.
- Contacting a professional to remove any bats found in the home, rather than trying to capture bats oneself.
- Preventing entry of bats into the home.

Rabies in Wellington-Dufferin-Guelph

- From 2014 to 2018, there were no laboratory-confirmed cases of rabies in people in Wellington-Dufferin-Guelph.

WEST NILE VIRUS

What is West Nile Virus?

West Nile Virus illness is a disease caused by a virus that is normally carried by mosquitoes.

Can the organism infect animals as well as people?

The virus is carried by infected mosquitoes of the *Culex* group, and is usually found in birds that have been bitten by an infected mosquito. In North America the most commonly infected birds are crows, ravens and Blue Jays. Only two *Culex* species (*Culex pipiens* and *Culex restuans*) are able to spread the virus.

How is the organism transmitted?

People can become infected with West Nile Virus when they are bitten by an infected mosquito. People can also become infected if they receive a blood donation or an organ transplant from an infected person.

What are the symptoms of West Nile Virus?

A person can develop symptoms within 2-15 days after being bitten by an infected mosquito, although most people do not develop any symptoms. Approximately 20% of infected people develop a mild flu-like illness; symptoms include a fever, headache and body ache and may also include a rash, swollen lymph nodes, nausea, vomiting, eye pain and photophobia. A small percentage of infected people develop encephalitis or paralysis.

How can someone avoid getting West Nile Virus?

Steps that can be taken to prevent becoming ill with this organism include:

- Protecting oneself against mosquito bites when outdoors, including wearing light coloured clothing, long-sleeved shirts and pants, and using an insect repellent containing DEET
- Cleaning up any standing water outside the home, such as water in bird baths, wading pools and tires.

West Nile Virus in Wellington-Dufferin-Guelph

- From 2014 to 2018, there were fewer than five reported laboratory-confirmed cases of West Nile Virus infection in Wellington-Dufferin-Guelph. Cases included persons who reported having traveled outside Ontario shortly before the onset of their illness, and were therefore considered to have contracted the disease abroad, and persons who had not travelled outside south-western Ontario and therefore appeared to have contracted the infection in or near the local area.

SECTION 3: VACCINE PREVENTABLE DISEASES

Vaccine preventable diseases are those for which a vaccine is available that can minimize a person's risk of developing the disease. Symptoms of these illnesses can vary and may include fever, a rash and respiratory or gastrointestinal symptoms. Some people may go on to develop more severe symptoms or may develop a reoccurrence of the illness later on in life.

Wellington-Dufferin-Guelph Public Health follows up on all reported probable, suspect or confirmed cases of vaccine preventable disease. The Control of Infectious Disease (CID) team is responsible for follow-up of all reported vaccine preventable disease. CID Public Health Inspectors and Public Health Nurses interview cases in an attempt to identify suspect exposures and determine how illness may have been contracted, and provide education on how to prevent future illness, including information on vaccines available to prevent illness in people who do not have any vaccine contraindications such as an allergy to vaccine components. The WDGPH Clinical Services team provides vaccinations within regularly scheduled public immunization clinics, and the School Health team visits public schools and high schools within Wellington-Dufferin-Guelph to offer publicly funded routine immunizations to students.

Where an individual is identified to have developed illness due to non-immunization, the CID team will provide information and education on available immunizations and encourage these individuals to bring their immunizations up to date in order to protect against future vaccine preventable illness.

The following reportable vaccine preventable diseases are covered in this chapter:

- Chickenpox
- Influenza
- Invasive meningococcal disease
- Invasive pneumococcal disease
- Measles
- Mumps
- Pertussis
- Rubella

CHICKENPOX

What is chickenpox?

Chickenpox, also known as varicella, is a highly contagious disease caused by the Chickenpox (varicella-zoster) virus.

Can the organism infect animals as well as people?

This organism only infects people; it is not known to occur in animals.

How is the organism transmitted?

Chickenpox is a highly infectious airborne disease. People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, such as the droplets produced when an infected person coughs or sneezes. People can also become indirectly infected by touching or breathing in virus particles from the blisters of a person with chickenpox. Shingles, the form of the disease that re-emerges in people who have been previously infected, can also cause chickenpox infections in others.

What are the symptoms of chickenpox?

A person usually develops symptoms of chickenpox within 10 to 21 days after being exposed to the virus. The first symptom of the disease is usually an itchy rash; however, some people may develop a fever and may feel generally unwell about 1 to 2 days before the rash appears. The rash most often appears first on the head (including the face), chest and back, after which it spreads to the rest of the body. It develops into raised bumps followed by blisters, which eventually scab over and then heal.

In some cases, chickenpox can lead to complications such as pneumonia or encephalitis; this is most likely to occur in adults who have been exposed to chickenpox infection for the first time, pregnant women, and people with weakened immune systems.

Chickenpox infections often remain dormant in the body long after symptoms have disappeared. In some older people, these dormant infections can re-emerge as a painful localized rash on the body. This illness is called shingles.

How can someone avoid getting chickenpox?

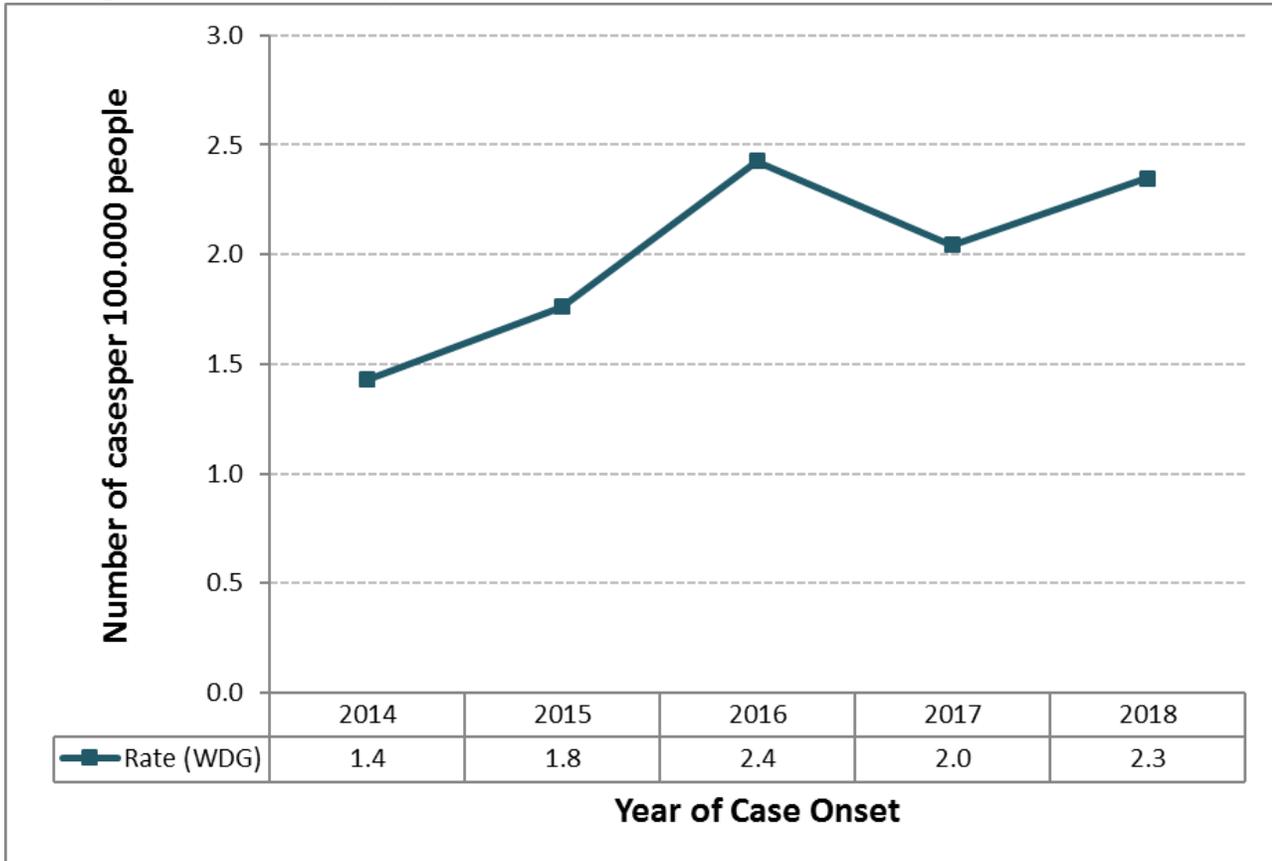
Steps that can be taken to prevent becoming ill with this disease include:

- Avoiding contact with someone who is ill with chickenpox.
- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.

- Receiving the chickenpox vaccine, as per publicly funded immunization schedules.

Chickenpox in Wellington-Dufferin-Guelph

Figure 28: Age-Standardized Incidence Rates of Laboratory-Confirmed Chickenpox in Wellington-Dufferin-Guelph and Ontario, 2014-2018



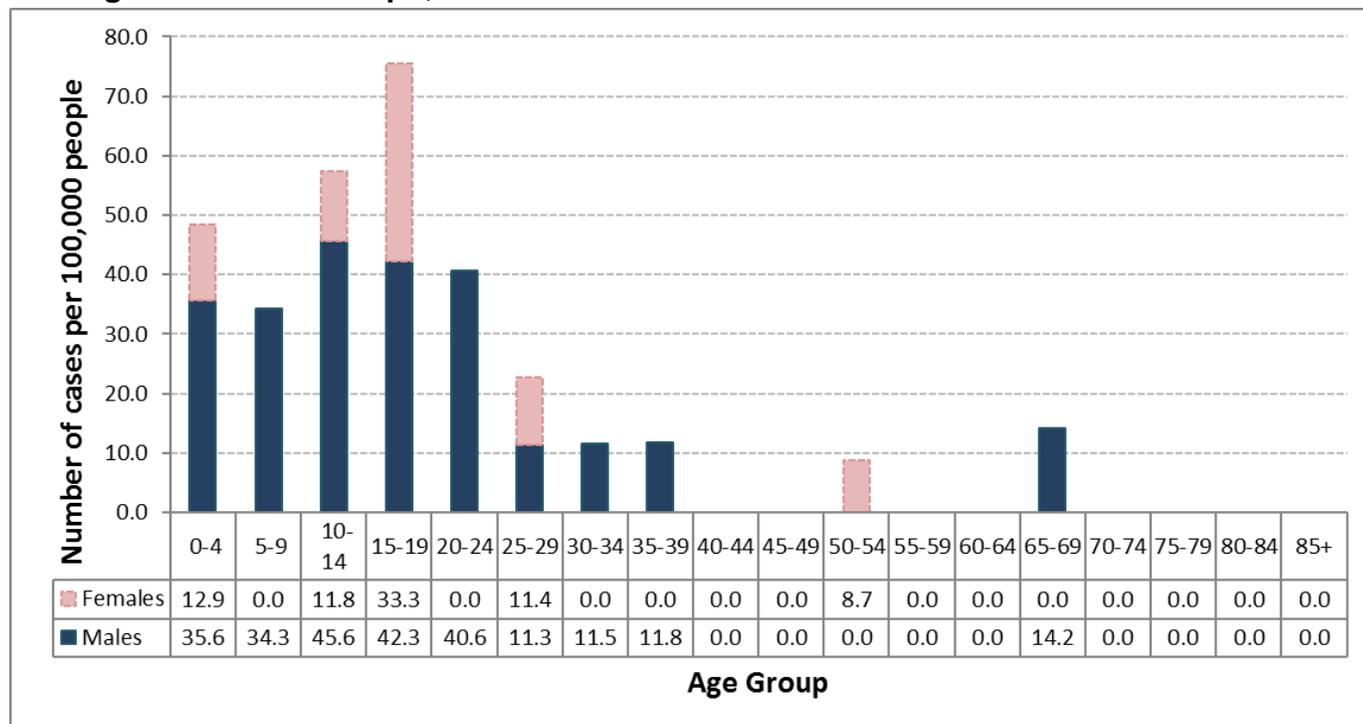
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of reported cases was greater than zero but less than five. No data available for Ontario.

- Calculated rates of chickenpox in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. In addition, many cases of chickenpox that occur in the community are not diagnosed by a physician and are therefore never reported to Public Health. The rates reported here should therefore be interpreted with caution.
- Rates of reported chickenpox rose each year from 2014 to 2018, with the exception of 2017, when the rate was lower than it had been in the previous year.

- Over the five-year period, the rate of reported cases of chickenpox was highest in 2016, at 2.4 cases per 100,000 people.

Figure 29: Incidence Rates of Laboratory-Confirmed Chickenpox by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Calculated age/gender-specific rates of chickenpox in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- Because of poor uptake of the chickenpox vaccine and because of increasing numbers of immigrants from countries where chickenpox is not very common, more cases of chickenpox have been occurring in older adults than previously occurred. This is reflected in the relatively high number of cases that occurred in age groups over nine years old in WDG in 2014 to 2018.
- Most cases of chickenpox reported to Public Health over the five years were male, including those who were children. The reason for this is unclear.

INFLUENZA

What is influenza?

Influenza (“the flu”) is caused by the influenza virus. There are 3 types of influenza virus that cause illness in humans: Influenza A, Influenza B and Influenza C. Influenza type A has 15 different subtypes, 2 of which (H1 and H3) are associated with widespread annual influenza illness.

Can the organism infect animals as well as people?

Other people are the main source of influenza infection in people. Birds, pigs and some other animal species may also become infected with influenza, and are the likely source of new, emerging subtypes of influenza.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, i.e. the droplets produced when an infected person coughs or sneezes. People can become directly infected with Influenza if they are within 2 metres of an infected person who is coughing, sneezing or talking, or may become indirectly infected with Influenza if they have contact with a surface that has been contaminated with the virus, for example, a door handle that has been handled by an infected person who has sneezed into their hands. The virus is able to live on contaminated surfaces for up to several hours (Weber and Stilianakis, 2008).

Influenza virus can be spread by someone who is infected even if that person is not experiencing any symptoms of illness.

What are the symptoms of influenza?

A person can develop symptoms of influenza within 1-3 days after being exposed to the virus. Symptoms may include a sudden fever, headache, muscle aches, runny nose, sore throat and non-productive cough. Children may also develop gastrointestinal symptoms, including nausea, vomiting and diarrhoea. Some persons infected with influenza show no symptoms.

How can someone avoid getting influenza?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after coughing or sneezing and before preparing food.
- Receiving annual influenza vaccination to protect against commonly circulating strains of the virus.

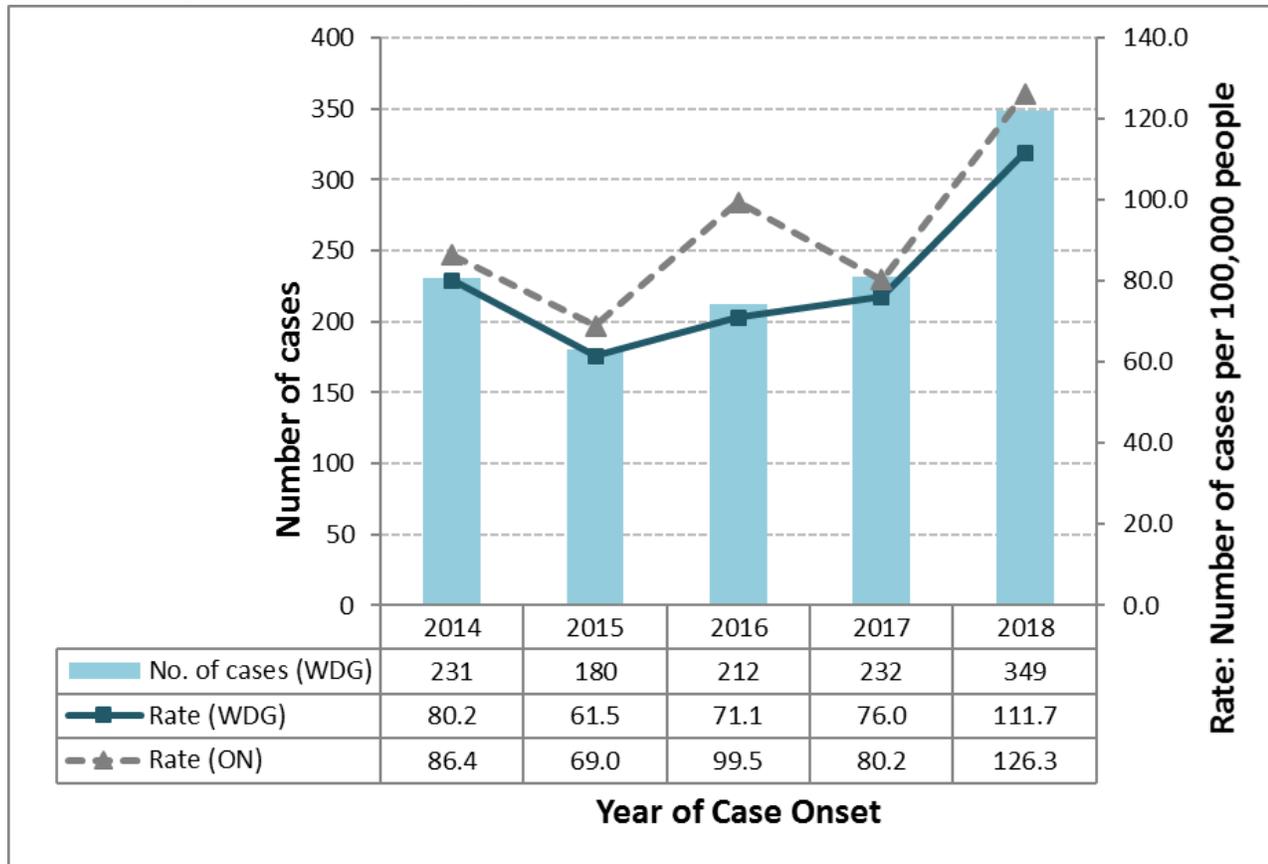
How can someone avoid spreading influenza?

If ill with influenza, one can help to prevent transmitting it to others by:

- Frequent and thorough hand washing
- Staying home from work, childcare or school when ill to prevent spreading the illness to others.

Influenza in Wellington-Dufferin-Guelph

Figure 30: Age-Standardized Incidence Rates of Laboratory-Confirmed Influenza (A and B) in Wellington-Dufferin-Guelph and Ontario, 2014-2018



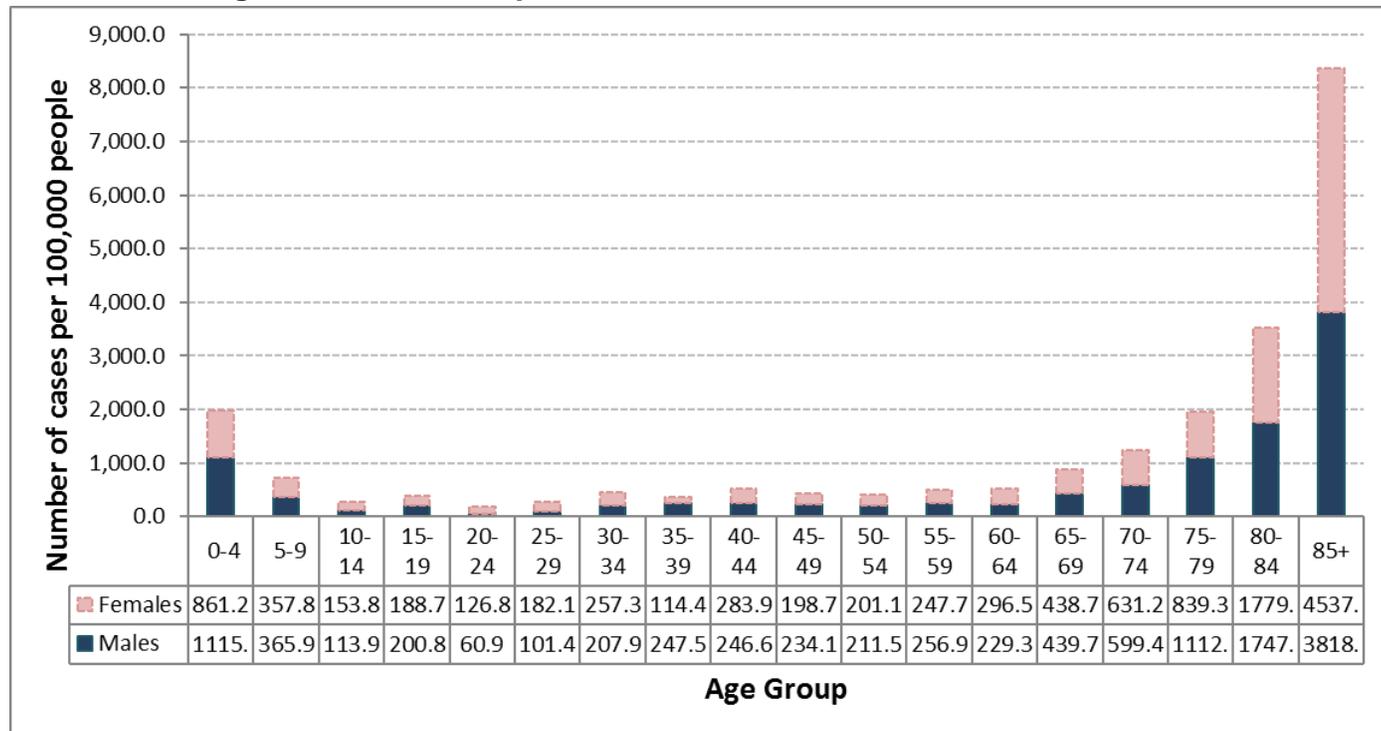
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario.

