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Message from the Medical Officer of Health

One of the mandates of local public health units in Ontario is to prevent or reduce the burden of infectious diseases of public health importance. Region of Waterloo Public Health fulfills this mandate by working to prevent the transmission of infectious and other reportable diseases in the region. These diseases are important since they have the ability to cause serious illness and/or be transmitted to large numbers of individuals. Public Health’s disease-related programs are guided by the Ontario Public Health Standards (OPHS) and local needs.

In fulfilling its mandate related to infectious disease, Public Health monitors the occurrence of these diseases, their associated risk factors and emerging trends. Through the provision of reports such as Local Influenza Surveillance Bulletins and previous Waterloo Region Infectious Disease Status Reports, Region of Waterloo Public Health is committed to providing the public with timely and accurate information on the local status of infectious diseases.

To add to this body of knowledge, I am pleased to release the Infectious Diseases in Waterloo Region Surveillance Report for 2013. This annual report builds on previous reports and not only presents local disease trends, but also provides a provincial comparison of rates.

I hope you find the information contained in this report both interesting and useful. As always, Region of Waterloo Public Health continually works to improve its programs, services and reporting related to infectious diseases in an effort to build healthy and supportive communities.

Dr. Liana Nolan
Commissioner/Medical Officer of Health
Region of Waterloo Public Health
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Executive Summary

Background
Infectious diseases (IDs) are illnesses caused by microorganisms such as bacteria, viruses and parasites which may cause serious illness or be transmitted to large numbers of individuals. In accordance with the Ontario Public Health Standards (OPHS), one of the mandates of local public health units in Ontario is to prevent and manage infectious diseases of public health importance. As such, the purpose of this report is to assess Waterloo Region’s rates of infectious diseases of public health importance and to monitor trends over time. This information will be used to aid in planning and evaluating evidence-based public health policies, programs, interventions, and related services so as to mitigate the frequency and impact of infectious diseases in the local community. This report presents Waterloo Region’s rates of reportable diseases for 2013, comparisons to the historical five-year average, and comparison of local rates to those of the province of Ontario. Basic epidemiology, exposure and risk factor information is also provided where appropriate.

Key Findings

Overall
In 2013 there were 2,539 cases of reportable infectious diseases in Waterloo Region (excluding influenza). The top five infectious diseases reported in 2013 (excluding influenza) were chlamydia, latent (i.e., inactive) tuberculosis, gonorrhea, campylobacteriosis and salmonellosis, which accounted for 79.4 per cent of all cases. Overall, the rates of most reportable diseases in Waterloo Region were consistent with or lower than provincial rates; for a few diseases, local rates were higher than provincial rates. Some variation occurs naturally, as disease rates are not expected to be uniform across populations.

Enteric Diseases
Among enteric diseases, campylobacteriosis and salmonellosis were the most frequently reported infectious diseases. With the exception of giardiasis, Waterloo Region rates of enteric diseases were similar or lower compared to those for all of Ontario. Local giardiasis rates have historically been higher than those of the province, and this trend continued in 2013. Travel was the main risk factor for giardiasis, accounting for the majority of cases. Among those who did not travel, exposure to untreated recreational water (e.g., swallowing water from lakes or rivers while swimming) was the second most common factor. Region of Waterloo Public Health works to manage and control enteric diseases by following up on reported cases and their contacts, providing education
regarding risk factors and prevention, supporting long-term care homes, hospitals and daycares in the prevention and control of enteric outbreaks, and performing routine food premise inspections, residential facilities, day nurseries, personal service settings, and recreational water facilities (e.g., public pools, hot tubs and splash pads). In addition, Region of Waterloo Public Health collaborates with federal and provincial partners to identify and remove sources of contaminated food products from the consumer marketplace.

**Vector-borne and Zoonotic Diseases**

Vector-borne diseases (e.g., malaria, West Nile Virus, Lyme disease) and zoonotic diseases (e.g., rabies) are relatively uncommon in Waterloo Region. Similar to previous years, malaria was the most common illness in this category in Waterloo Region; all cases of malaria were either related to travel or living in an endemic area. The local rate of Lyme disease (cases of which were not locally acquired) remained stable and was lower than that of the province. Region of Waterloo makes significant efforts to reduce the risk of exposure to Lyme disease and West Nile Virus through public education, investigation of suspect human cases, vector surveillance, and the implementation of vector control measures. Although rare, the possibility of human rabies acquired from animal bites continues to exist, as animals with rabies can be found on occasion in Waterloo Region. Given that rabies is usually fatal, prevention is of prime importance. To prevent the transmission of rabies from animals to humans, the rabies program at Region of Waterloo Public Health investigates all reported animal biting incidents and provides recommendations about post-exposure prophylaxis and dispenses rabies vaccine when appropriate.

**Sexually Transmitted and Blood-borne Infections**

Among all sexually transmitted and blood-borne infections, chlamydia, gonorrhea and hepatitis C contributed the greatest number of cases in Waterloo Region in 2013. As in previous years, chlamydia remains the most common infectious disease in Waterloo Region overall, with particularly high rates among 15 to 24 year old females. The local chlamydia rate decreased slightly in 2013, and remained statistically lower than the rate for the province as a whole. The most common risk factors reported by chlamydia cases in 2013 included not using a condom and having multiple sexual partners. Region of Waterloo Public Health is specifically addressing high rates of chlamydia and other sexually transmitted infections among youth through the ‘Sexual Health Youth Strategy for Waterloo Region’. This strategy involves partnership with several community stakeholders and outlines a multi-year action plan to promote healthy sexuality among youth in Waterloo Region, and to provide strategic direction for youth sexual health
education, programs, and services. It focuses on three key focus areas: access to programs and services, education, and parents.

The rate of gonorrhea in Ontario has been increasing in recent years, and the local rate increased between 2012 and 2013. The 2013 local rate of gonorrhea remained lower than that for the province as a whole; although, the difference was not statistically significant. The most commonly reported risk factors for local cases of gonorrhea included not using a condom and having multiple sexual partners. The rate of infectious syphilis has been gradually increasing over recent years; although, local rates continue to be lower than that of the province. Rates of hepatitis B, hepatitis C, and HIV/AIDS all remained relatively stable and below those of the province. Region of Waterloo Public Health continues to address sexually transmitted and blood-borne infections by providing free testing, treatment and counselling for STIs at sexual health clinics and by engaging in harm reduction strategies which include the provision of needle syringe programs and other related services at several locations in the region.

**Vaccine Preventable Diseases**

Although the local rate of invasive pneumococcal disease (IPD) decreased from 2012 to 2013, it remained higher than the provincial rate in 2013. The most common risk factors for invasive pneumococcal disease (IPD) included having a chronic illness or underlying medical condition, being under two years of age and over 65 years of age. Nearly half of cases eligible for vaccine to reduce their risk of illness were not immunized. Region of Waterloo Public Health is currently working to promote IPD immunization among priority and high-risk individuals through health care providers.

Rates of varicella, mumps, invasive meningococcal disease (IMD) and measles were either stable or decreased in 2013, and remained similar or lower to those of the province. Region of Waterloo Public Health supports the prevention of vaccine-preventable illnesses through the provision of vaccine delivered through health care providers and public health immunization clinics, the achievement and maintenance of high immunization rates among children enrolled in publicly-funded elementary and secondary schools through the *Immunization of School Pupils Act*, as well as other health education and promotion activities to increase immunization coverage rates.

**Other Infectious Diseases**

Among other reportable infectious diseases, local rates for active and latent (i.e., inactive) tuberculosis, encephalitis/meningitis and neonatal group B streptococcal disease were stable in 2013 compared to previous years and similar to those of the province. Although the local rate of invasive Group A streptococcal disease (iGAS) increased from 2012 to 2013, some fluctuation from year to year is expected and the
local and provincial iGAS rates remained statistically comparable. Diverse types of Group A Streptococcal bacteria were identified among the cases, suggesting no linkages.

The number of local cases of legionellosis has increased in recent years. Cases have been sporadic and not linked to an outbreak. This local increase in cases mirrors the increase seen in legionellosis rates across Ontario, Canada and the United States. The reasons for this are not fully understood; part of the increase is thought to be due to greater physician awareness and testing. An important component of legionellosis prevention is proper maintenance of cooling towers. In 2012 and 2013, Region of Waterloo Public Health distributed legionellosis information to hospitals, schools, long-term care homes, retirement homes, and other identified cooling tower operators within the Region. The information included recommendations and resources for best practices for cooling tower maintenance.

Conclusion
Infectious diseases have the potential to cause serious illness and can have community-wide implications. As such, Region of Waterloo Public Health undertakes a number of activities to prevent or reduce the burden of infectious diseases in the community. These activities include follow-up of all reportable disease cases, their contacts as well as follow-up and management of outbreaks of infectious diseases. Prevention activities include inspections of food premises, recreational water, residential facilities, day nurseries and personal service settings, immunization programs and vector-borne control programs. Region of Waterloo Public Health also engages in a number of health promotion activities that target the general public, as well as more vulnerable group settings such as long-term care homes, hospitals, and child care centres.

The Infectious Diseases in Waterloo Region Surveillance Report for 2013 helps to fulfill the Region of Waterloo Public Health’s mandate to prevent and manage infectious diseases of public health importance by providing enhanced disease surveillance and reporting in accordance with the Ontario Public Health Standards. This surveillance report provides an update to the community on the local status of infectious diseases and the findings from this report will be used to inform and improve local public health programming in the prevention and transmission of infectious and reportable diseases in Waterloo Region.
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<table>
<thead>
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<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>GBS</td>
<td>Group B streptococcus</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C</td>
</tr>
<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>HPI</td>
<td>Health Protection and Investigation</td>
</tr>
<tr>
<td>HPPA</td>
<td>Health Protection and Promotion Act</td>
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<td>IDDSH</td>
<td>Infectious Diseases, Dental and Sexual Health</td>
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<tr>
<td>iGAS</td>
<td>Invasive Group A streptococcal disease</td>
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<td>IMD</td>
<td>Invasive meningococcal disease</td>
</tr>
<tr>
<td>IPD</td>
<td>Invasive pneumococcal disease</td>
</tr>
<tr>
<td>iPHIS</td>
<td>Integrated Public Health Information System</td>
</tr>
<tr>
<td>MOHLTC</td>
<td>Ministry of Health and Long-Term Care</td>
</tr>
<tr>
<td>MSM</td>
<td>Men who report having sex with men</td>
</tr>
<tr>
<td>NACRS</td>
<td>National Ambulatory Care Reporting System</td>
</tr>
<tr>
<td>OPHS</td>
<td>Ontario Public Health Standards</td>
</tr>
<tr>
<td>PHO</td>
<td>Public Health Ontario</td>
</tr>
<tr>
<td>SRR</td>
<td>Standardized rate ratio</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually transmitted infection</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>VTEC</td>
<td>Verotoxin producing <em>Escherichia coli</em></td>
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Introduction