- Numbers of cases and rates shown in the chart are lower than actual levels in the population during the pandemic, as only a portion of clinical samples submitted to public health laboratories was tested for influenza.
- Over the five-year period, the incidence of influenza in WDG was highest in 2018, at 111.7 cases per 100,000 people. Circulating strains of influenza differ somewhat from season to season, and further, each calendar year shown in the chart above includes cases from two successive seasons of seasonal influenza. Therefore, the reason for this is unknown.

- From 2014-2018, the annual average rate of influenza in WDG was very similar to the provincial rate.

Figure 31: Incidence Rates of Laboratory-Confirmed Influenza (A and B) by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Over the period 2007-2011, the rate of lab-confirmed influenza was highest in the 80-84-year-old and over-85-years age groups for both sexes. This is most likely a reflection of the increased severity of the disease in older people, which often results in an increased likelihood that older people with influenza are seen by a doctor and tested for influenza, as compared to younger people with influenza.

INVASIVE MENINGOCOCCAL DISEASE

What is invasive meningococcal disease?

Invasive Meningococcal Disease is caused by bacteria called *Neisseria meningitidis* (*N. meningitidis*).

Can the organism infect animals as well as people?

Other people are the main source of infection with Invasive Meningococcal Disease. *N. meningitidis* bacteria can live in the nose and throat of healthy people (asymptomatic carriers) without causing any symptoms, but can go on to cause illness in others.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory (nose or throat) secretions of an infected person or asymptomatic carrier, i.e. the droplets produced when an infected person coughs or sneezes. People can also become infected with Invasive Meningococcal Disease if they have close or prolonged contact with an infected person or asymptomatic carrier, i.e. via kissing or sharing water bottles, utensils or other mouthed objects.

What are the symptoms of invasive meningococcal disease?

A person can develop symptoms of Invasive Meningococcal Disease within 2-10 days, but usually do so 3-4 days after being exposed to the bacteria. Symptoms include a sudden fever with progression to meningitis (infection of the membrane surrounding the brain) and/or septicemia (spread of the infection to the blood) and the development of a rash. Symptoms of meningitis include a stiff neck, sensitivity to light, headache, nausea and vomiting.

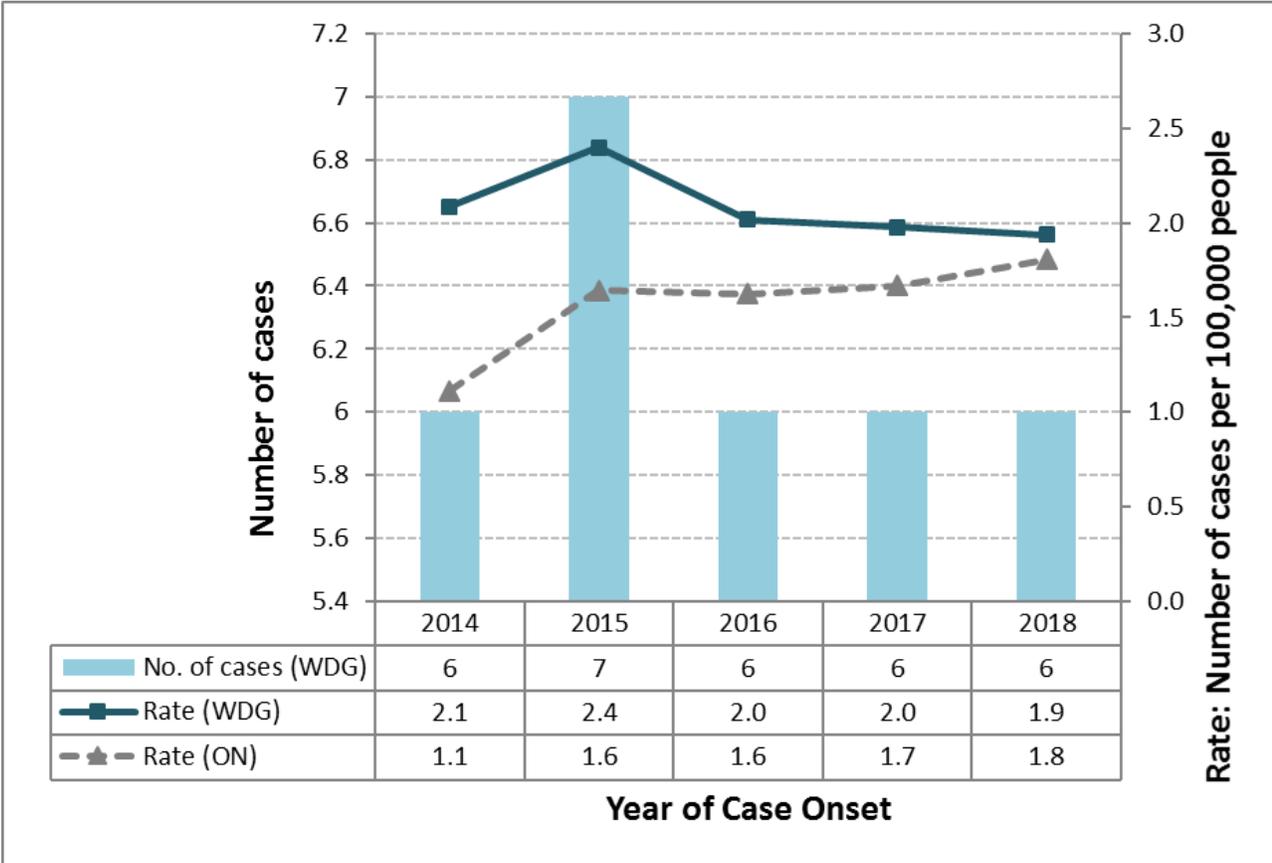
How can someone avoid getting invasive meningococcal disease?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving the meningococcal vaccine, as per publicly funded immunization schedules.
- Visiting a travel clinic prior to travelling, as meningococcal vaccine may be recommended for travellers to endemic areas.

Invasive Meningococcal Disease in Wellington-Dufferin-Guelph

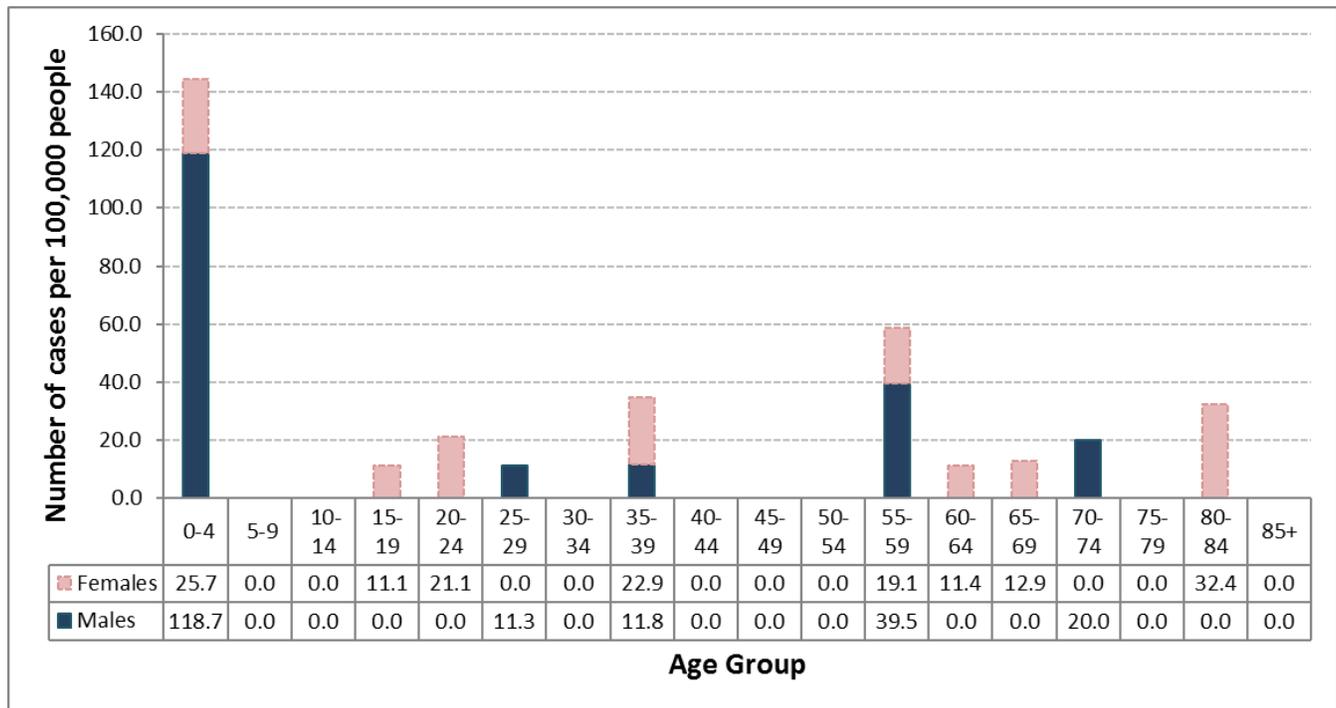
Figure 32: Age-Standardized Incidence Rates of Laboratory-Confirmed Bacterial Meningitis (including Invasive Meningococcal Meningitis) in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Calculated rates of bacterial meningitis (including invasive meningococcal meningitis) in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- In WDG, the highest incidence of the disease occurred in 2015, with a rate of 2.4 cases per 100,000 people. Provincially, the highest annual incidence was in 2018, at 1.8 cases per 100,000 people.
- Throughout the period 2014 to 2018, annual rates of the disease in WDG were higher than provincial rates, which ranged from 1.1 to 1.8 cases per 100,000 people.

Figure 33: Incidence Rates of Laboratory-Confirmed Bacterial Meningitis (including Invasive Meningococcal Meningitis) by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014-2018, other than in the 0-4 year age group in which cases were mostly males, there was no significant difference in the rates of laboratory-confirmed bacterial meningitis reported in males and females. Reported cases of the disease also occurred in a wide range of ages.

INVASIVE PNEUMOCOCCAL DISEASE

What is invasive pneumococcal disease?

Invasive pneumococcal disease is an illness caused by bacteria called *Streptococcus pneumoniae* (*S. pneumoniae*).

Can the organism infect animals as well as people?

Other people are the main source of infection with invasive pneumococcal disease. *Streptococcus pneumoniae* bacteria can live in the upper respiratory tract of healthy people (asymptomatic carriers) without causing any symptoms, but carriers can go on to cause illness in others. Children are more likely to be carriers of the bacteria than adults.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory (nose or throat) secretions of an infected person or asymptomatic carrier, i.e. the droplets produced when an infected person coughs or sneezes. People can also become infected with invasive pneumococcal disease if they have close or prolonged contact with an infected person or asymptomatic carrier, i.e. via kissing or sharing water bottles, utensils or other mouthed objects. Young children under 2 years of age, people older than 65 years of age, and people who have compromised immune systems, such as those who have had their spleens removed, are especially vulnerable to invasive pneumococcal disease (Atkinson et al, 2012 [CDC 'Pinkbook']).

What are the symptoms of invasive pneumococcal disease?

A person can develop symptoms of invasive pneumococcal disease within 1-3 days after being exposed to the bacteria. *Streptococcus pneumoniae* infection in adults may cause pneumonia, meningitis and other manifestations. Symptoms of pneumonia include a sudden fever, chills, shortness of breath, chest pain and a productive cough. Symptoms of meningitis include a high fever, stiff neck, headache, nausea, vomiting and sensitivity to light.

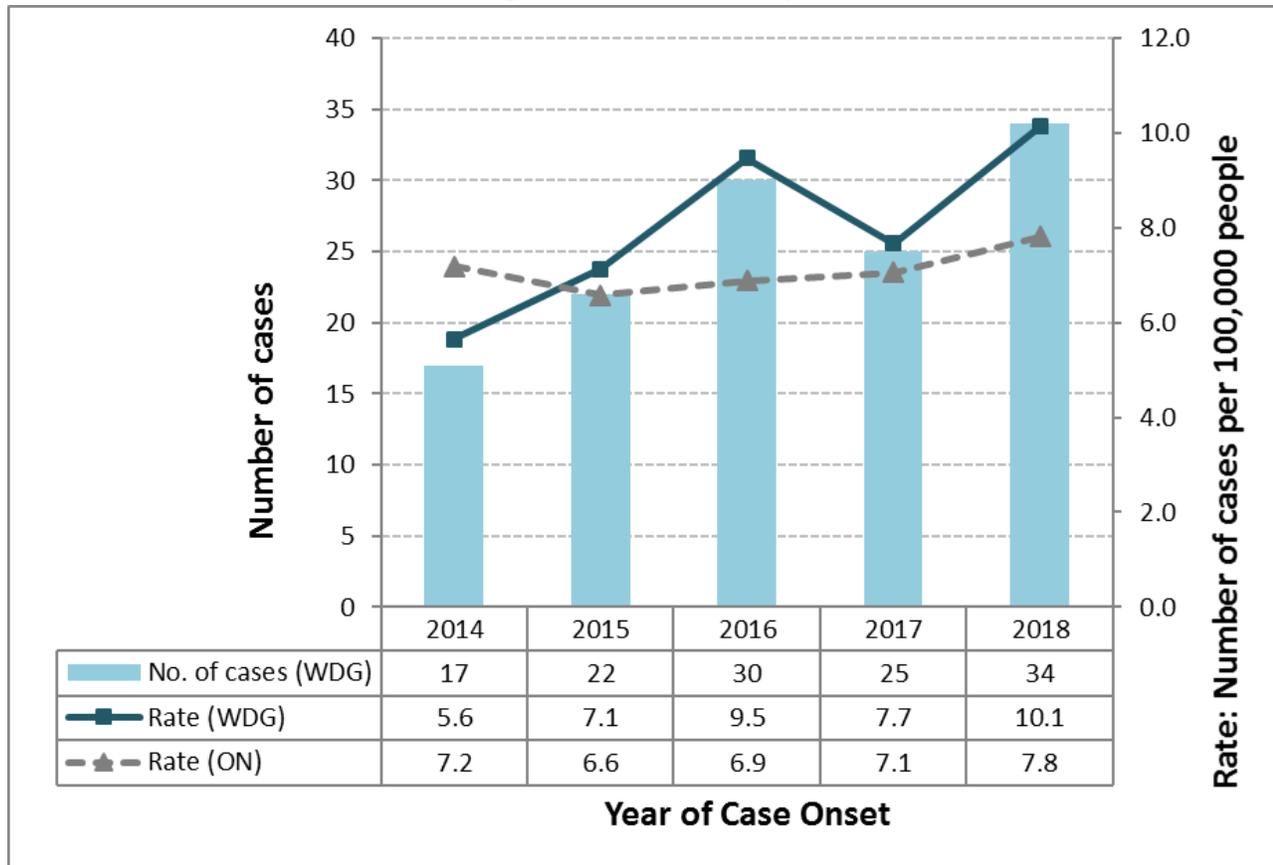
How can someone avoid getting invasive pneumococcal disease?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving the pneumococcal vaccine, as per publicly funded immunization schedules.
- Avoiding crowded living conditions, such as barracks and institutions.

Invasive Pneumococcal Disease in Wellington-Dufferin-Guelph

Figure 34: Age-Standardized Incidence Rates of Laboratory-Confirmed Invasive Pneumococcal Disease in Wellington-Dufferin-Guelph and Ontario, 2014-2018

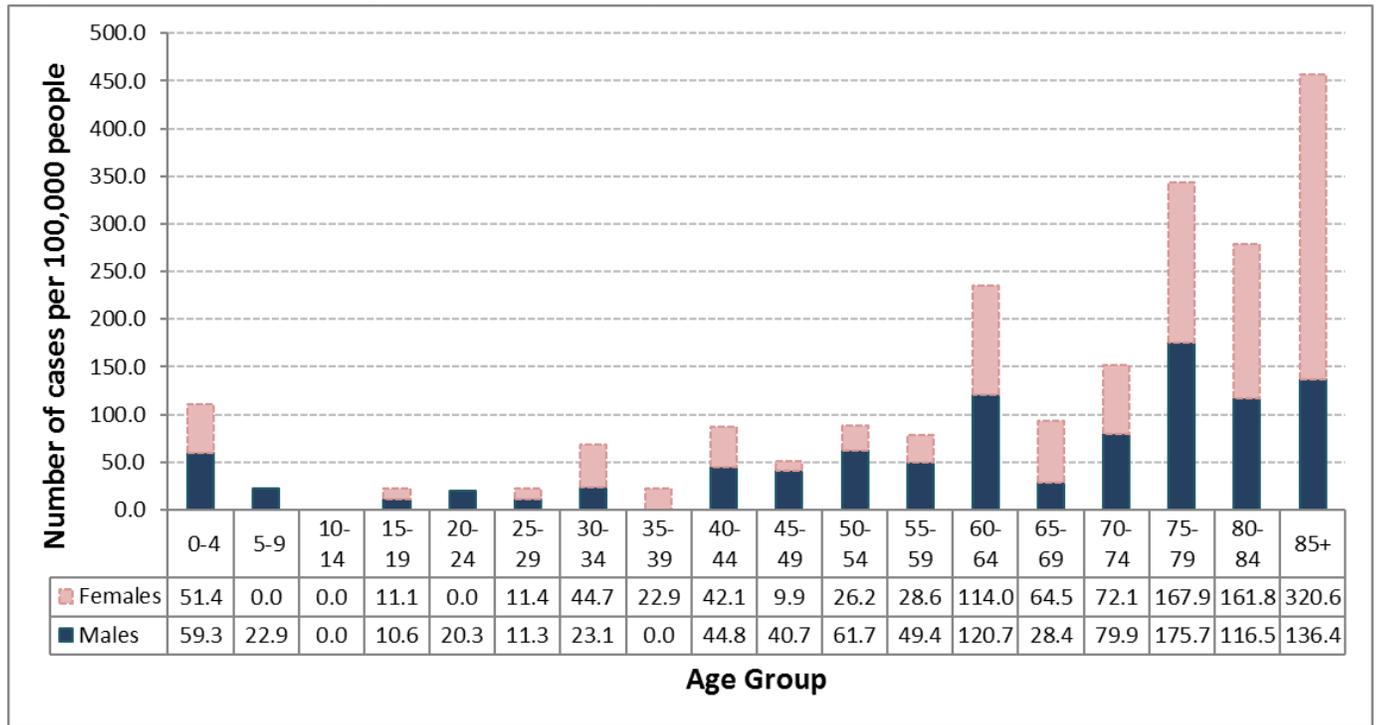


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, with the exception of 2017, there was a steady increase in the annual rate of invasive pneumococcal disease in WDG, while provincial rates remained approximately steady.
- The rate of invasive pneumococcal disease in WDG was highest in 2018, at 10.1 cases per 100,000 people.
- From 2015 to 2018, annual rates of *S. pneumoniae* infection in WDG were higher than rates of the disease in Ontario overall.

Figure 35: Incidence Rates of Laboratory-Confirmed Invasive Pneumococcal Disease by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2007 to 2011, the rate of invasive pneumococcal disease in WDG was highest in people over the age of 74 years. The higher rates in older age groups reflect the increased risk of serious illness, and therefore the increased likelihood of hospitalization and diagnosis, in these age groups.
- Young children under 2 years of age are also at increased risk; however, most children in WDG in this age group are vaccinated against pneumococcal disease and rates of reported cases in this age group was not especially high in comparison to other age groups.

MEASLES

What is measles?

Measles is a highly contagious disease caused by the measles virus.

Can the organism infect animals as well as people?

This organism only infects people; it is not known to occur in animals.

How is the organism transmitted?

Measles is a highly contagious airborne disease. People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, such as the droplets produced when an infected person coughs or sneezes. People can also become indirectly infected with measles if they have contacted with clothing or bedding that has been freshly soiled with the respiratory secretions of a case, if they share the same air space as an infected person, including up to 2 hours after the ill person has left the air space, or if they have contact with a surface that has been contaminated with the virus and then touch their nose or mouth. The virus is able to live on contaminated surfaces for up to several hours.

What are the symptoms of measles?

A person can develop symptoms of measles within 7-18 days after being exposed to the virus, although most people will develop a fever within 10 days and a rash within 14 days of being exposed. Symptoms include a fever, runny nose, cough, drowsiness and irritability, followed by a rash that begins 3-7 days after the onset of initial symptoms. A rash comprised of small white spots (commonly known as "Koplik's spots") appears in the mouth and throat, followed by a blotchy, red rash that begins on the face and spreads to the rest of the body.

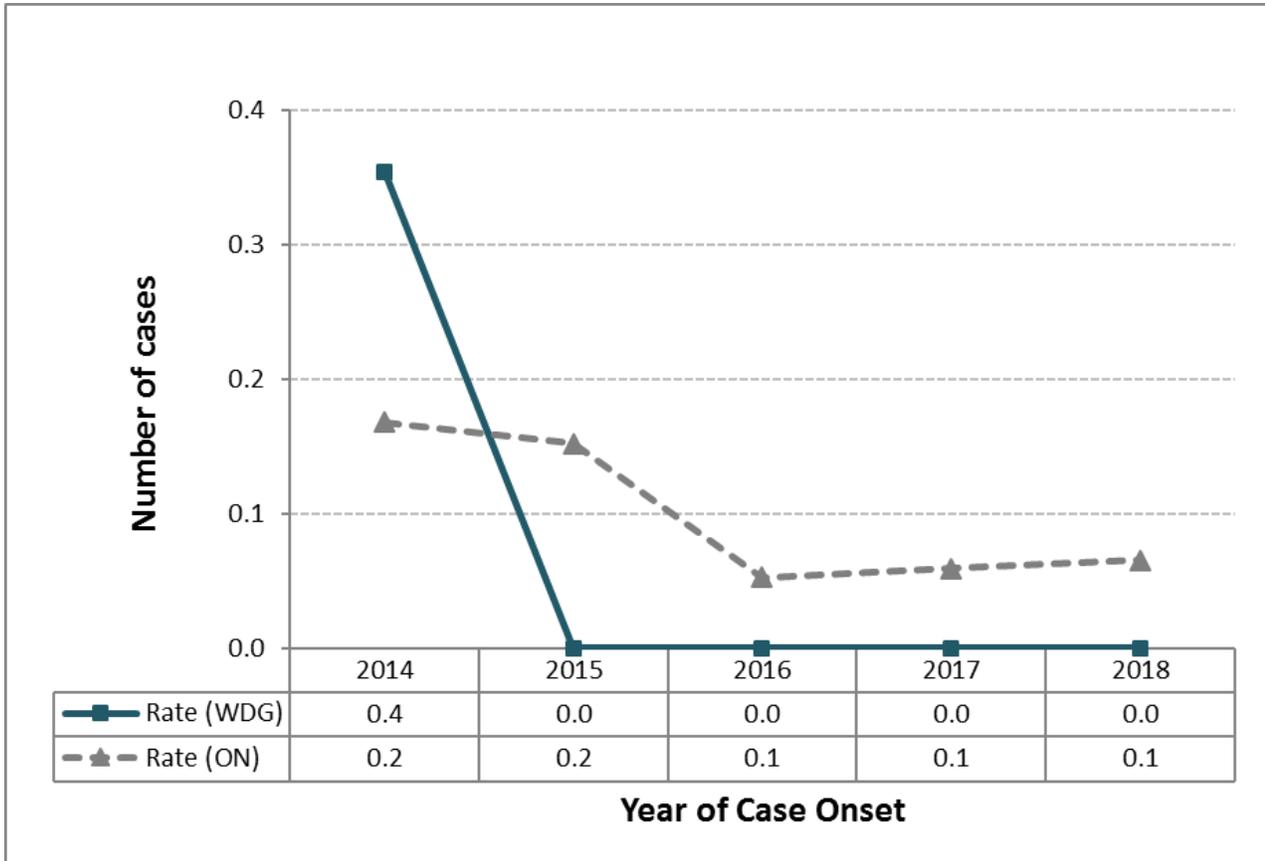
How can someone avoid getting measles?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving the measles vaccine, as per publicly funded immunization schedules.

Measles in Wellington-Dufferin-Guelph

Figure 36: Age-Standardized Incidence Rates of Laboratory-Confirmed Measles in Wellington-Dufferin-Guelph and Ontario, 2014-2018

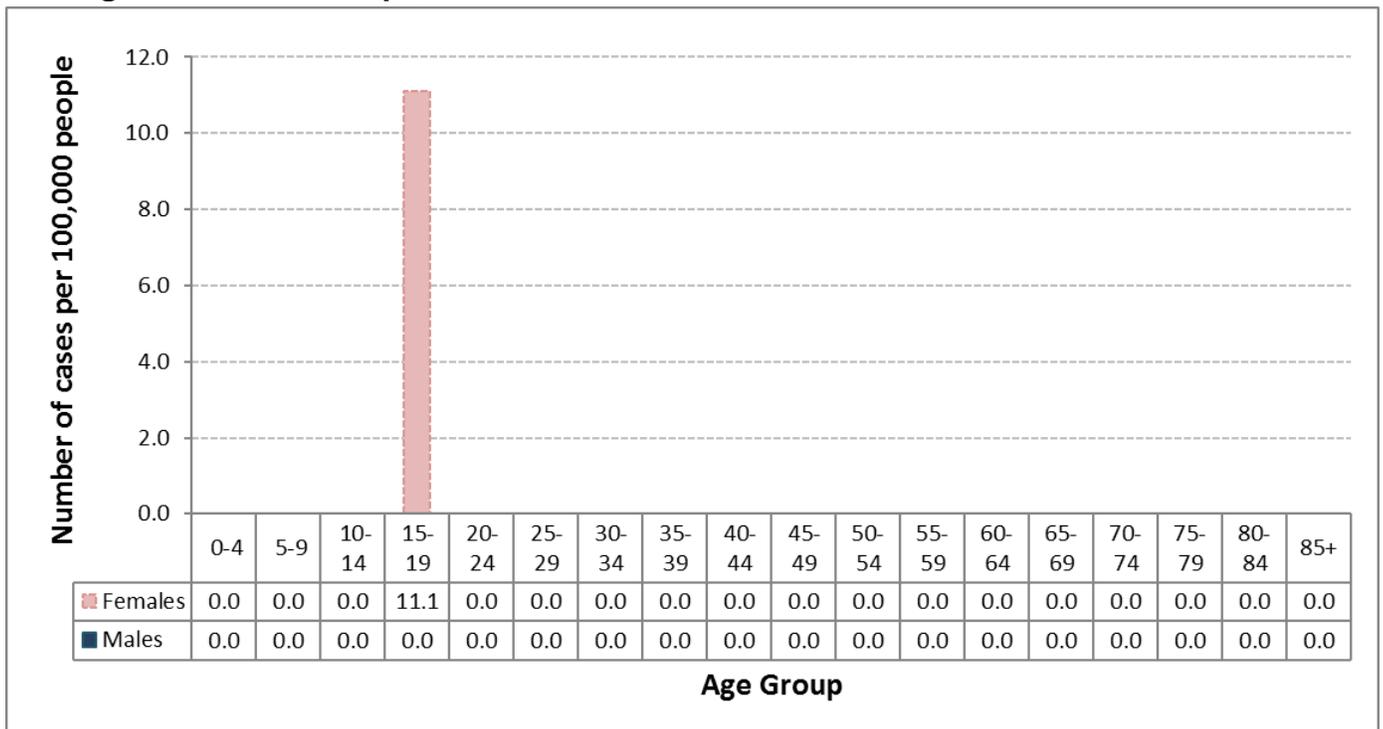


*Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario*

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of reported cases was greater than zero but less than five.

- Calculated rates of measles in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- In total, there were fewer than five cases of laboratory-confirmed measles reported in WDG over the period 2014 to 2018, with no cases reported from 2015 to 2018.
- The rate of reported measles in the province was also low during the five-year period. In four of the five years, the provincial rate was higher than that in WDG.

Figure 37: Incidence Rates of Laboratory-Confirmed Measles by Age and Gender, Wellington-Dufferin-Guelph, 2007-2011



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Calculated age/gender-specific rates of measles in WDG are based on low numbers of cases (2014 cases only) and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- Over the five-year period 2014 to 2018, all cases of measles reported to WDGPH were females aged 15-19.

MUMPS

What is mumps?

Mumps is an illness caused by the mumps virus.

Can the organism infect animals as well as people?

This organism only infects people; it is not known to occur in animals.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, i.e. the droplets produced when an infected person coughs or sneezes. People can become indirectly infected with mumps if they have close contact with an infected person, i.e. by kissing or sharing water bottles, utensils or other objects that come into contact with the mouth, or if they have contact with a surface that has been contaminated with the virus and then touch their nose or mouth. The virus is able to live on contaminated surfaces for up to several hours.

What are the symptoms of mumps?

A person can develop symptoms of mumps within 14-21 days after being exposed to the virus. However, most people will develop a fever within 14-16 days of being exposed to the virus. Symptoms may include a fever, and swelling and tenderness of the salivary glands. Approximately one in three infected people will develop respiratory tract infections without any salivary gland swelling.

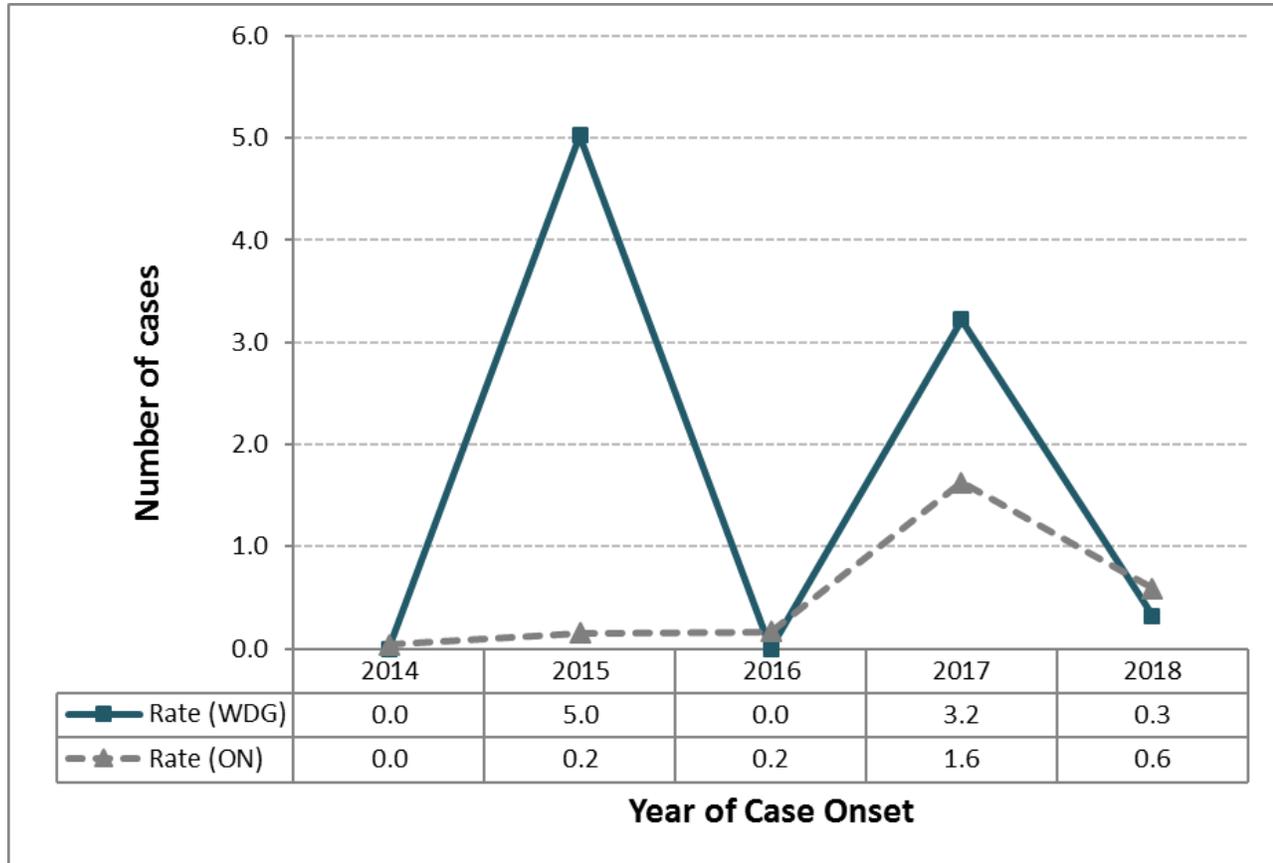
How can someone avoid getting mumps?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving the mumps vaccine, as per publicly funded immunization schedules.

Mumps in Wellington-Dufferin-Guelph

Figure 38: Age-Standardized Incidence Rates of Laboratory-Confirmed Mumps in Wellington-Dufferin-Guelph and Ontario, 2014-2018



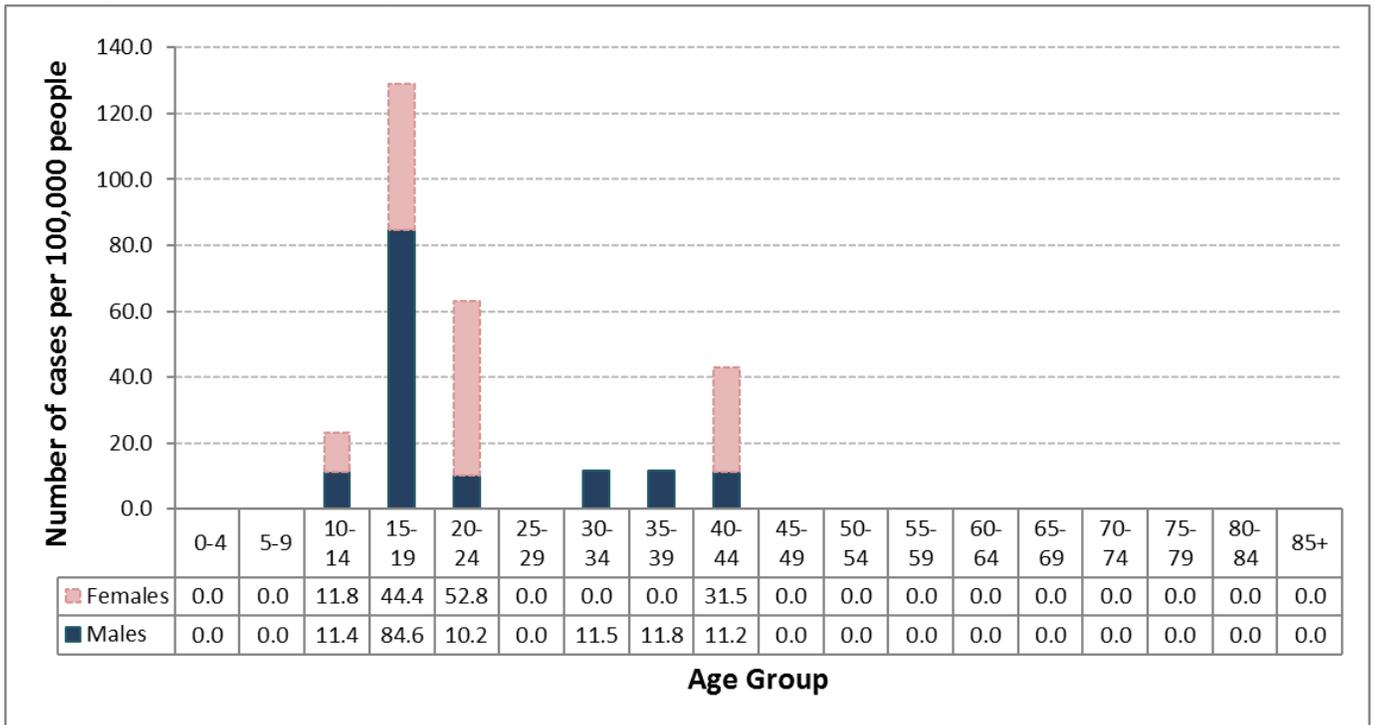
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of reported cases was greater than zero but less than five.

- Calculated rates of mumps in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- Trends seen in the annual rates of mumps on WDG reflected two outbreaks of the disease in the area in 2015 and 2017, respectively.
- In 2014, 2016 and 2018, there were few or no cases of laboratory confirmed mumps reported in WDG.
- The rate of reported measles in the province was generally low over the five-year period, with the rate being over 1 case per 100,000 people in only one year.

Figure 39: Incidence Rates of Laboratory-Confirmed Mumps by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, from 2014 to 2018, there was no difference in the proportion of male and female cases of mumps reported in WDG.
- All cases reported over the five-year period were in children, teens and young adults with no cases younger than 10 years old or older than 44 years of age.

PERTUSSIS

What is pertussis?

Pertussis is a disease caused by the bacteria *Bordetella pertussis* (*B. pertussis*). Pertussis is commonly known as “Whooping Cough”.

Can the organism infect animals as well as people?

This species of *Bordatella* bacteria only infects people; it is not known to occur in animals.

How is the organism transmitted?

People can become infected when they have direct contact with the respiratory secretions of an infected person, i.e. the droplets produced when an infected person coughs or sneezes.

What are the symptoms of pertussis?

A person can develop symptoms of pertussis within 5-21 days after being exposed to the virus. However, most people develop symptoms within 7-10 days of being exposed to the virus. Symptoms include a mild cough that increases in severity and frequency after 1-2 weeks, with the development of a characteristic ‘whoop’ between incidents of violent coughing, often resulting in vomiting. Symptoms persist for several months before becoming less severe and eventually resolving.

Pertussis is typically most common in school-aged children, and is most serious in young children under one year of age. However, it can occur in persons of any age.

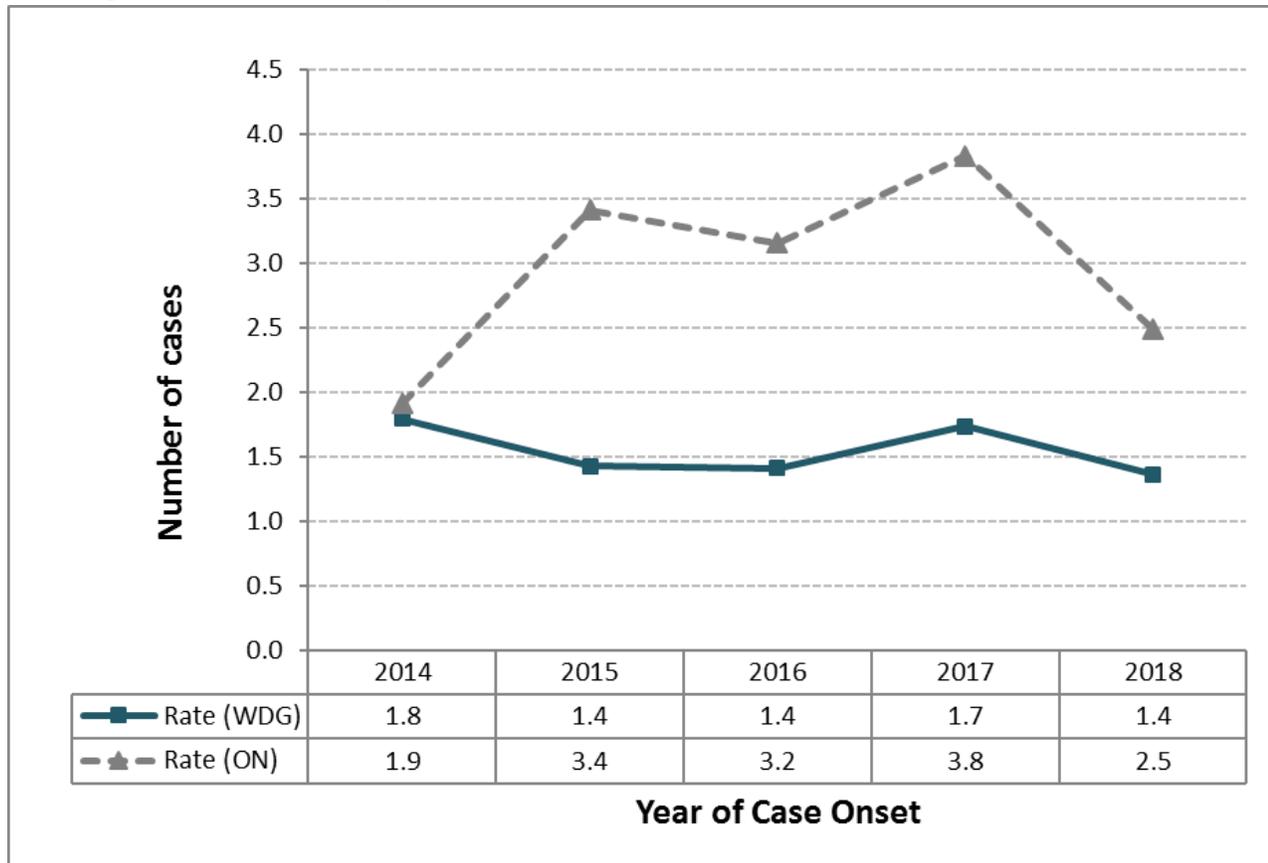
How can someone avoid getting pertussis?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding contact with any person ill with pertussis, especially if you are elderly, immunocompromised, a child under 1 year of age or a pregnant woman, until 5 days after the ill person has begun treatment with antibiotics or until at least 21 days after the start of symptoms.
- Receiving the pertussis vaccine, as per publicly funded immunization schedules.