Infectious diseases are illnesses caused by microorganisms, such as bacteria, viruses and parasites, which may cause serious illness or be transmitted to large numbers of individuals. As per Ontario’s Health Protection and Promotion Act (HPPA), any case of a number of diseases must be reported to the local Medical Officer of Health (refer to Appendix C for a full list).

This technical report, Infectious Diseases in Waterloo Region: Surveillance Report 2013, presents Waterloo Region’s rates of reportable diseases for 2013, provides comparisons of rates to previous years (2008 to 2012) for historical context, as well as comparisons to provincial rates. Cases of disease included in this report are for individuals who were residents of Waterloo Region at the time of the onset of their illness.

For ease of reference, the diseases in this report are categorized as follows:

- Enteric diseases
- Vector-borne and zoonotic diseases
- Sexually transmitted and blood-borne infections
- Vaccine preventable diseases
- Other infectious diseases

Disease-specific data is presented in alphabetical order within each section and follows a standard format. Diseases are described individually if five or more cases were reported during 2013 or if Public Health undertakes specific measures to prevent transmission of the disease.

Note that influenza and infectious disease outbreak data are not included in this report, but will be described in a separate report, to be published later this year.
## Overall Findings

Table 1. Numbers and age-standardized incidence rates per 100,000 for all reportable diseases (excluding influenza), Waterloo Region, 2013 and 2008-2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Disease</th>
<th># Cases in 2013</th>
<th>2013 Rate per 100,000</th>
<th>Five-year average rate per 100,000 (2008-2012)</th>
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<tbody>
<tr>
<td>1</td>
<td>Chlamydia</td>
<td>1,220</td>
<td>240.8</td>
<td>235.2</td>
</tr>
<tr>
<td>2</td>
<td>Tuberculosis (latent)</td>
<td>353</td>
<td>64.8</td>
<td>67.0</td>
</tr>
<tr>
<td>3</td>
<td>Gonorrhea</td>
<td>164</td>
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</tr>
<tr>
<td>4</td>
<td>Campylobacteriosis</td>
<td>150</td>
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</tr>
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<td>Salmonellosis</td>
<td>128</td>
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<tr>
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<td>Hepatitis C</td>
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<tr>
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<td>Giardiasis</td>
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<td>8</td>
<td>Invasive pneumococcal disease</td>
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<td>9</td>
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<td>40</td>
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<td>10</td>
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<tr>
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<tr>
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<td>Encephalitis/meningitis</td>
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<td>1.0</td>
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<tr>
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<td>Tuberculosis (active)</td>
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<td>1.3</td>
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<td>Hepatitis A</td>
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<td>Listeriosis</td>
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<td>1.6</td>
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<td>Typhoid/paratyphoid fever</td>
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<td>0.7</td>
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<td>23</td>
<td>Group B streptococcal disease, neonatal</td>
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<td>Q Fever</td>
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<td>0.05</td>
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<td>24</td>
<td>Herpes, neonatal</td>
<td>1</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>25</td>
<td>Mumps</td>
<td>0</td>
<td>0.0</td>
<td>0.8</td>
</tr>
<tr>
<td>25</td>
<td>Hepatitis B</td>
<td>0</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td>25</td>
<td>Invasive meningococcal disease</td>
<td>0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>25</td>
<td>Measles</td>
<td>0</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>25</td>
<td>West Nile virus (WNV)</td>
<td>0</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>25</td>
<td>Brucellosis</td>
<td>0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>25</td>
<td>Haemophilus influenzae B (Hib)</td>
<td>0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>25</td>
<td>Botulism</td>
<td>0</td>
<td>0.0</td>
<td>0.04</td>
</tr>
<tr>
<td>25</td>
<td>Creutzfeldt-Jakob disease</td>
<td>0</td>
<td>0.0</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

Includes both confirmed and probable cases of amebiasis, mumps, Lyme disease, pertussis and WNV due to case definition changes in 2009 (see Appendix B for more information).

Varicella ambulatory care visits from IntelliHEALTH are reported because iPHIS reports varicella as aggregated case counts, not individual cases (see Appendix B for more information). Ambulatory care visits include both visits to emergency departments as well as hospital outpatient visits.

Primary, secondary and early latent syphilis are all considered infectious (includes early latent; primary genital; primary other sites; secondary of skin and mucous membranes; secondary, other; infectious neurosyphilis and primary anal).