Pertussis in Wellington-Dufferin-Guelph

Figure 40: Age-Standardized Incidence Rates of Laboratory-Confirmed Pertussis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

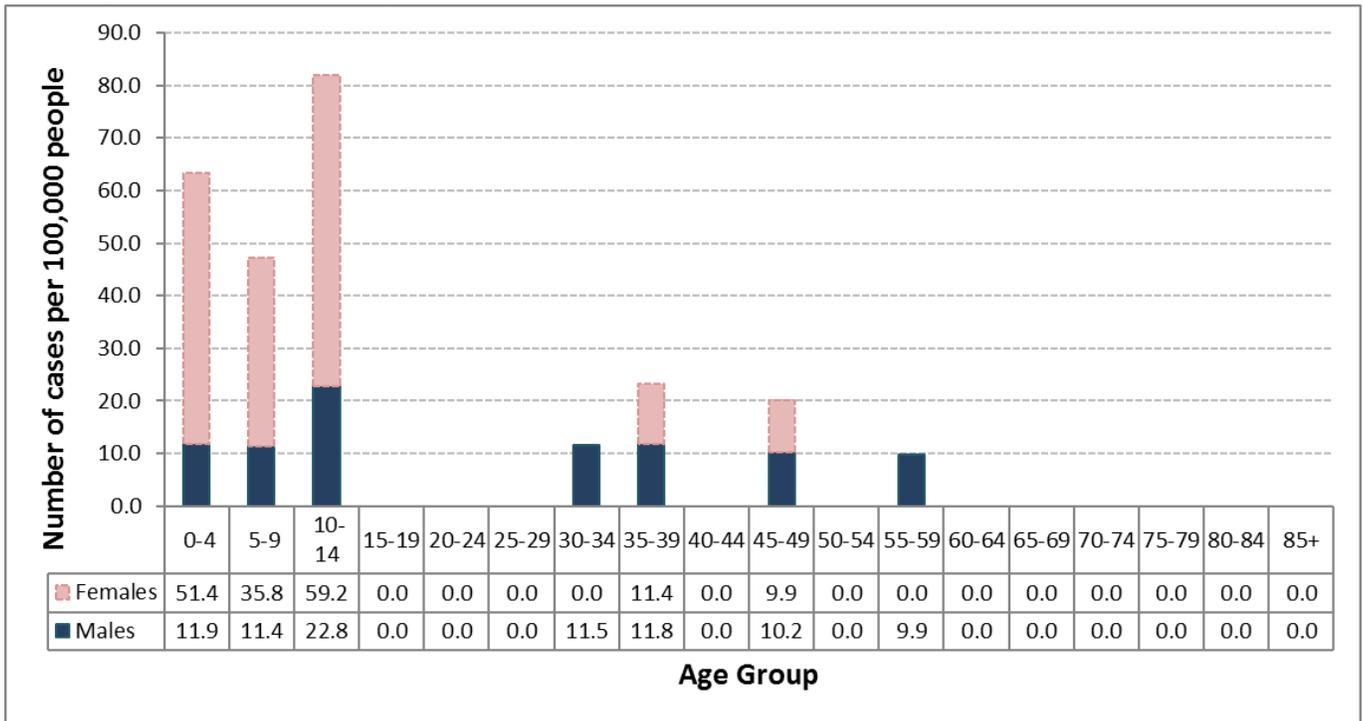


*Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario*

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of reported cases was greater than zero but less than five.

- Calculated rates of pertussis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- From 2014 to 2018, annual rates of pertussis remained approximately steady in WDG, ranging from 1.4 to 1.8 cases per 100,000 people.
- Throughout the five-year period, rates of laboratory confirmed pertussis in WDG were lower than rates of the disease in Ontario, which ranged from 1.9 to 3.8 cases per 100,000 people.

Figure 41: Incidence Rates of Laboratory-Confirmed Pertussis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Over the period 2014-2018, most of the laboratory-confirmed cases of pertussis in WDG occurred in children and teenagers under 14 years of age, that is, in pre-school and school-aged children. This reflects the typical age-distribution of the disease.
- There were more laboratory-confirmed cases of pertussis in WDG in females than in males. This applied to cases in both children and adults, and may reflect the fact that females, especially those of school age, are most likely to come into close contact with each other than males.

RUBELLA

What is rubella?

Rubella is an illness caused by the rubella virus. This disease is also known as “German Measles”.

Can the organism infect animals as well as people?

This organism only infects people; it is not known to occur in animals.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, i.e. the droplets produced when an infected person coughs or sneezes. People can become indirectly infected with rubella if they have close contact with an infected person, i.e. by kissing or sharing water bottles, utensils or other objects that come into contact with the mouth, or if they have contact with a surface that has been contaminated with the virus and then touch their nose or mouth. The virus is able to live on contaminated surfaces for up to several hours.

What are the symptoms of rubella?

A person can develop symptoms of Rubella within 14-21 days after being exposed to the virus, although most people will develop a fever within 14-17 days of being exposed to the virus. Symptoms include a fever, headache, runny nose, malaise, red and inflamed eyes, and a rash which starts on the face and spreads to the rest of the body within 24 hours. Up to 50% of people infected with Rubella may not show any symptoms.

How can someone avoid getting rubella?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving the rubella vaccine, as per publicly funded immunization schedules.
- Being aware of the importance of being vaccinated for Rubella before becoming pregnant, as infection during early pregnancy can cause severe problems for the baby.

Rubella in Wellington-Dufferin-Guelph

- From 2007 to 2011, there were no laboratory-confirmed cases of rubella in Wellington-Dufferin-Guelph.

SECTION 4: SEXUALLY-TRANSMITTED AND BLOOD-BORNE INFECTIONS

Sexually-transmitted infections (STIs) are infections with organisms that are passed from one person to another by sexual contact. Diseases caused by such organisms include chlamydial infection, syphilis, gonorrhoea and human immunodeficiency virus (HIV) infection, which can progress to the illness Acquired Immunodeficiency Syndrome (AIDS).

Some infections are spread by contact with the blood of an infected person. Diseases caused by blood-borne infections include Hepatitis B and Hepatitis C. As a vaccine exists for Hepatitis B, this disease can be considered a vaccine-preventable disease; however, it has been included in this section as it is also a blood-borne disease.

The Clinical Services team at Wellington-Dufferin-Guelph follows up on all reported cases of STIs in Wellington, Dufferin and Guelph, including Chlamydia, GC, Hep B and C and Syphilis and HIV. Most cases are contacted within 2-5 business days of WDGPH receiving the report of a laboratory-confirmed case. Follow-up of cases includes providing information to clients on treatment options, prevention of spread to others, and practices that can be used to protect oneself from future infections. Where possible, those who have been at risk from infections from the case being followed-up are also contacted by Public Health and are provided with similar advice and counselling.

Through Clinical Services, Public Health provides sexual health clinics that serve the local population. At these clinics, testing for STIs is made available to the public free of charge, as well as advice on prevention of infections and treatment of existing ones. Where indicated, clients are referred to other clinics and services within the WDG area where additional information and support are available. Clinical Services also provides testing, education and counselling for cases that have been recently diagnosed with the blood borne diseases Hepatitis B and C, and for those persons (contacts) who may have been exposed to infection from those cases. Public Health ensures that the relevant vaccinations of cases and their contacts vaccinations are up to date, and where necessary, provides access to immunizations against Hepatitis B and Human Papillomavirus (HPV), a virus that can cause cervical cancer in women, thus helping to reduce the client's or contact's risk of contracting these diseases in the future.

To reduce the exposure to blood-borne infections among intravenous drug users in the community, Public Health also provides needle and drug equipment exchange services in the community. To reduce the spread of STIs among drug users, testing for STIs is also made available to clients attending drop-in clinics in the local area.

The following reportable blood-borne and sexually transmitted infections are covered in this chapter:

- Chlamydial infection
- Gonorrhoea
- Hepatitis B
- Hepatitis C

- Human Immunodeficiency Virus
- Syphilis

CHLAMYDIAL INFECTION

What is Chlamydia?

Chlamydia is a disease caused by a microscopic parasite, *Chlamydia trachomatis*, which lives in the cells of an infected person. It is most often sexually transmitted and can cause infertility.

Can the organisms infect animals as well as people?

Other species of the organism, such as *Chlamydia psittaci*, are found in animals and birds. However, *Chlamydia trachomatis* is usually only found in humans.

How are the organisms transmitted?

Chlamydia trachomatis is usually passed from one person to another through sexual intercourse. Like any sexually transmitted infection, a person's risk of acquiring the infection increases with the number of sexual partners one has. However, unprotected sexual contact with one infected person can be enough to acquire the infection. Chlamydia is the most prevalent sexually-transmitted infection in Wellington-Dufferin-Guelph, in Ontario and in Canada.

What are the symptoms of Chlamydia infection?

Symptoms of Chlamydia infection usually begin within one to three weeks after sexual contact with an infected person. Men may experience a burning feeling while urinating, discharge from the penis or anus, or pain or tenderness in the testicles and rectal area. Women with symptoms often feel a burning sensation while urinating, and pain in the vagina or rectum, including during sexual intercourse. In women, there may also be a discharge from the vagina or anus.

In women, Chlamydia infection may cause inflammation of the cervix, and if untreated, can also spread to the uterus and fallopian tubes, causing infertility.

As many as one in four men and one in three women with Chlamydia infection do not develop any symptoms. However, an infected person can transmit the infection to a sexual partner even if they haven't experienced any symptoms.

How can someone avoid getting Chlamydia infection?

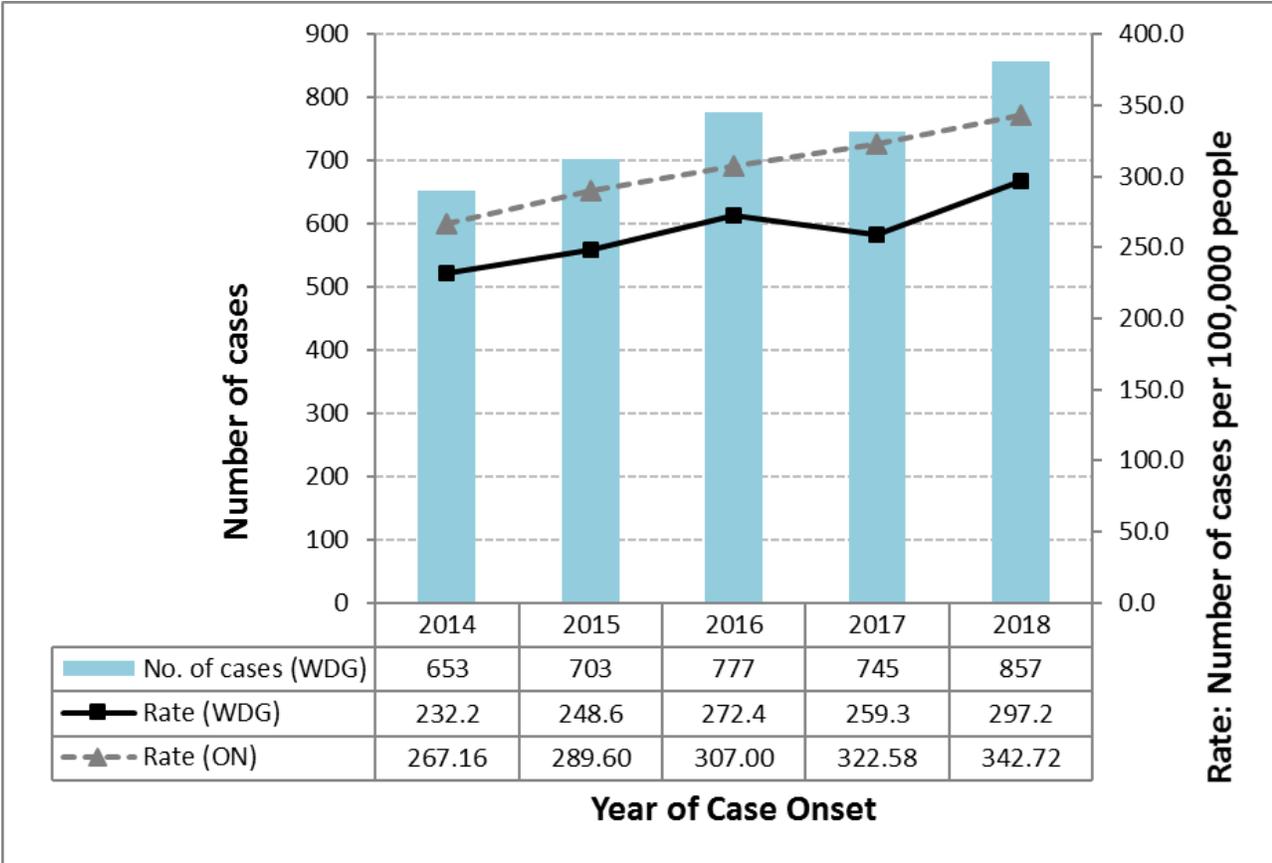
Steps that can be taken to prevent acquiring Chlamydia include:

- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.
- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with Chlamydia, and who is not having sex with anyone else.

Men or women at risk of becoming infected should be tested regularly for Chlamydia to avoid developing complications of the disease, and also to avoid spreading the infection to sexual partners. Any partners of a person who has tested positive should also be tested, and treated if infected.

Chamydia in Wellington-Dufferin-Guelph

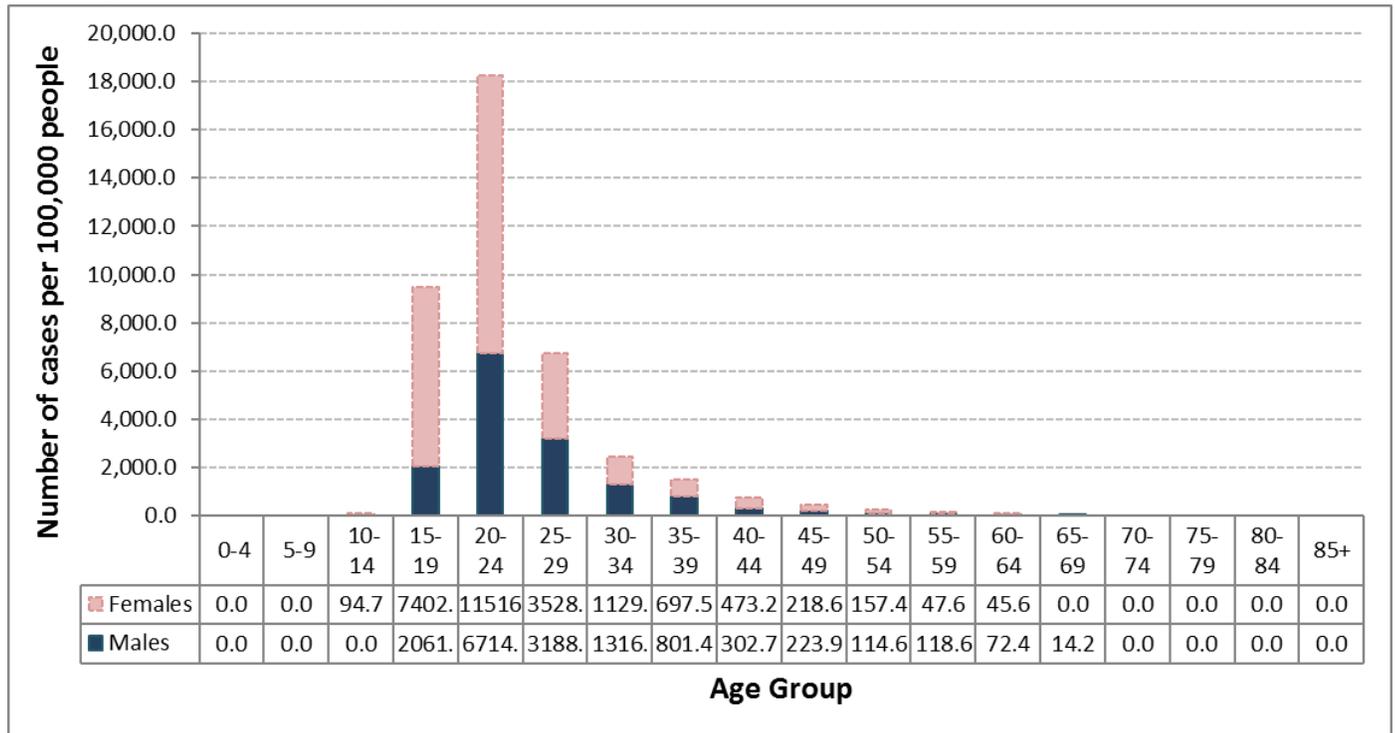
Figure 42: Age-Standardized Incidence Rates of Laboratory-Confirmed Chlamydia in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Over the past five years and more, there has been a general rising trend in the incidence rate of *Chlamydia* infections in Wellington-Dufferin-Guelph. This reflects trends in the disease that have occurred provincially and nationally, as well as throughout North America.
- From 2014 to 2018, the rate of *Chlamydia* infection in Wellington-Dufferin-Guelph, though steadily increasing, remained below the provincial rate.

Figure 43: Incidence Rates of Laboratory-Confirmed Chlamydia by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Overall, the number of laboratory-confirmed cases of Chlamydia infection in WDG has been higher in females than in males, with the highest number of cases seen in individuals aged 20-24 years.
- The observed difference in rates between the sexes may reflect the fact that females were more likely to be tested than males over the five-year period, due to women often being screened along with routine pap smears.

GONORRHOEA

What is gonorrhoea?

Gonorrhoea is a disease caused by a microscopic parasite, *Neisseria gonorrhoeae*, which infects the lining of the reproductive and urinary systems.

Can the organisms infect animals as well as people?

Neisseria gonorrhoeae is usually only found in humans.

How are the organisms transmitted?

Neisseria gonorrhoeae is usually passed from one person to another through sexual intercourse. Like any sexually transmitted infection, a person's risk of acquiring the infection increases with the number of sexual partners one has. However, unprotected sexual contact with one infected person can be enough to acquire the infection.

What are the symptoms of gonorrhoea infection?

Symptoms of gonorrhoea usually begin within one day to two weeks after sexual contact with an infected person. Many men with gonorrhoea do not experience any symptoms of the infection, but where symptoms occur, men may experience difficulty urinating and a discharge from the penis. Pain or tenderness in the testicles may also occur. Most women do not experience any symptoms, but if they do, difficulty urinating, increased vaginal discharge and bleeding between periods may occur. In men and women, infection in the rectum can cause discharge or bleeding from the anus, itching or soreness in the area, and painful bowel movements. The bacteria may also infect the throat during oral sex, which may or may not cause the symptom of a sore throat.

Women with or without symptoms may go on to develop serious complications of the infection, such as pelvic inflammatory disease and infertility. In men, infection may also cause infertility. In rare cases, the infection in either men or women may enter the blood and spread throughout the body, causing infections of the joints and skin. This condition, known as disseminated gonococcal infection, can be life-threatening.

The baby of a pregnant woman infected with gonorrhoea can become infected while passing through the birth canal during birth. This can cause blindness, joint infections or disseminated gonococcal infection in the child.

A person infected with *Neisseria gonorrhoeae* can transmit the infection to a sexual partner even if they haven't experienced any symptoms.

How can someone avoid getting gonorrhoea?

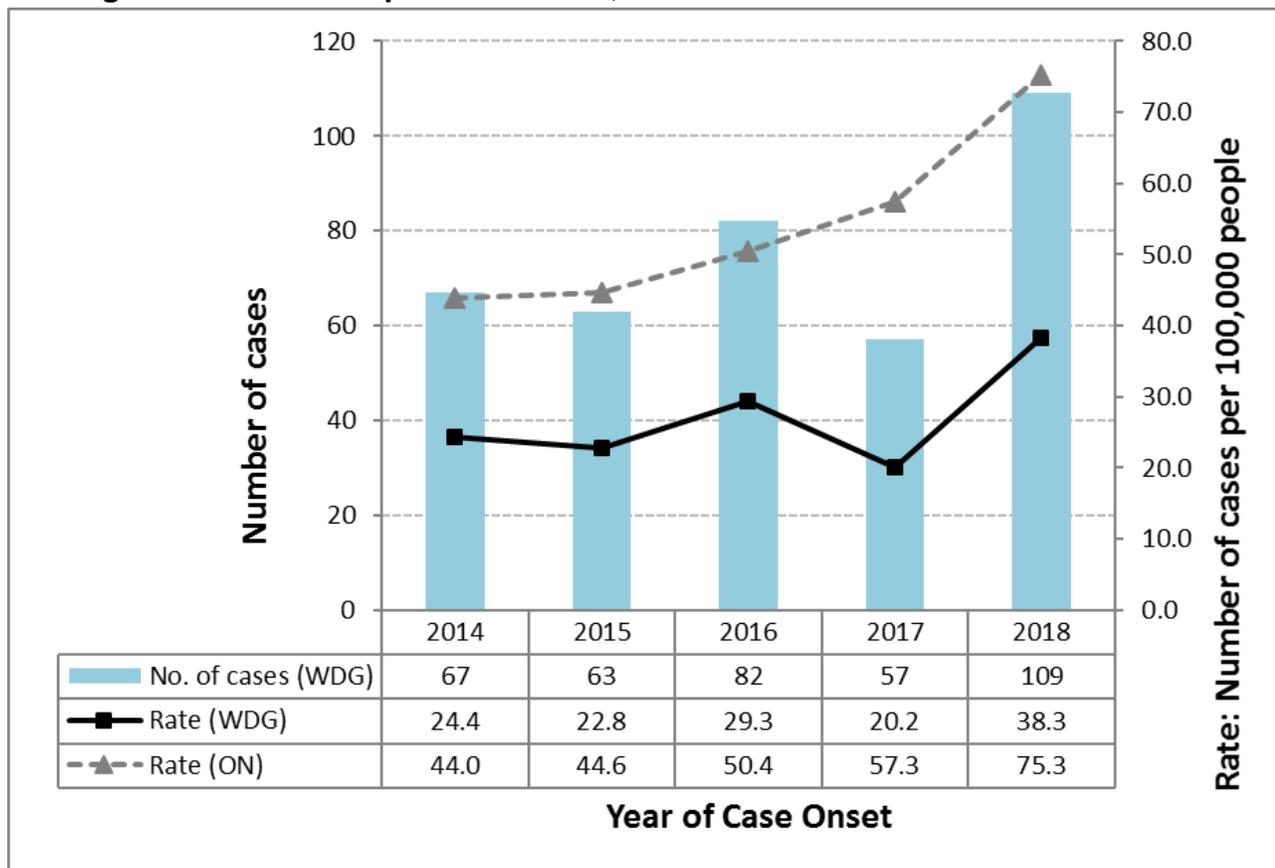
Steps that can be taken to prevent acquiring gonorrhoea include:

- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.
- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with gonorrhoea, and who is not having sex with anyone else.

Men or women at risk of becoming infected or showing symptoms of the disease should be tested for gonorrhoea to avoid developing complications of the disease, and also to avoid spreading the infection to sexual partners. Any partners of a person who has tested positive should also be tested, and treated if infected.

Gonorrhoea in Wellington-Dufferin-Guelph

Figure 44: Age-Standardized Incidence Rates of Laboratory-Confirmed Gonorrhoea in Wellington-Dufferin-Guelph and Ontario, 2014-2018



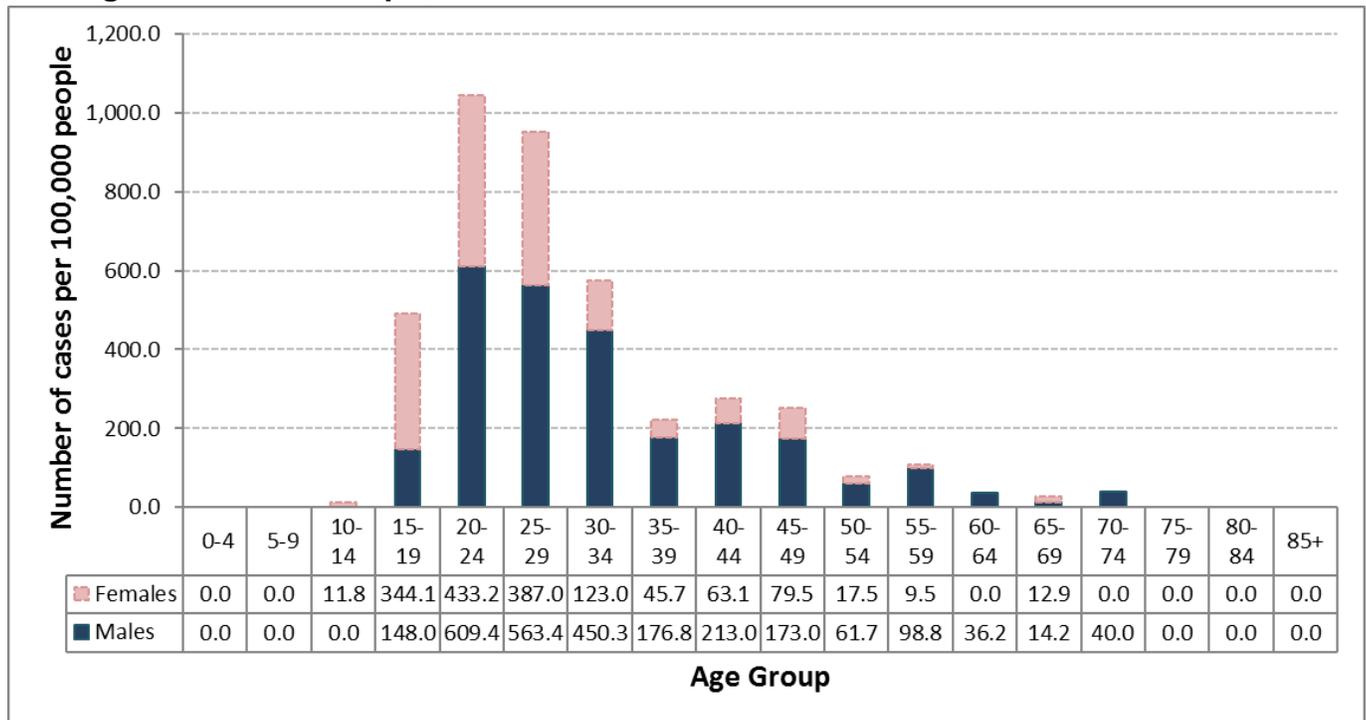
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2007 to 2011, the rate of gonorrhoea in Wellington-Dufferin-Guelph was consistently below the provincial rate. This could reflect the fact that the geographical distribution of gonorrhoea tends to be uneven throughout Canada, with relatively small

areas of high incidence associated with localized sexual networks (Wylie and Jolly, 2001).

- In WDG, within the period 2014-2018, the rate of laboratory-confirmed cases of gonorrhoea was lowest in 2017 at 20.2 cases per 100,000 people, and highest the next year (in 2018) at 38.3 cases per 100,000.
- Provincial rates of the disease rose steadily over the five-year period, with the steepest rise occurring between 2016 and 2018.

Figure 45: Incidence Rates of Laboratory-Confirmed Gonorrhoea by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- During the period 2014-2018, the highest number of laboratory-confirmed cases of gonorrhoea infection in WDG occurred in individuals aged 20-24 years.
- In teens 15-19 years of age, more lab-confirmed cases occurred in females than in males. However, in older age groups, the number of cases was generally higher in males than in females.

HEPATITIS B

What is hepatitis B?

Hepatitis B is a disease caused by the Hepatitis B virus (HBV) that affects the liver.

Can the virus infect animals as well as people?

The Hepatitis B virus is mainly found in humans, although chimpanzees and other primates may also be infected (Starkman et al, 2003; Makuwa et al 2006).

How is the virus transmitted?

HBV is usually passed from one person to another through contact with the blood or other body fluids of an infected person, such as through sexual intercourse, being born to an HBV-infected mother, sharing contaminated injection drug-taking or tattooing equipment such as needles, transfusion of blood from an HBV-positive donor, or sharing items such as razors or toothbrushes. Like any sexually transmitted infection, a person's risk of acquiring the infection increases with the number of sexual partners one has. However, unprotected sexual contact with one infected person or using contaminated equipment once can be enough to acquire the infection.

HBV is not known to be transmitted by sharing eating utensils, hugging or kissing.

What are the symptoms of hepatitis B infection?

HBV infection often produces no symptoms for several years, especially in very young children and people with compromised immune systems. During this time the virus can nevertheless be passed on by the infected person. In people who develop symptoms, HBV infection may cause a variety of symptoms including fever, jaundice, loss of appetite, abdominal pain and vomiting. These symptoms begin an average of 90 days following infection, but can begin any time between 60 and 150 days after infection. Symptoms can last for several weeks, and in some cases as long as 6 months.

If left untreated, HBV infection, even in those showing no symptoms in the weeks or months after infection, can eventually cause serious damage to the liver ranging from hepatitis (inflammation of the liver) to liver cancer, which can result in death.

How can someone avoid getting hepatitis B?

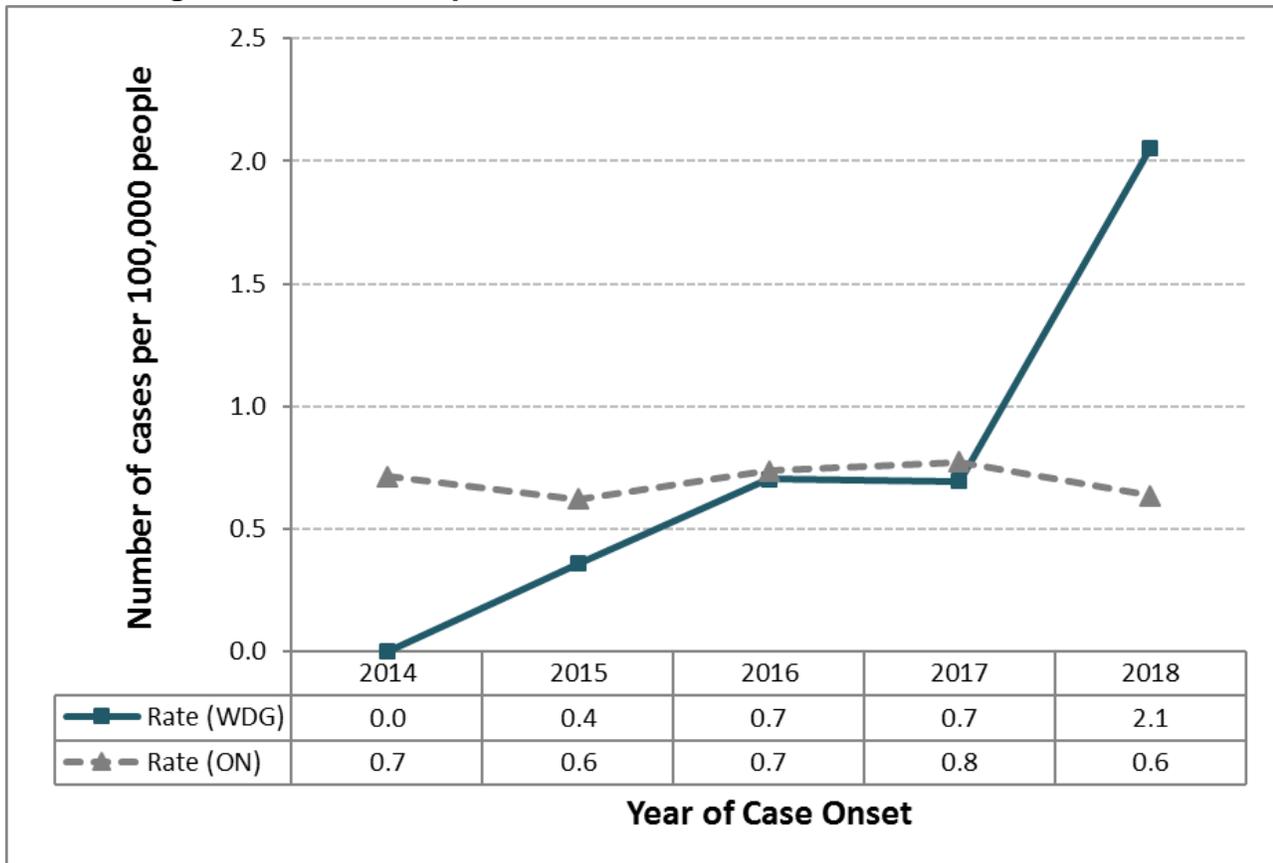
Steps that can be taken to prevent acquiring HBV infection include:

- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.

- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with HBV, and who is not having sex with anyone else.
- Being vaccinated against HBV.
- Abstaining from injection drug use.
- If injection drugs are used, using clean needles and equipment when injecting.
- Avoiding tattoo parlours where equipment may not have been sterilized properly.
- Not sharing personal care items that could be contaminated with blood, such as toothbrushes, razors, scissors or nail-clippers.
- Being especially aware of how to avoid infection, and being vaccinated against HBV, when travelling to parts of the world where HBV infection is common.

Hepatitis B in Wellington-Dufferin-Guelph

Figure 46: Age-Standardized Incidence Rates of Laboratory-Confirmed Acute Hepatitis B in Wellington-Dufferin-Guelph and Ontario, 2014-2018

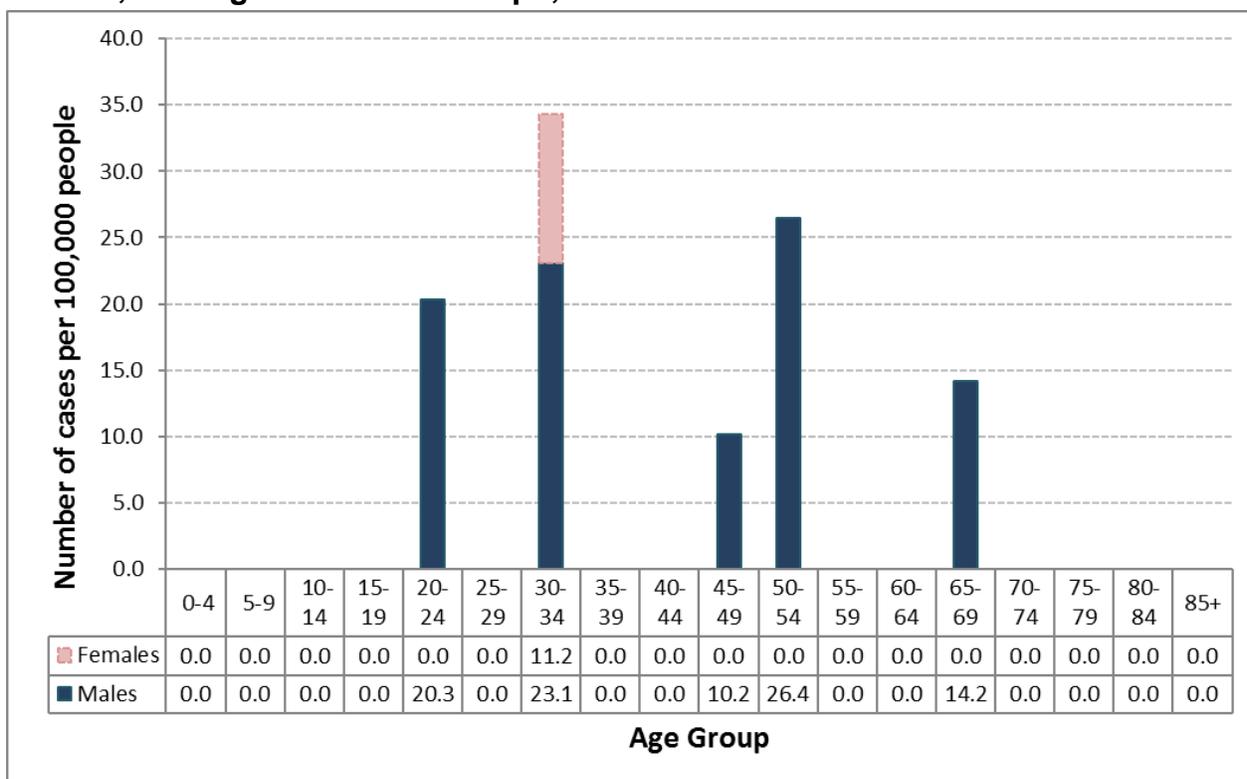


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- From 2014 to 2018, the rate of acute cases of HBV in Wellington-Dufferin-Guelph ranged from 0.0 to 2.1 cases per 100,000 people. This excludes carriers of the virus (people who were infected but showed no symptoms or were not diagnosed in the earlier stage of the infection).
- There was a steady decrease in the rate of acute HBV infections from 2014 to 2016. This was followed by a marked increase in the rate of acute infections in 2018 due to a cluster of cases among marginalized sections of the WDG population.
- In four of the five years, the rate of acute HBV infections in WDG was lower than the provincial rate of infections.

Figure 47: Incidence Rates of Laboratory-Confirmed Acute Hepatitis B by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, the rate of acute HBV infections reported to Public Health was much higher in males than in females; however, the number of cases reported to WDGPH was low and was heavily influenced by cases associated with the 2018 cluster among the homeless population.

HEPATITIS C

What is hepatitis C?

Hepatitis C is a disease caused by the Hepatitis C virus (HCV) that affects the liver.

Can the virus infect animals as well as people?

The Hepatitis C virus is usually found only in humans, although chimpanzees and other primates may also be experimentally infected (Bukh 2012).

How is the virus transmitted?

HCV is usually passed from one person to another through contact with the blood of an infected person, such as by being born to an HCV-infected mother, sharing contaminated injection drug-taking or tattooing equipment such as needles, or transfusion of blood from an HCV-positive donor. Using contaminated equipment once can be enough to acquire the infection.

This virus is not closely related to Hepatitis B virus and is not easily transmitted by sexual intercourse. A person can become infected by sexual intercourse, but this is not as common as blood-borne transmission (Centers for Disease Control).

What are the symptoms of Hepatitis C infection?

Most people with HCV infection often have no symptoms for several years. During this time the virus can nevertheless be passed on by the infected person. In people who develop symptoms, HCV infection may cause a variety of symptoms including fever, jaundice, loss of appetite, abdominal pain and vomiting. These symptoms begin an average of 4 to 12 weeks following infection, but can begin any time between 2 and 24 weeks after infection. Symptoms can last for several weeks, and in some cases as long as 6 months.

If left untreated, HCV infection, even in those showing no symptoms in the weeks or months after infection, can eventually cause serious damage to the liver ranging from hepatitis (inflammation of the liver) to liver cancer, which can result in death.

How can someone avoid getting Hepatitis C?

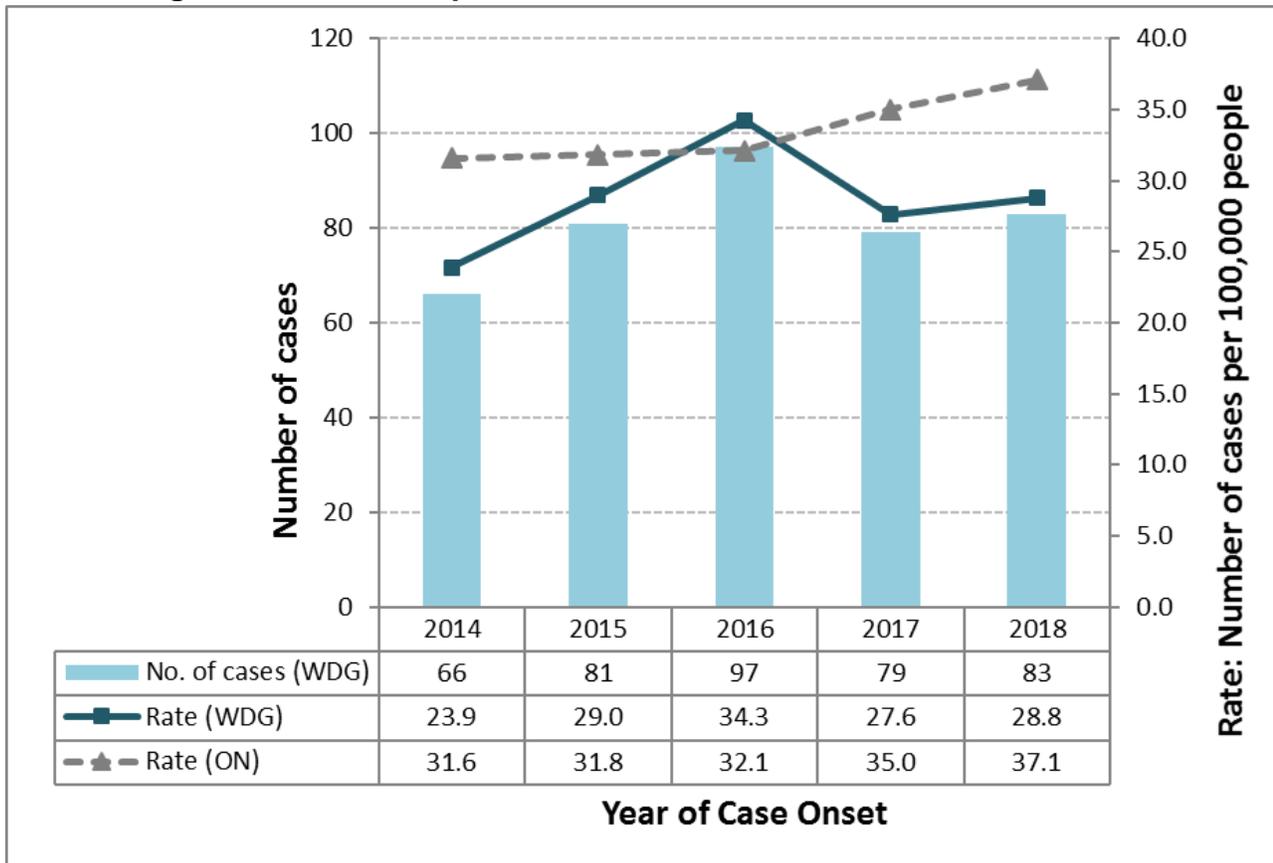
Steps that can be taken to prevent acquiring HCV infection include:

- Abstaining from injection drug use.
- If injectable drugs are used, using clean needles and equipment when injecting.
- Avoiding tattoo parlours where equipment may not have been sterilized properly.
- Not sharing personal care items that could be contaminated with blood, such as toothbrushes, razors, scissors or nail-clippers.

- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.
- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with HCV, and who is not having sex with anyone else.
- If not in a mutually monogamous relationship, avoiding sharing sex toys and always using a latex condom when having sex.