Other syphilis includes all other types of syphilis such as late latent or unspecified (the other category excludes early congenital syphilis).
Enteric Diseases

The following enteric diseases are included in this section:

- Amebiasis
- Brucellosis
- Campylobacteriosis
- Cryptosporidiosis
- Cyclosporiasis
- Giardiasis
- Hepatitis A
- Listeriosis
- Salmonellosis
- Shigelllosis
- Typhoid/paratyphoid fever
- Verotoxin-producing *Escherichia coli* (VTEC)
- Yersiniosis

Table 2. Numbers and age-standardized incidence rates per 100,000 for enteric diseases, Waterloo Region & Ontario, 2013 and 2008-2012 (five-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2013 Standardized rate ratio (95% confidence interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2008-2012)</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>150</td>
<td>27.5</td>
<td>28.6</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>128</td>
<td>24.3</td>
<td>22.6</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>74</td>
<td>14.3</td>
<td>14.3</td>
</tr>
<tr>
<td>Amebiasis³</td>
<td>30</td>
<td>5.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>19</td>
<td>4.1</td>
<td>4.0</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>13</td>
<td>2.5¹</td>
<td>1.4¹</td>
</tr>
<tr>
<td>VTEC</td>
<td>6</td>
<td>1.3¹</td>
<td>3.2¹</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>6</td>
<td>1.1¹</td>
<td>1.0¹</td>
</tr>
<tr>
<td>Listeriosis</td>
<td>5</td>
<td>0.8¹</td>
<td>0.2¹</td>
</tr>
<tr>
<td>Yersiniosis</td>
<td>3</td>
<td>0.5¹</td>
<td>1.6¹</td>
</tr>
<tr>
<td>Typhoid/paratyphoid fever</td>
<td>3</td>
<td>0.5¹</td>
<td>0.7¹</td>
</tr>
<tr>
<td>Cyclosporiasis</td>
<td>2</td>
<td>0.4¹</td>
<td>0.5¹</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>0</td>
<td>0.0¹</td>
<td>0.1¹</td>
</tr>
</tbody>
</table>


¹Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

²Standardized rate ratio (SRR) refers to the ratio of the Waterloo Region age-standardized rate for 2013 compared to the Ontario age-standardized rate for 2013. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% confidence interval contains 1.00, the two rates are not statistically different from one another).

³Includes both confirmed and probable amebiasis cases.
Region of Waterloo Public Health Activities for Enteric Diseases

Region of Waterloo Public Health:

- Receives, confirms, and investigates reports of enteric illness in the Region.
- Follows up with all cases and their contacts to adequately address and manage the infectious disease (e.g., recommends that a case speak with their physician about treatment; enforces work restrictions of food handlers and care providers; etc.)
- Provides information on enteric diseases, transmission, risk factors and prevention strategies.
- Performs routine inspections of food premises, personal service settings, residential facilities and day nurseries in order to prevent the occurrence and transmission of infectious and foodborne illness; the results of food premises and personal service settings inspections in the Waterloo Region are available on Public Health’s website.
- Performs routine inspections of recreation water facilities (e.g., pools, hot tubs, splash pads) in order to prevent the occurrence and transmission of infectious and waterborne illness.
- Works in cooperation with federal and provincial partners including the Ministry of Health and Long Term Care, Ontario Ministry of Agriculture and Rural Affairs, and Canada Food Inspection Agency to identify and remove sources of contaminated food products from the consumer marketplace.
- Conducts disease surveillance and provide timely updates on local disease status to area health care providers and other stakeholders.
- Provides health education for staff of daycares, long-term care homes and retirement homes.
- Partners with the Well Aware Program (offered by Green Communities Canada) to educate well owners on how to keep their well water safe. Public Health also assists private well owners with access to well water testing and interpreting results.
- Offers several locations for well water sample pick-up and drop-off within the townships to encourage private well owners to sample their water.
Amebiasis

Background

- Amebiasis is caused by a parasite called *Entamoeba histolytica*, which lives in human intestines (i.e., the gut) and is passed in the feces.
- It is spread mainly through ingestion of contaminated food and water but can also be spread through fecal-oral contact.
- Some who are infected may have no symptoms while others may have severe diarrhea and pain. It could also lead to infections involving the liver, lungs and brain.
- Although anyone can acquire amebiasis, those who are most at risk include: recent immigrants or visitors who have returned from countries with poor sanitation; persons who live in institutions; and men who have sex with men. The very young, the elderly, and pregnant women are most at risk of developing complications from this infection.

Local Picture

Figure 1. Age-standardized amebiasis\(^1\) incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo probable cases</th>
<th>Waterloo confirmed cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>33</td>
<td>6.5</td>
<td>5.9</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>27</td>
<td>5.5</td>
<td>7.0</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>24</td>
<td>4.4</td>
<td>6.2</td>
</tr>
<tr>
<td>2011</td>
<td>2</td>
<td>21</td>
<td>4.3</td>
<td>5.6</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>33</td>
<td>6.7</td>
<td>5.7</td>
</tr>
<tr>
<td>2013</td>
<td>30</td>
<td>0</td>
<td>5.7</td>
<td>6.0</td>
</tr>
</tbody>
</table>


\(^1\)Includes both confirmed and probable amebiasis cases.
In 2013, there were 30 probable cases of amebiasis in Waterloo Region (incidence rate of 5.7 per 100,000); this is slightly higher than the previous five-year annual average rate for 2008-2012 of 5.5 per 100,000.