Hepatitis C in Wellington-Dufferin-Guelph

Figure 48: Age-Standardized Incidence Rates of Laboratory-Confirmed Acute Hepatitis C in Wellington-Dufferin-Guelph and Ontario, 2014-2018

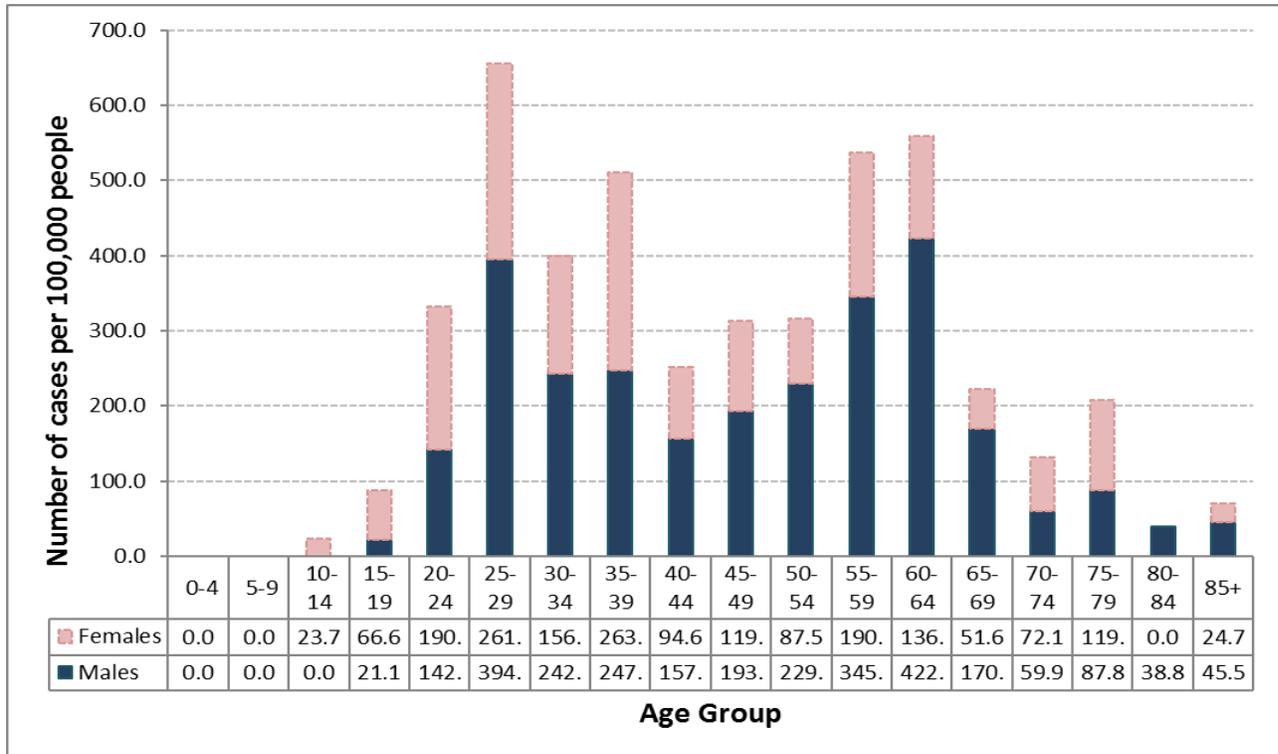


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, the rate of acute cases of HCV in Wellington-Dufferin-Guelph ranged from 23.9 to 34.3 cases per 100,000 people. This excludes carriers of the virus (people who were infected but showed no symptoms or were not diagnosed in the earlier stage of the infection).

- There was a steady increase in the rate of acute HCV infections from 2014 to 2016. This was followed by a decrease in 2017 that resulted in the 2017, 2018 and 2015 rates being similar.
- Throughout the five-year period, the rate of acute HCV infections in WDG was lower than the provincial rate of infections in all years except 2016.

Figure 49: Incidence Rates of Laboratory-Confirmed Acute Hepatitis C by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, most cases of acute HCV infections reported to Public Health occurred in adults aged 20 to 39 and 55 to 64 years.
- Most reported cases of acute HCV infection occurred in males, particularly in adults aged 40 to 69 years.

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

What is HIV?

Human immunodeficiency virus (HIV) is a virus that can destroy infection-fighting white blood cells in infected people.

Can the organisms infect animals as well as people?

HIV is usually only found in humans.

How are the organisms transmitted?

HIV is usually passed from one person to another through contact with the blood or sexual body fluids of an infected person, such as through sexual intercourse, being born to an HIV-infected mother, sharing injection drug-taking equipment such as needles, or the transfusion of blood from an HIV-positive donor. Like any sexually transmitted infection, a person's risk of acquiring the infection increases with the number of sexual partners one has. However, unprotected sexual contact with one infected person can be enough to acquire the infection.

What are the symptoms of HIV infection?

From 2 weeks to 3 months after a person has become infected, flu-like symptoms may occur, including fever, muscle aches, sore throat and fatigue. However, HIV infection very often produces no symptoms for several years, during which time the virus can nevertheless be passed on by the infected person. If left untreated, the infection eventually produces a disease called Acquired Immune Deficiency Syndrome (AIDS), where the destruction of infection-fighting white blood cells by the virus causes reduced resistance to infectious diseases, eventually resulting in death. Timely treatment of HIV infection can delay the development in AIDS in an infected person; however, infection with the virus usually cannot be eliminated by currently available treatments.

How can someone avoid getting HIV?

Steps that can be taken to prevent acquiring HIV infection include:

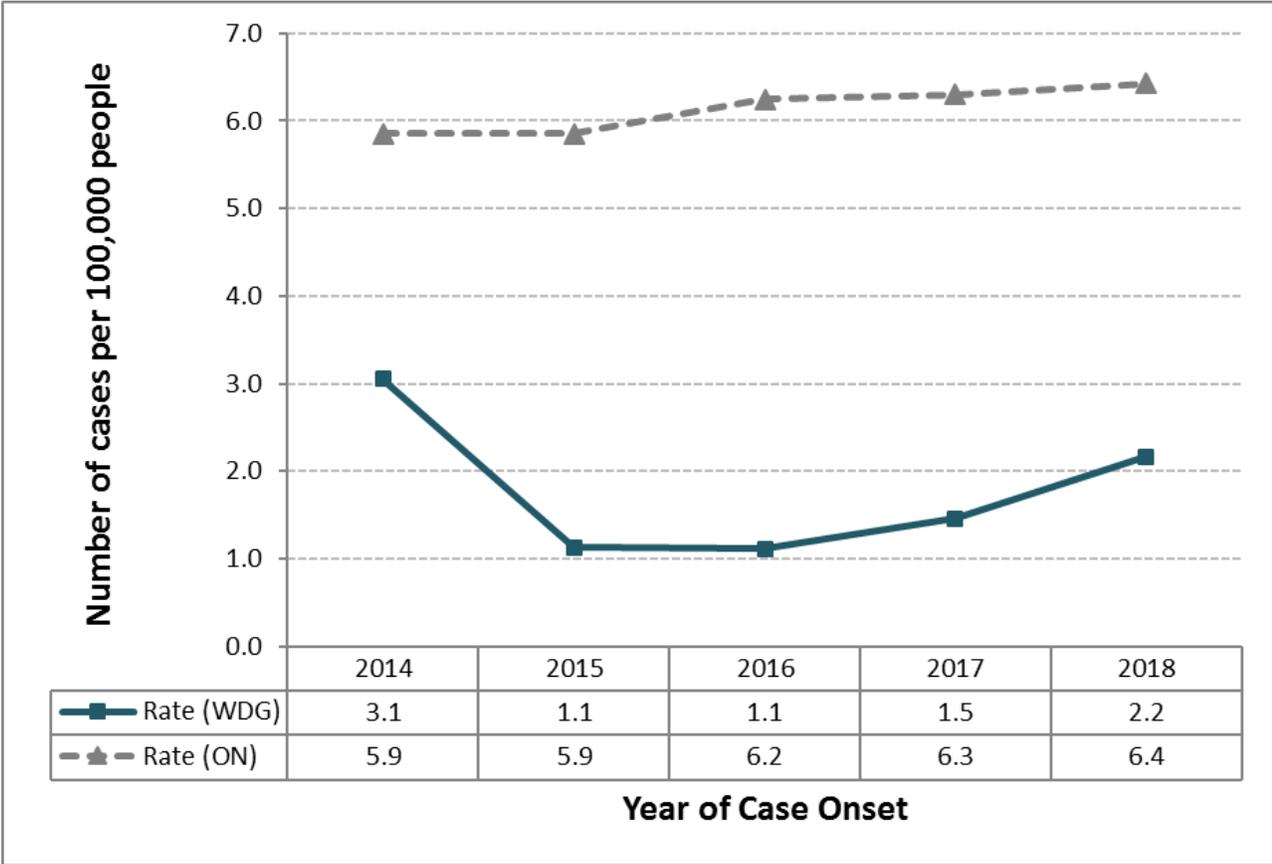
- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.
- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with HIV, and who is not having sex with anyone else.
- Abstaining from injection drug use.
- If injectable drugs are used, using clean needles and equipment when injecting.

Men or women at risk of becoming infected or showing symptoms of the disease should be tested for HIV to avoid developing AIDS, and also to avoid spreading the infection to sexual partners or unborn children. Any partners of a person who has tested positive should also be tested, and treated if infected. Beginning anti-HIV medication soon after exposure to the virus (e.g. soon after sex with an infected person) can in some cases prevent HIV infection from becoming established in the body.

The risk of transmission of infection to an unborn child by a pregnant mother who is HIV-positive may be reduced by early testing and treatment of the mother.

HIV in Wellington-Dufferin-Guelph

Figure 50: Age-Standardized Incidence Rates of Laboratory-Confirmed Human Immunodeficiency Virus Infections (Including Carriers) in Wellington-Dufferin-Guelph and Ontario, 2014-2018

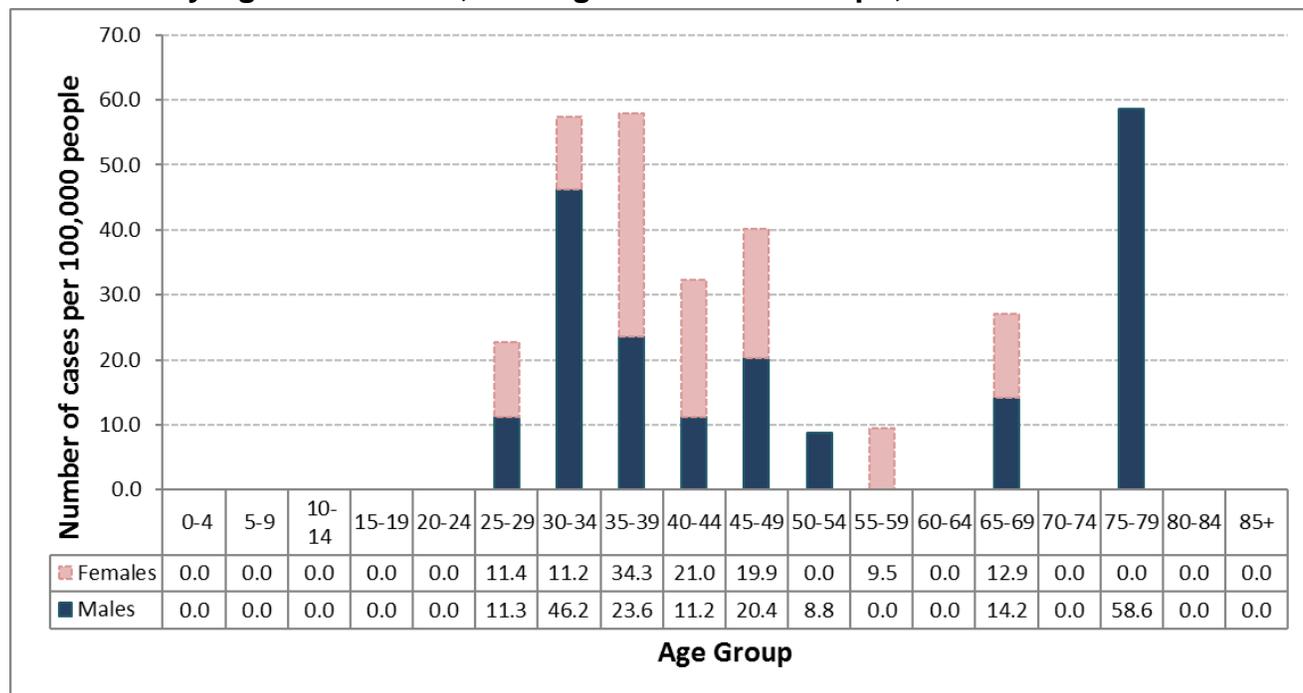


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- In three of the years from 2014 to 2018, there were fewer than five laboratory-confirmed cases of HIV in Wellington-Dufferin-Guelph, including carriers.
- Throughout the 5-year period, the rate of lab-confirmed HIV in Wellington-Dufferin-Guelph was consistently well below the provincial rate, ranging from 1.1 to 3.1 cases per 100,000 people.

Figure 51: Incidence Rates of Laboratory-Confirmed Human Immunodeficiency Virus Infections by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, cases of laboratory-confirmed or carrier HIV infections reported to Public Health occurred in adults aged 25 to 79 years.
- During this period, slightly more reported cases of laboratory-confirmed HIV infection occurred in males than in females. This could be at least partly explained by the fact that in at least half of the cases reported MSM (men having sex with men) activity; HIV infection in men practising MSM would be expected to reduce the exposure of women to the risk of being infected by sexual contact with those men.

SYPHILIS

What is syphilis?

Syphilis is a disease caused by the bacterium *Treponema pallidum*, which can infect the lining of the reproductive system and the mouth. From these, the bacterium can spread to other systems of the body, causing serious illness.

Can the organisms infect animals as well as people?

Other species of the organism, such as *Treponema cuniculi*, are found in other warm-blooded animals. However, *Treponema pallidum* is usually only found in humans.

How are the organisms transmitted?

Syphilis bacteria are usually passed from one person to another through sexual intercourse; the organism is transmitted by contact with syphilis sores on the genitals or mouth of an infected person. Like any sexually transmitted infection, a person's risk of acquiring the infection increases with the number of sexual partners one has. However, unprotected sexual contact with one infected person can be enough to acquire the infection.

What are the symptoms of syphilis?

Symptoms of syphilis begin an average of three weeks after sexual contact with an infected person, but can appear any time from 10 days to 13 weeks after. The first sign of infection is usually the appearance of a firm, painless sore (chancre), or several sores, at the point where the organism entered the body. Sores last three to six weeks. This period is referred to as the primary stage. At the end of this time, the sores usually heal whether or not the infection has been treated. However, if untreated, the infection remains in the body and goes on to produce further symptoms – in the secondary stage, then the latent and late stages of the disease.

In the secondary stage of syphilis, which can begin as the primary sore is healing or up to several weeks after, sores in the mouth, vagina or anus and rough, non-itchy skin rashes usually appear. The rash may include the palms of the hands and soles of the feet. There may also be fever, swollen lymph glands, sore throat, patchy hair loss, headaches, weight loss, muscle aches, and fatigue. Left untreated at this stage, the infection goes on to the dormant (latent) stage in which no symptoms are experienced, followed by the late stage of the disease with severe illness. The late stage of syphilis can develop as much as 10 to 20 years after the infection was first acquired. In this stage, the organs of the body show signs of damage, causing difficulty coordinating muscle movements, paralysis, numbness, gradual blindness, dementia and sometimes death.

At any stage of the disease, the syphilis infection may spread to the nervous system, causing altered behaviour and problems with movement and coordination. In addition, infection acquired by a woman during pregnancy can result in stillbirth, death of the baby shortly after

death, or infection in the newborn that can develop into severe illness and death within a few weeks after birth.

A person infected with syphilis may transmit the infection to a sexual partner even if they have not had any noticeable symptoms.

How can someone avoid getting syphilis?

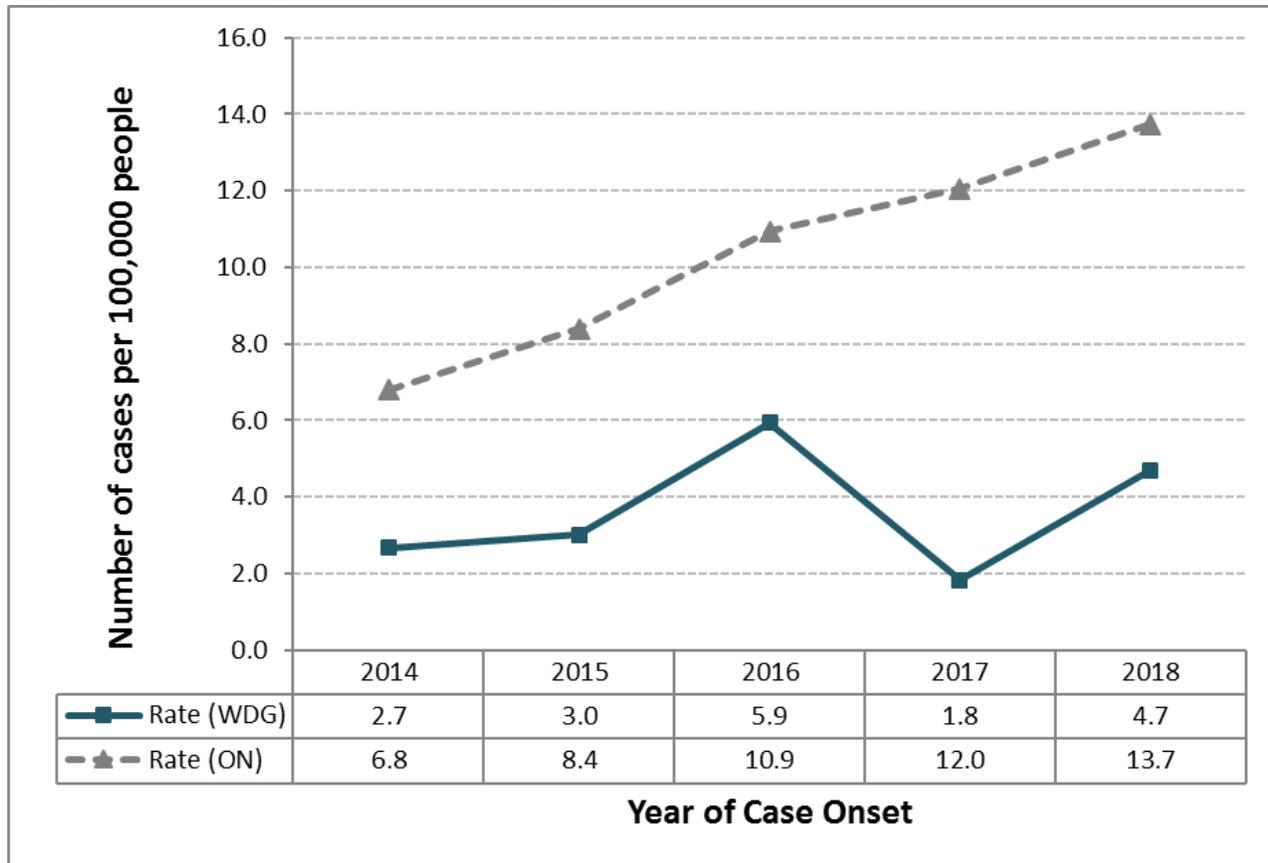
Steps that can be taken to prevent acquiring syphilis include:

- Using a condom or dental (oral) dam, avoiding sharing sex toys, or abstaining from sexual intercourse.
- Having a mutually monogamous relationship with an uninfected partner, that is, having sex with only one person who is not infected with syphilis, and who is not having sex with anyone else.
- Exercising caution even when having sex with a condom; contact with the syphilis sores of an infected partner that are not covered by a condom can allow the disease to be transmitted.

Men or women at risk of becoming infected or showing symptoms of the disease should be tested for syphilis to avoid developing complications of the disease, and also to avoid spreading the infection to sexual partners. Any partners of a person who has tested positive should also be tested, and treated if infected.

Syphilis in Wellington-Dufferin-Guelph

Figure 52: Age-Standardized Incidence Rates of Laboratory-Confirmed Infectious Syphilis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



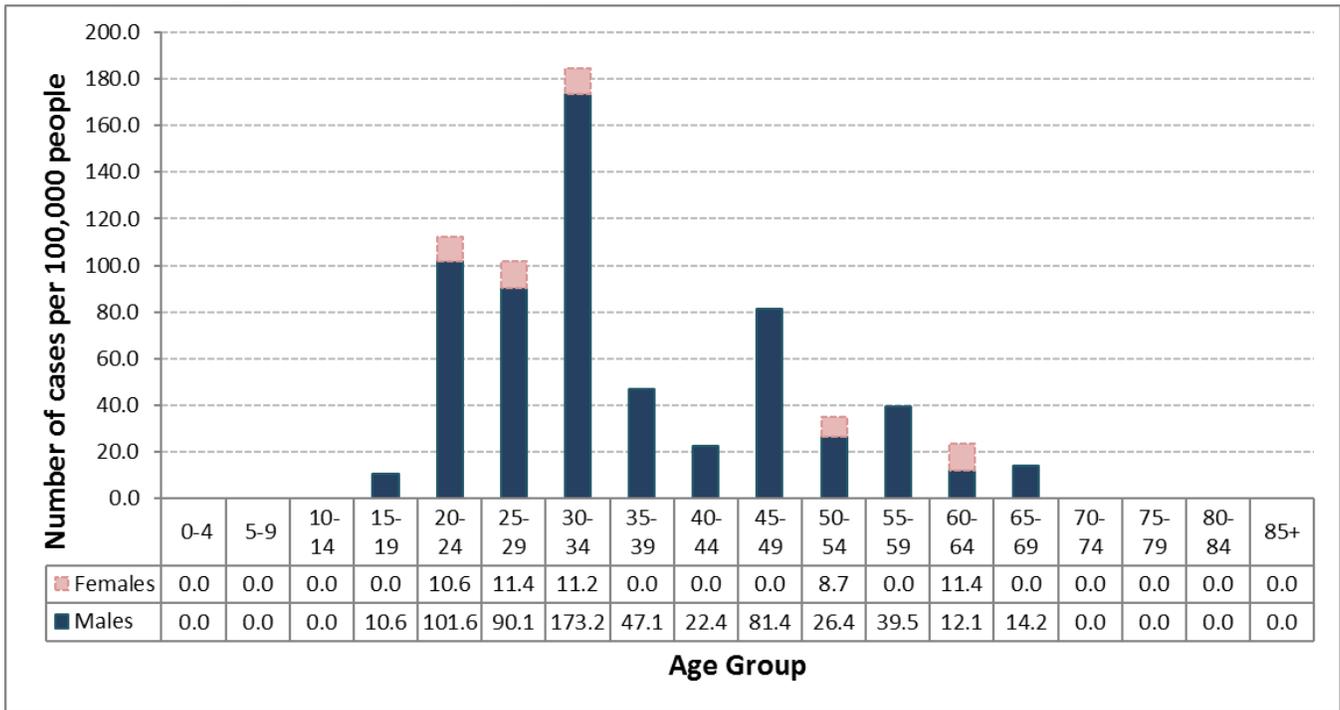
Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- From 2014 to 2018, the annual incidence of laboratory-confirmed cases of syphilis in Wellington-Dufferin-Guelph ranged from 1.8 to 5.9 cases per 100,000 people per year. This included cases in the primary and later stages of the disease.
- From 2014 to 2018, annual rates of lab-confirmed cases of syphilis reported to Public Health in WDG were unsteady.
- Over the five-year period, rates of syphilis in WDG remained consistently lower than provincial rates of the disease.

Figure 53: Incidence Rates of Laboratory-Confirmed Infectious Syphilis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2007 to 2011, the vast majority of cases of infectious syphilis diagnosed in WDG occurred in males. This is consistent with what is known about the current epidemiology of the disease in North America; the incidence of syphilis is presently highest, and rising, among the MSM (men having sex with men) community (CDC factsheet; Leber et al., 2008).
- Most cases of infectious syphilis reported to Public Health occurred in adults aged 20 to 69 years.

SECTION 5: OTHER INFECTIOUS DISEASES

In this section, 'other infectious diseases' refers to those that, while they may be spread by either the airborne or droplet route, are not spread by vectors such as animals, mosquitoes or ticks, are not sexually-transmitted infections, and cannot be prevented by vaccination. Symptoms of these illnesses can vary and may be absent, or may include chills, fever, a rash and respiratory or gastrointestinal symptoms. Some people may go on to develop more severe symptoms, including organ failure or organ impairment.

Wellington-Dufferin-Guelph Public Health follows up on all reported probable, suspect or confirmed cases of other reportable infectious diseases. The Control of Infectious Disease (CID) team is responsible for follow-up of all reported infectious diseases. CID Public Health Inspectors and Public Health Nurses interview cases in an attempt to identify suspect exposures and determine how illness may have been contracted, and provide education on how to prevent future illness. CID staff may also become involved in ensuring that people diagnosed with active tuberculosis (TB) disease complete the prescribed course of medication, by observing these individuals on a daily basis or as necessary, to ensure that medications are taken.

The following reportable diseases are covered in this chapter:

- Encephalitis/Meningitis
- Group A Streptococcus Disease, Invasive (iGAS)
- Legionellosis
- Tuberculosis

ENCEPHALITIS/MENINGITIS

What is encephalitis/meningitis?

Encephalitis is disease caused by several viruses, including enteroviruses, coxsackie virus and arboviruses, that affect the brain. Encephalitis (inflammation of the brain) can also be caused by several bacteria, fungi or protozoa. Meningitis (inflammation of the membrane surrounding the brain) can be caused by either bacteria or viruses, including *E.coli*, *Staphylococcus aureus*, measles, mumps and varicella (chickenpox).

Can the organisms infect animals as well as people?

Bacterial meningitis is only found in humans. Some viruses that cause viral meningitis and encephalitis (such as measles, mumps and varicella) are only found in humans, but others are also found in animals - for example, West Nile Virus and St. Louis Encephalitis are carried by mosquitoes.

How are the organisms transmitted?

The route of transmission varies, depending on the causative agent. For example, arboviruses such as West Nile Virus and St. Louis encephalitis are spread when a person is bitten by an infected mosquito. Meningitis is usually spread by a person coming into contact with droplets or discharges from an infected person's nose or throat.

What are the symptoms of encephalitis/meningitis?

A person can develop symptoms of encephalitis within 5-15 days after being exposed to a virus, although most people do not develop any symptoms. The time between exposure and onset of symptoms varies for both encephalitis and meningitis, depending on the organism to which a person is exposed. Some people infected with encephalitis only develop a mild illness and experience a febrile headache; other people may develop more severe symptoms of encephalitis, including a sudden headache, fever, symptoms of meningitis and possibly tremors, coma and paralysis. Symptoms of meningitis include a sudden high fever, headache, vomiting, seizures, stiff neck and a skin rash on the hands and feet.

How can someone avoid getting encephalitis/meningitis?

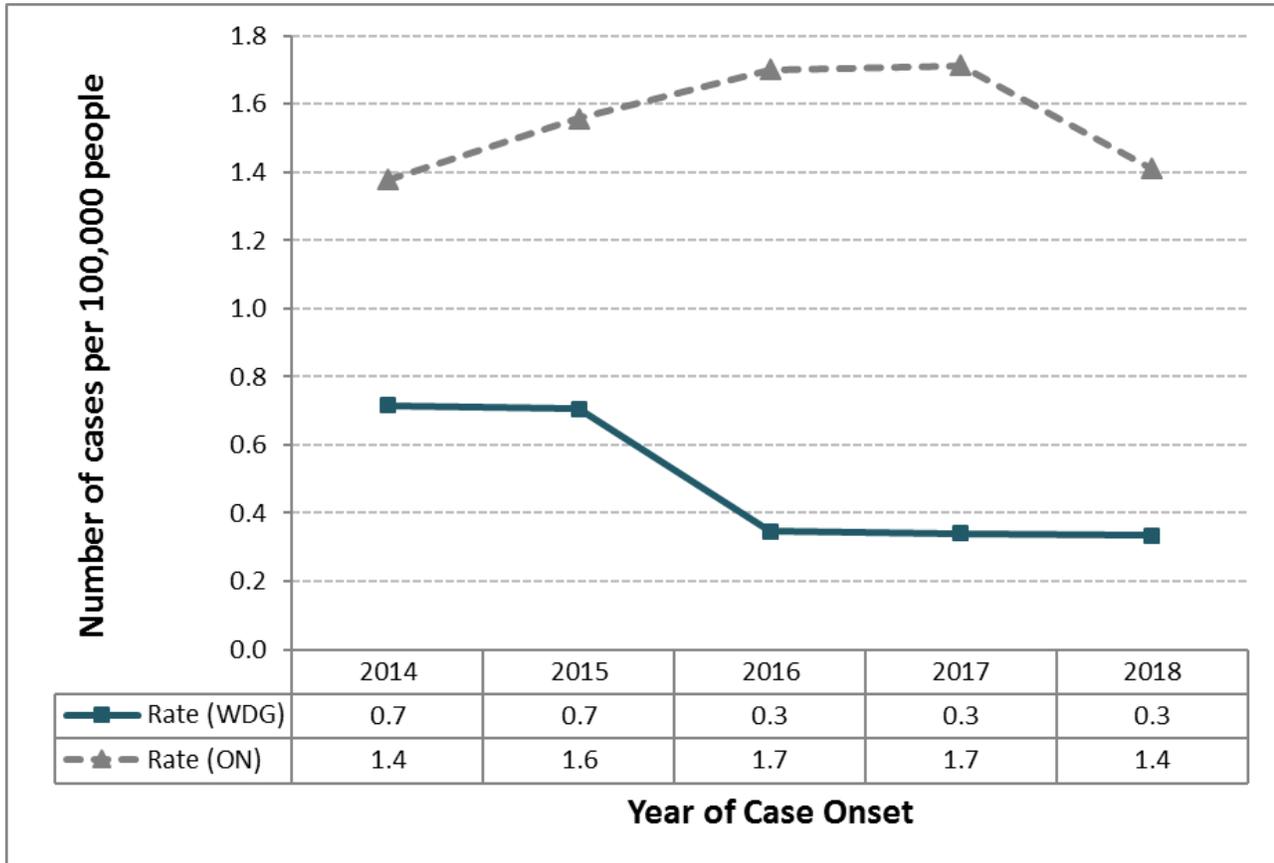
Steps that can be taken to prevent becoming ill with these diseases include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.

- Protecting oneself against tick and mosquito bites when outdoors, including wearing light coloured clothing, long-sleeved shirts and pants, and using an insect repellent containing DEET.

Encephalitis/Meningitis in Wellington-Dufferin-Guelph

Figure 54: Age-Standardized Incidence Rates of Laboratory-Confirmed Encephalitis/Meningitis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

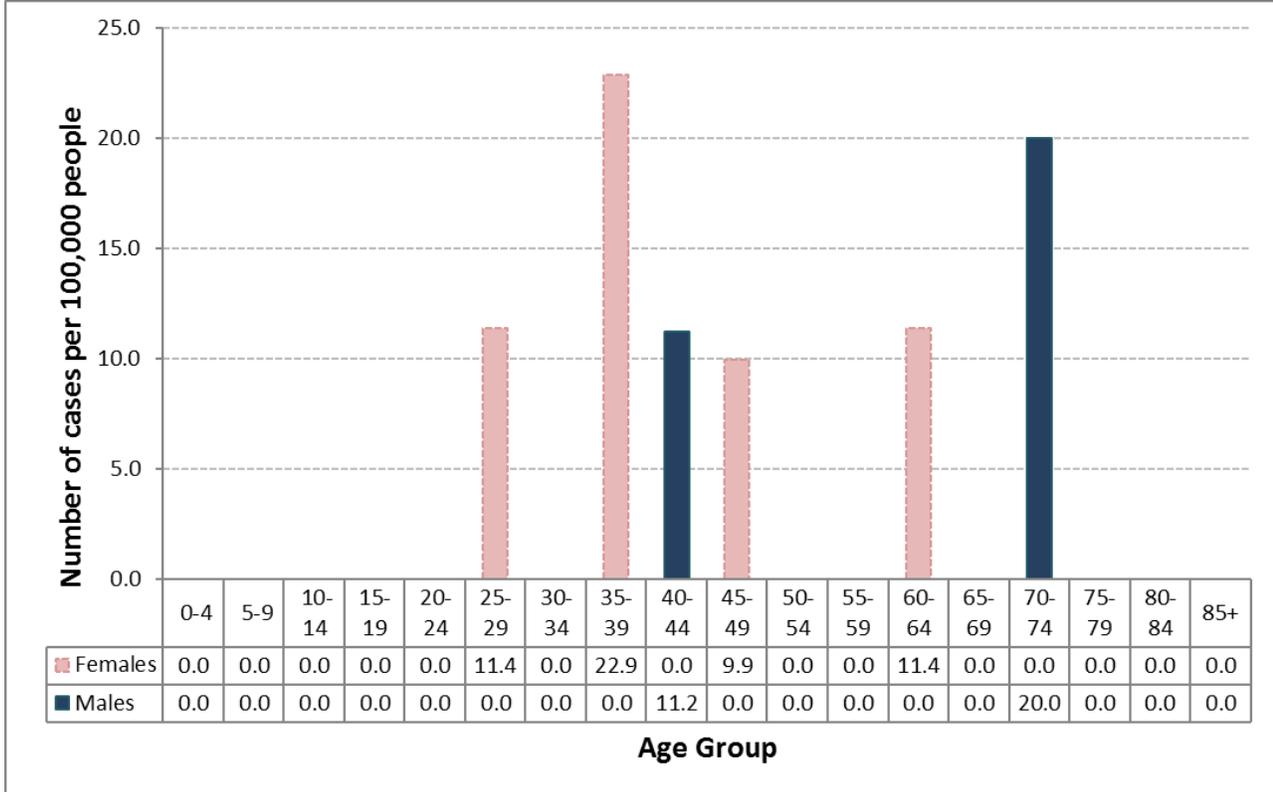
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of encephalitis/meningitis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- From 2014 to 2018, there were seven reported laboratory-confirmed cases of encephalitis/meningitis in Wellington-Dufferin-Guelph.

- Rates of encephalitis/meningitis in WDG were lower than provincial rates from throughout the five-year period.

Figure 55: Incidence Rates of Laboratory-Confirmed Encephalitis/Meningitis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, most cases of laboratory-confirmed encephalitis/meningitis reported to Wellington-Dufferin-Guelph Public Health occurred in females aged 25 to 64 years. This could be a reflection of the fact that females are more likely to come into close contact with each other than males, especially during the pre-teen and teenage years.

GROUP A STREPTOCOCCAL INFECTIONS (INVASIVE)

What is invasive Group A Streptococcal disease?

Invasive Group A Streptococcal (iGAS) disease is an illness caused by bacteria known as *Streptococcus pyogenes* (*S. pyogenes*).

Can the organism infect animals as well as people?

This organism only infects humans. An infected person typically carries the bacteria in their nose and on their skin.

How is the organism transmitted?

People can become infected when they have direct or indirect contact with the respiratory secretions of an infected person, i.e. when an infected person coughs or sneezes. People can also become infected if they share needles with an infected person, or if they have contact with wounds or broken skin, or fluid from the wounds, of an infected person.

What are the symptoms of iGAS?

A person can develop symptoms of iGAS within 1-3 days after being exposed to the bacteria. Some people may not show any symptoms but may still be able to pass the bacteria on to others, i.e. if a person carries the bacteria in their throat. There are several different types of infection caused by iGAS bacteria. Symptoms may be vague and begin with unusually severe pain, swelling, fever, chills, muscle aches and other flu-like symptoms. This may progress to red, painful tissue swelling, respiratory distress, kidney impairment, and shock or organ failure.

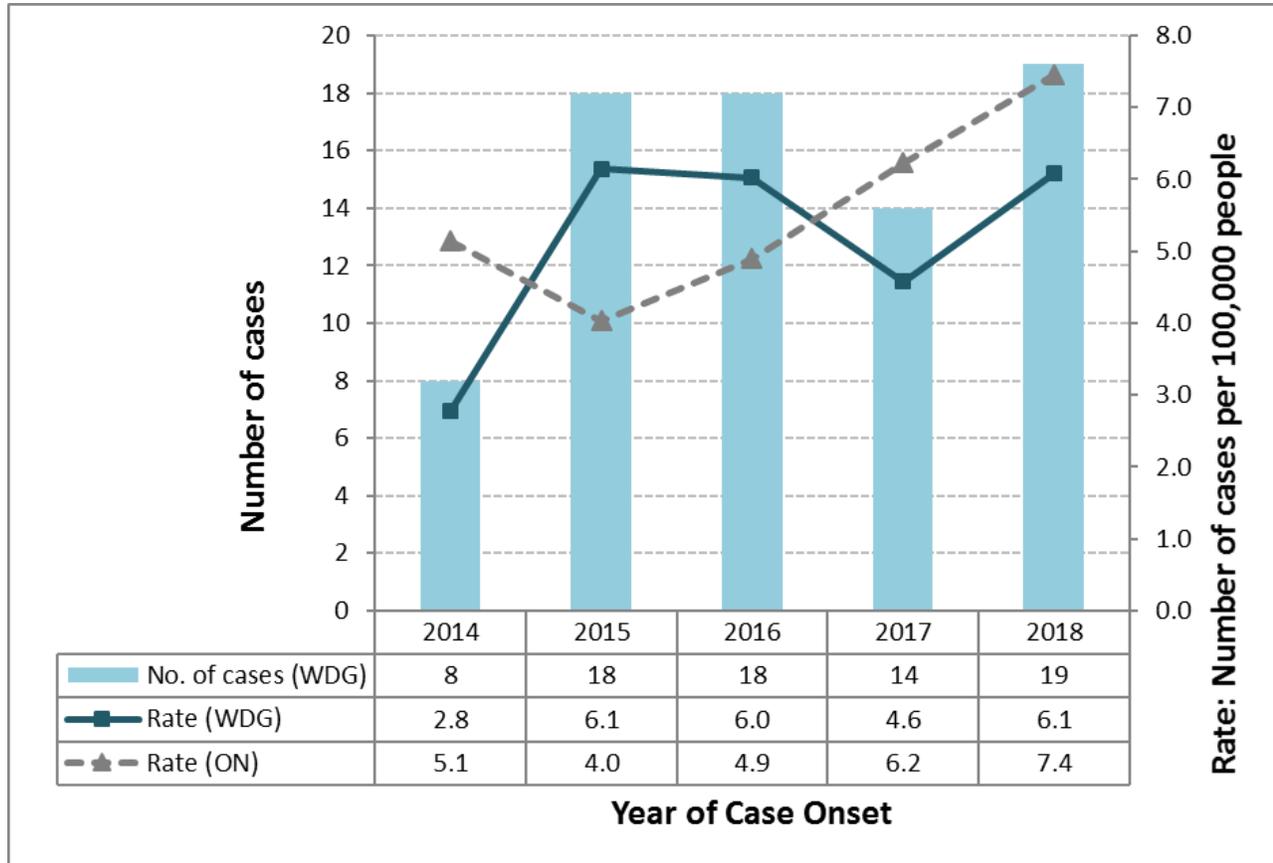
How can someone avoid getting iGAS?

Steps that can be taken to prevent becoming ill with this disease include:

- Frequent and thorough hand washing, especially after using the washroom, after coughing or sneezing and before preparing food.
- Avoiding sharing utensils, water bottles, mouthed musical instruments and other items that may come into contact with saliva or respiratory secretions.
- Receiving vaccination for varicella (chickenpox) as varicella infection or exposure to varicella is the most commonly identified risk factor in children.

Invasive Group A Streptococcal Disease in Wellington-Dufferin-Guelph

Figure 56: Age-Standardized Incidence Rates of Laboratory-Confirmed Invasive Group A Streptococcal Disease in Wellington-Dufferin-Guelph and Ontario, 2014-2018

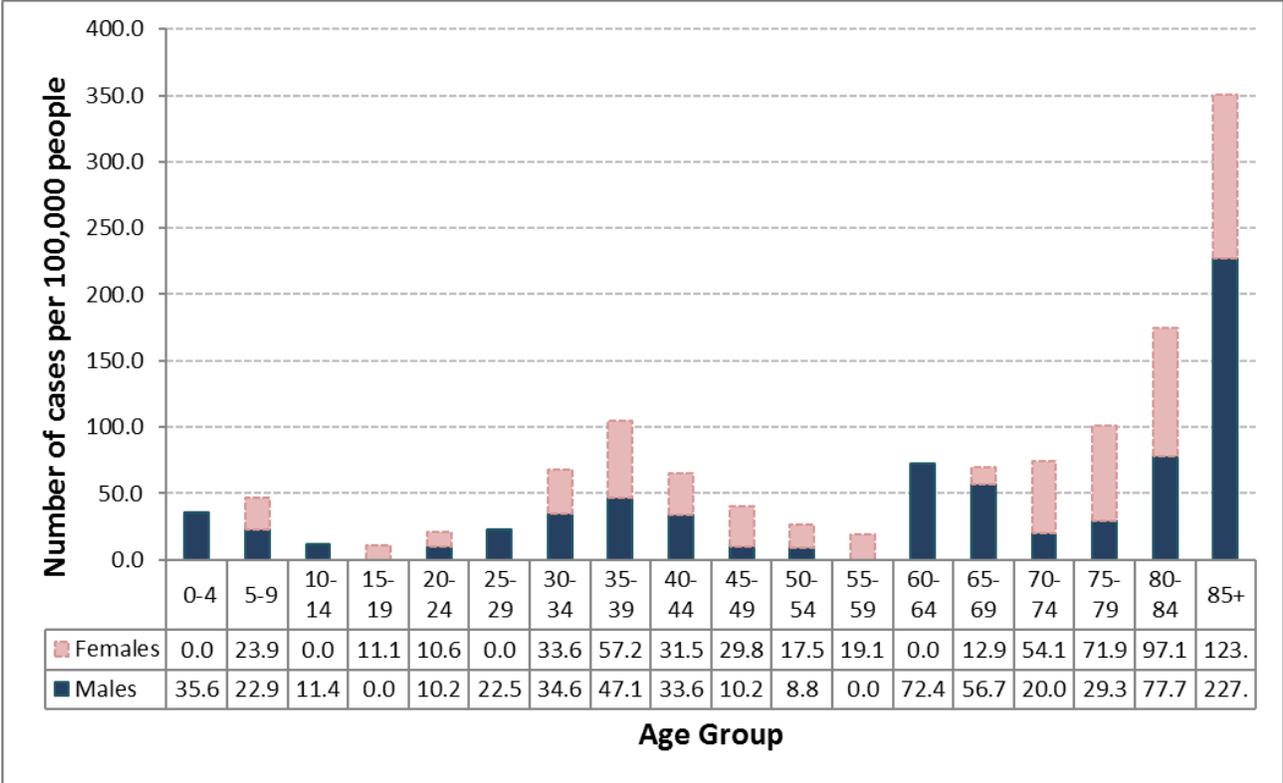


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, annual rates of Invasive Group A Streptococcal (iGAS) disease in WDG fluctuated, with a noticeable increase in the rate of the disease in 2015 followed by a general decrease from 2015 to 2017 and another increase in 2018. Provincially, there was a slight decrease from 2014 to 2015, followed by a steady increase from 2015 to 2018.
- Over the five-year period, annual rates of iGAS in WDG were higher than provincial rates in 2015 and 2016, at 6.1 and 6.0 cases per 100,000 people, respectively. Local rates of the disease were lower than provincial rates in 2014, 2017 and 2018.