Due to changes in testing protocols from 2012 to 2013, nearly all amebiasis cases in the province in 2013 are now defined as ‘probable’ cases. Previous provincial testing protocols typically yielded ‘confirmed’ amebiasis case results. This distinction in the case definition does not alter the follow-up on cases performed by Region of Waterloo Public Health.

In 2013, there were a similar number of cases among males (N=16) and females (N=14), and the highest age-specific rates were in 20 to 24 year olds and 25 to 29 year olds (14.7 and 14.1 per 100,000, respectively).

Of the 2013 Waterloo Region cases that had risk factor information available (N=18), the most common risk factor cited was travel outside the province.

Amebiasis rates in the region were not significantly different from those of the province (SRR = 0.96 [CI: 0.67-1.37]).
Brucellosis

Background

- Brucellosis is an infectious disease caused by *Brucella* bacteria.
- People can get the disease when they consume infected meat or unpasteurized milk or if they come in close contact with an infected animal. Animals which are most commonly infected include sheep, cattle, goats, pigs, and dogs.
- In humans, brucellosis causes non-specific flu-like symptoms such as fever, sweating, anorexia (loss of appetite), headache, muscle pain, back pain, and physical weakness. Some severe infections of the brain or heart and long lasting symptoms (e.g., recurrent fevers, joint pain, pain in the testicles, fatigue, and depression) can also occur.
- Those at higher risk for the disease include slaughterhouse workers, meat inspectors, animal handlers, veterinarians, and laboratory workers.

Local Picture

- There were no cases of brucellosis in Waterloo Region in 2013. The last reported case in the region was in 2012.
- In 2013, there were 10 brucellosis cases in Ontario.
Campylobacteriosis

Background

- Campylobacteriosis is a disease caused by bacteria called *Campylobacter*. It is one of the most common causes of diarrhea-related illness in Canada and around the world.
- The most common way to become infected is by ingestion of undercooked poultry meats and/or raw or unpasteurized milk. The infection can also spread by cross-contamination (e.g., cutting poultry meat on a cutting board), and then using the unwashed cutting board or utensil to prepare vegetables or other raw or lightly cooked foods.
- Common symptoms include mild to severe diarrhea, stomach pain, cramps, nausea, vomiting, fever, headache, and muscle pain. Some people infected with *campylobacter* may not have symptoms but can still pass the infection onto others.
- Although anyone can acquire the infection, those at higher risk include infants and young children, pregnant women, the elderly, and people with weakened immune systems.

Local Picture

Figure 2. Age-standardized campylobacteriosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

• Campylobacteriosis is the most common enteric (intestinal-related) illness in Waterloo Region and Ontario.
• In 2013, there were 150 reported cases of campylobacteriosis in Waterloo Region (annual incidence rate of 27.5 cases per 100,000).
• The current year’s incidence rate was similar to the previous five-year annual average for 2008-2012 (28.6 per 100,000).
• In 2013, the local rate of campylobacteriosis remained very similar to the provincial rate (SRR = 0.95 [CI: 0.81-1.12]).
• In 2013, cases of campylobacteriosis were fairly evenly distributed among males (N=73) and females (N=77) and the highest rate occurred in the 0 to 4 year age group (68.1 per 100,000).
Cryptosporidiosis

Background
- Cryptosporidiosis is a diarrheal illness caused by the parasite *Cryptosporidium*.
- It is transmitted through the fecal-oral route, which includes person-to-person contact, animal-to-person contact (e.g., from pets and farm animals), and food-borne transmission. Cryptosporidiosis can also be transmitted by waterborne contact, i.e., by drinking contaminated water or, as is often the case, swallowing untreated recreational water (e.g., lakes or rivers).
- The main symptom is watery diarrhea. Other symptoms include abdominal cramps, fatigue, nausea, vomiting, and fever. Some infected people may have no symptoms.
- Children under the age of two, animal handlers, travellers, men who have sex with men, and close contacts of infected people are at higher risk of infection.

Local Picture

Figure 3. Age-standardized cryptosporidiosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

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The Waterloo Region rates for 2008 and 2012 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013, there were 19 cases of cryptosporidiosis in Waterloo Region for an age-adjusted incidence rate of 4.1 per 100,000; this rate is similar to the previous five-year annual average for 2008-2012 (4.0 per 100,000).
• In 2013, local and provincial rates of cryptosporidiosis were similar (SRR = 1.54 [CI: 0.87-2.71]).
• Cryptosporidiosis cases were evenly distributed between males (N=10) and females (N=9) in 2013 and the highest age-specific rate was among the 0 to 4 year age group (29.2 per 100,000).
• There were very few cases among adults older than 30 years, and there were no cases among adults older than 50 years.
• Of the 15 cases that had risk factor information available, 11 of the cases were related to travelling or living outside of the province, one was related to exposure outside of the region, and the others were associated with animal contact (e.g., pets, farm animals or petting zoo).
• Due to the small number of cases in 2008 and 2012 and resulting unstable rates, caution should be used when interpreting this data.
Cyclosporiasis

Background

- Cyclosporiasis is a disease caused by a parasite called *Cyclospora cayetanensis*. The parasite infects the small intestines of humans.
- It is not very common in Waterloo Region and is usually associated with travel; cyclosporiasis is more common in tropical or subtropical countries.
- *Cyclospora* is spread when people eat or drink food or water that has been contaminated with infected feces.
- Cyclosporiasis usually causes watery diarrhea. Other common symptoms include: loss of appetite, weight loss, stomach cramps, bloating/gas, nausea, vomiting, fever, and fatigue.

Local Picture

Figure 4. Age-standardized cyclosporiasis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

• In 2013, there were two cases of cyclosporiasis in Waterloo Region (incidence rate of 0.4 cases per 100,000); this rate is similar to that of the previous five-year annual average rate for 2008-2012 (0.5 per 100,000).
• Local incidence rates in 2013 are similar to those of the province (SRR=0.59 [CI: 0.19-1.80]), and remained similar to or lower than provincial rates from 2008 to 2013.
• There were no notable differences in case distribution by sex or age group.
• Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Giardiasis

Background

- Giardiasis is a diarrheal infection caused by a parasite called *Giardia lamblia*.
- It is one of the most common waterborne illnesses in North America. Giardiasis can be spread through ingestion of contaminated food or water, such as through swallowing untreated recreational water (e.g., lakes or rivers), or directly from fecal-oral contact such as in child care settings or through sexual contact.
- Giardiasis causes watery diarrhea, foul smelling bowel movements, weight loss, bloating, and stomach pain/cramps. Some persons may have no symptoms.
- Travelers to countries where giardiasis is common, those who are in close contact with someone who has the illness, people who swallow contaminated drinking water (e.g., untreated water from lakes or rivers), and men who have sex with men are among those at higher risk.

Local Picture

Figure 5. Age-standardized giardiasis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

- In Waterloo Region and Ontario, giardiasis was the third most common enteric disease reported in 2013.
• In 2013, there were 74 reported cases of giardiasis in Waterloo Region (incidence rate of 14.3 cases per 100,000).
• Rates have fluctuated in Waterloo Region since 2008; however, the rate in 2013 is the same as the previous five-year annual average for 2008-2012 of 14.3 per 100,000.
• Provincially, the rate of giardiasis decreased from 2008 to 2012, with only a slight increase in 2013. The 2013 local rate is higher than that of the province (SRR = 1.38 [CI: 1.05-1.82]).
• Distribution of giardiasis cases among males and females was similar (N=38 in males versus N=36 in females). The local rate of giardiasis in 2013 was highest among children aged 0 to 4 years of age (38.9 per 100,000) and also high among children aged 5 to 9 years of age (21.7 per 100,000), and adults aged 30 to 34 years and 45 to 49 years (20.4 and 21.9 per 100,000, respectively).
• There was no marked seasonal trend in the incidence of giardiasis cases.
• Of those that had risk factor information available (N=57), the majority of 2013 local giardiasis cases reported travelling or living outside the province within the incubation period. Of those who did not have a travel-related exposure, the most common self-reported risk factor was contact with river or lake water.
Hepatitis A

Background

- Hepatitis refers to the inflammation of the liver which can be due to a number of causes. In a hepatitis A infection, the cause is the hepatitis A virus.
- Hepatitis A is spread when the hepatitis A virus is taken in by mouth from contact with objects, food, or drinks contaminated by the feces of an infected person. This can occur through person to person contact or ingestion of contaminated food or water.
- Symptoms are often abrupt and include tiredness, fever, abdominal pain, loss of appetite, nausea, diarrhea and jaundice (yellowing of the skin and eyes). Some people may have no symptoms, and adults are more likely to have symptoms than children.
- Those at higher risk of contracting hepatitis A include travellers to regions with poor sanitation and/or high rates of hepatitis A, sexual contacts of infected persons, men who have sex with men, and household contacts of cases.

Local Picture

Figure 6. Age-standardized hepatitis A incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

• In 2013, there were six reported cases of hepatitis A in Waterloo Region (incidence rate of 1.1 per 100,000).
• Since 2009, the local rate of hepatitis A has remained relatively similar over time, and the current year’s incidence rate is similar to that of the previous five-year annual average rate for 2008-2012 (1.0 per 100,000).
• In 2013, the local and provincial hepatitis A rates were similar (SRR = 1.44 [CI: 0.54-3.84]).
• Of the six local hepatitis A cases, five had travelled outside of the province within the incubation period.
• Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Listeriosis

Background

- Listeriosis is an illness caused by eating food contaminated with bacteria called *Listeria monocytogenes*. The bacteria are commonly found in the environment (i.e., water and soil).
- Some foods are more likely to carry listeria than others. Those that present a higher risk include raw or unpasteurized milk, soft cheeses and ready-to-eat meats such as hot dogs, pâté and deli meats.
- The disease primarily affects the elderly, newborns, pregnant women, and those with weakened immune systems. These individuals should avoid eating the foods mentioned above to reduce the risk of becoming infected with listeriosis.
- Listeriosis usually causes fever and muscle aches. More severe consequences of listeriosis include septicemia (infection of blood and organs) and meningitis (infection of the lining of the brain). Infections during pregnancy can lead to complications such as miscarriage and infection of the newborn.

Local Picture

Figure 7. Age-standardized listeriosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013


The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
In 2013, there were five reported cases of listeriosis in Waterloo Region (incidence rate of 0.8 per 100,000).

The local rate of listeriosis in 2013 was higher than the provincial rate, although the difference was not statistically significant (SRR = 3.00 [CI: 0.69-13.04]).