Figure 57: Incidence Rates of Laboratory-Confirmed Invasive Group A Streptococcal Disease by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
 Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, cases of iGAS were distributed across all age groups and there was no noticeable difference between the rates of the disease in males and females.
- Over these five years, the rate of the disease in Wellington-Dufferin-Guelph was highest in those 75 years of age and older. This is likely due to the fact that people in these age groups are more likely to be at a higher risk of iGAS infection due to advanced age and/or chronic disease (CDC Group A Streptococcal online factsheet).

LEGIONELLOSIS

What is legionellosis?

Legionellosis is a disease caused by bacteria known as *Legionella*. The most common species of this bacterium associated with illness in humans is *Legionella pneumophila* (*L. pneumophila*).

Can the organism infect animals as well as people?

This organism only infects humans but is usually widely found in the environment, particularly in humid or moist environments, such as in whirlpool spas, decorative water fountains, humidifiers and air conditioning units.

How is the organism transmitted?

People can become infected by inhaling bacteria that have been aerosolized in water.

What are the symptoms of legionellosis?

A person can develop symptoms of mild disease (commonly known as Pontiac Fever) within 1-3 days after being exposed to the bacteria; however, most people develop symptoms within 1-2 days after inhaling the bacteria. Symptoms of Pontiac Fever include malaise, anorexia, fever, headache and muscle aches. Some people may also develop a non-productive cough, diarrhoea or abdominal pain. An infected person may develop a more severe illness (commonly known as Legionnaire's Disease) within 2-10 days after being inhaling the bacteria, but most people develop symptoms of Legionnaire's Disease within 5-6 days after exposure. Symptoms are similar to those of Pontiac Fever, but may progress to pneumonia and may involve multiple organ systems.

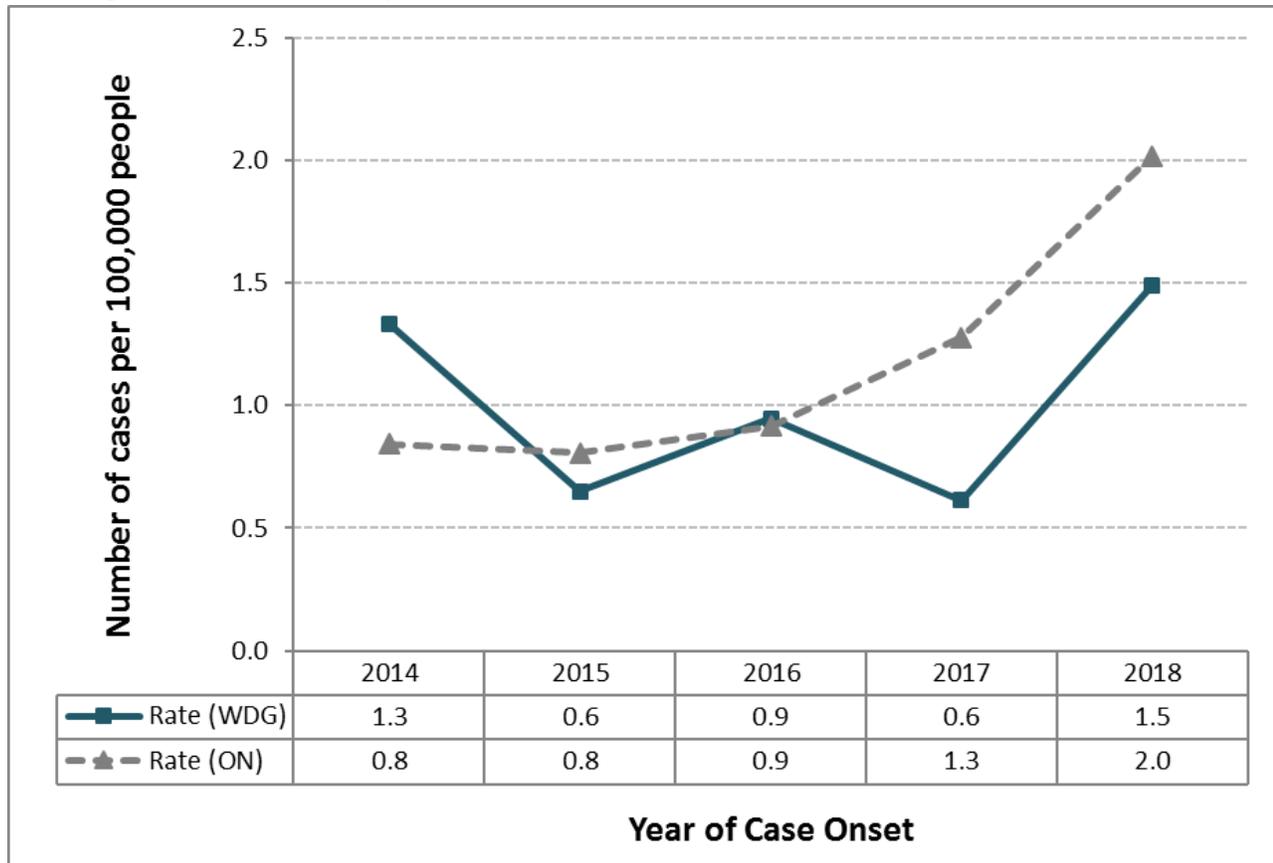
How can someone avoid getting legionellosis?

Steps that can be taken to prevent becoming ill with this disease include:

- Avoiding exposure to aerosolized contaminated water, i.e. wearing appropriate personal protective equipment if one's occupation involves exposure to aerosolized water spray.
- Ensuring appropriate maintenance and disinfection of water cooling towers in buildings or facilities where these exist.

Legionellosis in Wellington-Dufferin-Guelph

Figure 58: Age-Standardized Incidence Rates of Laboratory-Confirmed Legionellosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).

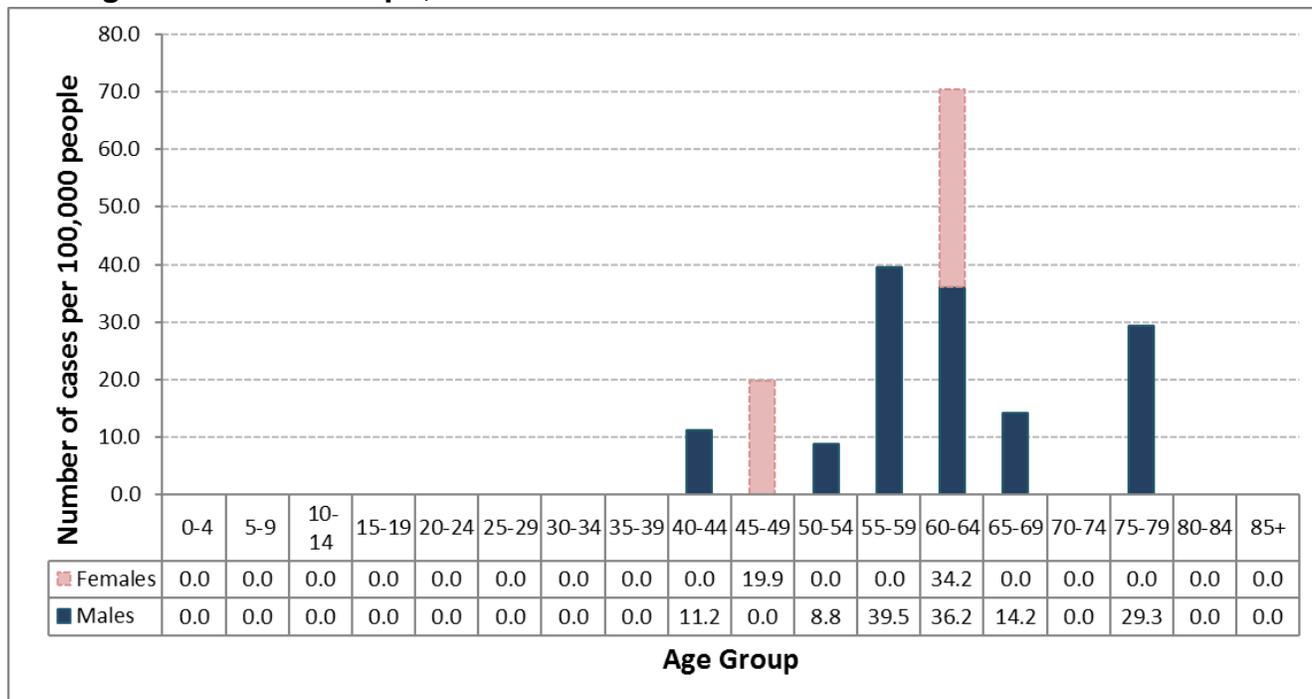
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

Case counts have been suppressed in this chart because of low numbers: in at least one of the five years shown, the number of cases was greater than zero but less than five.

- Calculated rates of legionellosis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The rates reported here should therefore be interpreted with caution.
- From 2014 to 2018, there were 13 reported laboratory-confirmed cases of legionellosis in Wellington-Dufferin-Guelph.
- The provincial rate of legionellosis rose steadily from 2014 to 2018. This was not reflected by the trend in WDG, where rates fluctuated from year to year over that time period.
- Annual rates of legionellosis in WDG ranged from 0.6 to 1.5 cases per 100,000 people. The local rate was higher than the provincial rate in one year (2014) and was

approximately equal in 2016; in the other three years, rates in WDG were lower than provincial rates.

Figure 59: Incidence Rates of Laboratory-Confirmed Legionellosis by Age and Gender, Wellington-Dufferin-Guelph, 2014-2018



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, most of the cases of laboratory-confirmed legionellosis reported to Wellington-Dufferin-Guelph Public Health occurred in males, of which most were in aged 55 year and over.
- All cases of legionellosis reported in WDG over the five years occurred in adults 40 years and older; no cases were reported in children or younger adults.

TUBERCULOSIS

What is tuberculosis (TB)?

Tuberculosis is a disease caused by bacteria that are part of the *Mycobacterium tuberculosis* (*M. tuberculosis*) complex, called 'tuberculous mycobacteria'. The *M. tuberculosis* complex includes *M. tuberculosis* and the subspecies *M. canetti*, *M. africanum*, *M. caprae*, *M. microti*, *M. pinnepedii* and *M. bovis* (bovine tuberculosis).

Can the organism infect animals as well as people?

Humans are the main source of human infection with *M. tuberculosis*, and this is the most common form of tuberculosis in people in Canada. While animals such as cattle, elephants and other animal species may also be infected with *M. tuberculosis*, these are rarely responsible for causing human infection. A person drinking unpasteurized milk from cattle infected with *M. bovis* (bovine tuberculosis) can become infected with that organism; however infection with *M. bovis* in people is very rare in Canada.

How is the organism transmitted?

People can become infected with *M. tuberculosis* when they have direct or indirect contact with the respiratory secretions of an infected person, i.e. when an infected person talks, sings, coughs or sneezes. Transmission of the disease usually requires prolonged or repeated contact with an infected person. People can also become infected by consuming unpasteurized milk or other dairy products from infected cattle.

What are the symptoms of tuberculosis?

A person can develop symptoms of tuberculosis (TB) within 5-24 months after being exposed to the bacteria. Most (90%) people may never show any symptoms, either because they have successfully overcome the infection, or because they have developed an inactive form of infection called 'latent TB infection (LTBI)'. Approximately 10% of people exposed to the bacteria go on to develop active TB (illness from the TB infection), half of whom will show symptoms in the first 24 months (2 years) after infection. There are several different types of infection caused by tuberculous mycobacteria. Symptoms may only affect the lungs and may include a cough lasting more than 3 weeks, chest pain, shortness of breath and production of sputum. Some people may develop symptoms involving the whole body, including fever, chills, night sweats, loss of appetite, weight loss and fatigue.

How can someone avoid getting Tuberculosis?

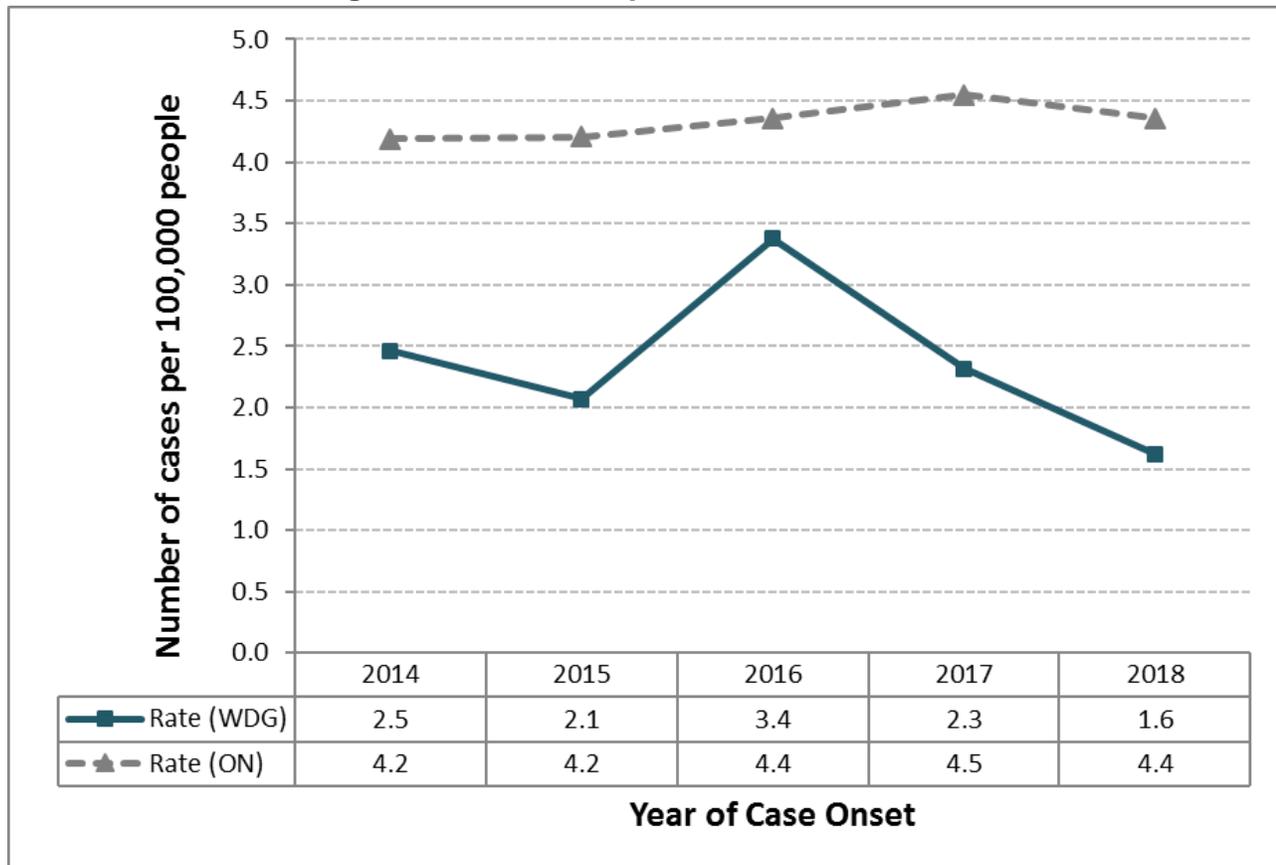
Steps that can be taken to prevent becoming ill with this disease include:

- Avoiding travel to endemic areas – visit a travel clinic prior to travel to find out which areas are considered to be high risk for tuberculosis.

- Avoiding close and prolonged contact with someone suffering from active TB.
- Getting a baseline Tuberculosis skin test to check for previous exposure to the disease, prior to travelling to an endemic area.
- Being treated with medication to prevent the development of active TB, if one is diagnosed as having latent TB. This diagnosis is usually done based on a TB skin test.

Tuberculosis in Wellington-Dufferin-Guelph

Figure 60: Age-Standardized Incidence Rates of Laboratory-Confirmed Active Tuberculosis in Wellington-Dufferin-Guelph and Ontario, 2014-2018

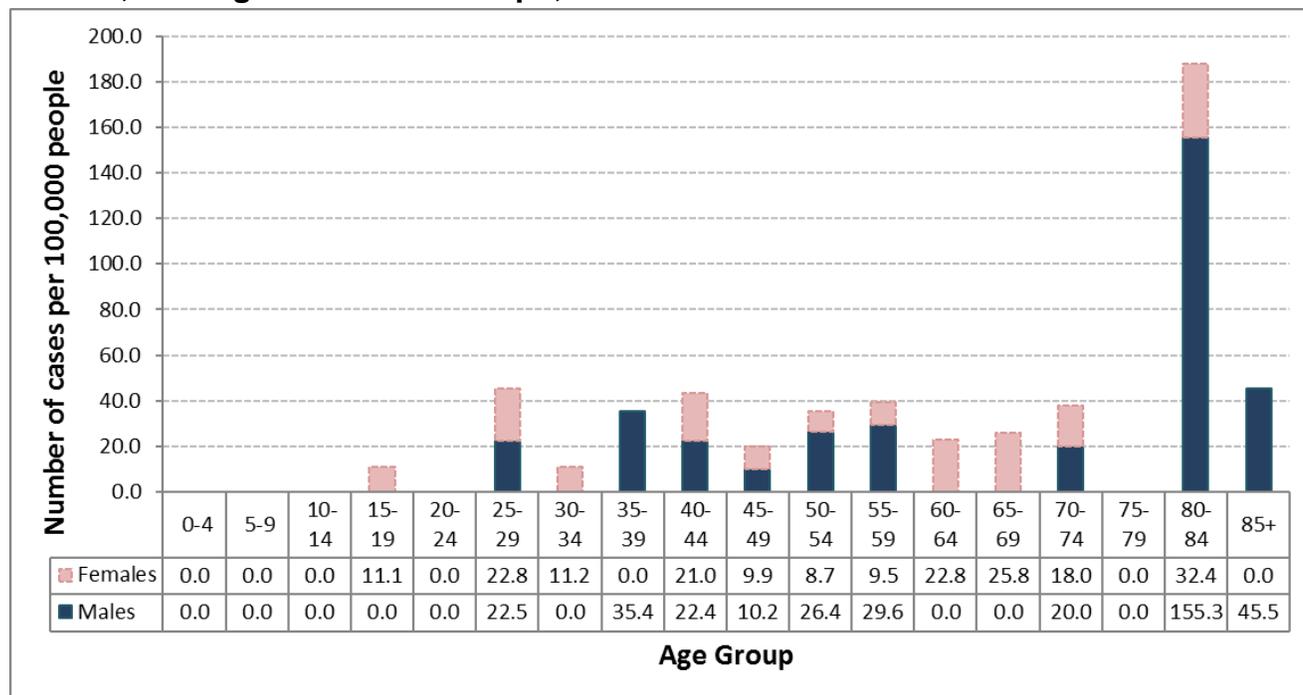


Data Sources: Disease counts: Integrated Public Health Information System (iPHIS). Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- Calculated rates of active tuberculosis in WDG are based on low numbers of cases and so are less likely to be accurate than rates calculated based on larger numbers of cases. The local trends reported here should therefore be interpreted with caution.
- From 2014 to 2018, annual rates of active tuberculosis in Ontario increased steadily until 2017, followed by a slight decrease in 2018, while in WDG, rates fluctuated for the first three years, followed by an annual decrease from 2016 to 2018.
- In WDG the rate of active tuberculosis in WDG was highest in 2016, at 3.4 cases per 100,000 people.

- Throughout the five-year period, annual rates of active tuberculosis in WDG were lower than provincial rates of the disease.
- In addition to the cases of active tuberculosis shown above, WDGPH managed the treatment of over 100 cases of latent tuberculosis infection each year over the period 2014-2018.

Figure 61: Incidence Rates of Laboratory-Confirmed Active Tuberculosis by Age and Gender, Wellington-Dufferin-Guelph, 2007-2011



Data Sources: Disease counts: Integrated Public Health Information System (iPHIS).
Population estimates: Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario

- From 2014 to 2018, in most age groups, the age-specific rate of active tuberculosis in males was higher than the rate of in females. However, there was no marked difference in the overall number of male as compared to female cases.
- Over these five years, the rate of the disease in Wellington-Dufferin-Guelph was highest in those over 80 years of age. This was partly due to relatively higher rate of tuberculosis in residents at long-term care facilities as compared to the general population.

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