The rates of listeriosis were fairly consistent over the previous five years, with the exception of 2008 in which Waterloo Region experienced a rise in cases due to a provincial outbreak (including Waterloo Region) related to Maple Leaf food products.

Among the 2013 Waterloo Region cases, risk factors identified included consumption of ready-to-eat meats, soft cheeses, and unpasteurized milk. One local case was linked to a national outbreak where the source was not identified.

Forty per cent of the cases had an underlying medical condition or chronic illness, and twenty per cent reported having cancer or being immunocompromised.

The local 2013 cases were sporadic and not linked to an outbreak.

Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Salmonellosis

Background

- Salmonellosis is a common food-borne infection caused by bacteria known as *Salmonella*.
- Salmonella is spread by consuming food or water that is contaminated by feces of an infected animal or person. It can also be spread from person-to-person (e.g., through inadequate hand washing after using the toilet).
- Symptoms of salmonellosis include fever, headache, diarrhea, nausea and stomach cramps.
- Those at higher risk of getting the infection include infants, the elderly, and persons with weakened immunity (e.g., those with HIV or taking corticosteroids). Owning a bird or reptile can also put a person at risk, since these animals can be carriers of the bacteria without having any symptoms.

Local Picture

Figure 8. Age-standardized salmonellosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

• Salmonellosis was the second most common enteric infection in Waterloo Region in 2013.
• In 2013, the local annual incidence rate of salmonellosis was 24.3 per 100,000 (N=128) which is similar to that of the province (SRR = 1.2 [CI: 0.99-1.46]).
• Since 2008, the local rate has remained relatively stable; the current year’s rate is similar to the previous five-year average annual rate for 2008-2012 (22.6 per 100,000).
• A slightly higher proportion of 2013 salmonella cases occurred in females (55.5 per cent) compared to males (44.5 per cent); the highest age-specific rate occurred among the 0 to 4 year age group (71.4 per 100,000) which is consistent with the age distribution over the previous five years.
Shigellosis

Background
- Shigellosis is an enteric infection that is caused by *Shigella* bacteria.
- *Shigella* is passed from person to person by the fecal-oral route. It can spread if hands are not properly washed, especially after going to the toilet or changing diapers, through certain sexual activities (e.g., anal-oral sex), and eating food or drinking water that has been contaminated with the bacteria.
- Shigellosis commonly causes diarrhea (even bloody diarrhea), fever, nausea, stomach cramps, and sometimes vomiting.
- Those at higher risk of infection include children, men who have sex with men, persons with weakened immune systems, and the elderly.

Local Picture

Figure 9. Age-standardized shigellosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013


1 The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013, there were 13 reported cases of shigellosis in Waterloo Region for an incidence rate of 2.5 per 100,000; this is slightly higher than the average annual rate for the previous five years (1.4 per 100,000).

• Although the 2013 local incidence rate is higher than the provincial rate, the difference is not statistically significant (SRR for 2013 = 1.23 [CI: 0.66-2.29]). In the previous five years, the local rate was consistently lower than the provincial rate, although again the differences were not statistically significant.

• There were no discernible trends between males and females or between age groups, and due to the small numbers, seasonal trends were not apparent.

• Of the 2013 Waterloo Region cases that had risk factor information (N=13), twelve cases were associated with travel outside the province during the incubation period. The other case was associated with person-to-person spread.

• Due to small numbers and resulting instability in rates, caution should be used when interpreting this data.
Typhoid/Paratyphoid Fever

Background

- Typhoid fever is a disease caused by bacteria called *Salmonella typhi*. Paratyphoid fever is caused by bacteria called *Salmonella paratyphi*. These diseases are similar, but typhoid fever tends to be more common and severe than paratyphoid fever.
- The bacteria that cause typhoid and paratyphoid fever are found in the feces of infected people. It is commonly spread by eating food or drinking water that has been contaminated with the bacteria. It is also spread from person to person by the fecal-oral route (e.g., hands not properly washed after going to the bathroom or after changing diapers, or through certain sexual activities such as oral-anal sex).
- The symptoms can range from mild to severe and include fever, headache, malaise (general discomfort), lack of appetite, and constipation or diarrhea.
- The greatest risk of infection for Canadians occurs while they are traveling to areas with poor sanitation. Children and people with weakened immune systems are at greater risk of getting the infection.

Local Picture

Figure 10. Age-standardized typhoid/paratyphoid fever incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

In 2013, there were three cases of typhoid and paratyphoid reported in Waterloo Region (incidence rate of 0.5 per 100,000); this is similar to the previous five-year annual average for 2008-2012 (0.7 per 100,000).

Local incidence rates have remained similar to or lower than provincial rates since 2008; in 2013, the local typhoid/paratyphoid rate was similar to that of the province (SRR = 0.69 [CI: 0.26-1.87]).

There were no notable differences in case distribution by age or sex and seasonal trends were not apparent.

All three local cases of typhoid/paratyphoid in 2013 had travelled outside the province within the incubation period.

Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Verotoxin producing *Escherichia Coli* (VTEC)

**Background**

- *Escherichia coli* or *E. coli* is a bacterium with many subtypes. Most subtypes of *E. coli* are harmless and live in the intestine (gut) of humans and animals. However, there are other subtypes of *E. coli* such as verotoxin-producing *Escherichia coli* (VTEC) that produce toxins and can cause severe illness. The most common strain from the VTEC group is *E. coli* O157:H7.
- *E. coli* is spread through eating contaminated food or drinking contaminated fluids (e.g., water, unpasteurized juice or milk). *E. coli* is found in feces and can also spread from person to person as a result of inadequate hand washing, and through improper food handling.
- The symptoms of *E. coli* infection include severe stomach pain/cramps, diarrhea/bloody diarrhea, nausea, vomiting, and fever. Some people may develop complications involving the kidneys (hemolytic uremic syndrome), which can be life-threatening.
- Those at higher risk include: children, the elderly, and those with weakened immune systems. Eating undercooked meats, especially ground beef such as hamburgers, cheese or milk products made from raw or unpasteurized milk, and drinking unpasteurized milk and fruit juices are key risk factors for getting the infection.
Local Picture

Figure 11. Age-standardized VTEC incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

- In 2013, the rate of VTEC in Waterloo Region was 1.3 per 100,000 (N=6); this is lower than the previous five-year annual average for 2008-2012 (3.2 per 100,000).
- In 2013, the local incidence rate of VTEC was similar to the provincial rate (SRR = 1.05 [CI: 0.45-2.44]). The local incidence rate in 2012 was significantly higher than the provincial rate; otherwise local rates were not statistically different from provincial rates from 2008 to 2011.
- The increase in VTEC cases in 2012 was likely due to the 10 cases linked to family clusters (multiple family members becoming ill from a common source or through person to person spread).
- In 2013, there were no notable trends in distribution of cases between males and females; the highest age-specific rates occurred in the 0 to 4 (13.0 per 100,000), which is consistent with the age distribution of VTEC cases in the past five years.
- The incidence of VTEC in 2013 was higher during the months of July and August, which is consistent with the seasonality of the previous five years.
- Of the six local cases of VTEC in 2013, all had risk factor information available. Risk factors included consumption of raw or undercooked ground beef (e.g., hamburgers), unpasteurized milk, and contact with farm animals and their manure. In three of the six cases, exposure is believed to have occurred outside the region.
• Due to the small number of cases and resulting instability in rates in 2008 to 2011 and 2013, caution should be used when interpreting this data.
Yersiniosis

Background

- Yersiniosis is an infection caused by a bacterium of the genus *Yersinia*. Most human infections are caused by *Yersinia enterocolitica*. Yersiniosis is more common in children.
- People get infected with yersiniosis by drinking contaminated fluids and eating contaminated food, especially raw or undercooked pork products.
- If proper hand washing is not practiced after using the toilet or handling raw meat, an infected person can transfer the bacteria to food and objects. A child can be infected if a parent or caretaker handles contaminated food and does not properly wash their hands. *Y. enterocolitica* can also be spread to humans by infected pets through fecal-oral transmission.
- The symptoms of yersiniosis include fever, abdominal pain and diarrhea (often bloody).
- Those who are at a higher risk of infection and severe illness include people with weakened immune system (e.g., with HIV/AIDS), those undergoing chemotherapy, young children, and the elderly.

Local Picture

Figure 12. Age-standardized yersiniosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013¹

![Graph showing incidence rates of yersiniosis from 2008 to 2013 for Waterloo and Ontario regions.](image)


¹The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
- In 2013, there were three cases of yersiniosis in Waterloo Region (incidence rate of 0.5 per 100,000); this is lower than the previous five-year annual average for 2008-2012 (1.6 per 100,000).
- The local rate of yersiniosis has decreased since 2008 from 2.3 cases per 100,000 to 0.5 cases per 100,000 in 2013.
- In 2013, the local incidence rate of yersiniosis was significantly lower than that of the province (SRR=0.32 [CI: 0.16-0.62]).
- Of the three local cases of yersiniosis in 2013, one reported travelling outside the province within the incubation period, and the other two both had contact with animals (e.g., pets, farm animals or petting zoo).
- Due to the small number of cases and resulting instability in rates, caution should be used in interpreting this data.
Vector-Borne and Zoonotic Diseases

For the purposes of this report, diseases transmitted by vectors and animals include:

- Lyme disease
- Malaria
- Rabies
- West Nile virus (WNV)

Table 3. Numbers and age-standardized incidence rates per 100,000 for vector-borne and zoonotic diseases, Waterloo Region & Ontario, 2013 and 2008-2012 (five-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2013 Standardized rate ratio (95% confidence interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2008-2012)</td>
</tr>
<tr>
<td>Malaria</td>
<td>8</td>
<td>1.3¹</td>
<td>1.0¹</td>
</tr>
<tr>
<td>Lyme disease³</td>
<td>6</td>
<td>1.0¹</td>
<td>0.4¹</td>
</tr>
<tr>
<td>West Nile virus³</td>
<td>0</td>
<td>0.0¹</td>
<td>0.2¹</td>
</tr>
<tr>
<td>Rabies</td>
<td>0</td>
<td>0.0¹</td>
<td>0.0¹</td>
</tr>
</tbody>
</table>


¹Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

²Standardized rate ratio (SRR) refers to the ratio of the Waterloo Region age-standardized rate for 2013 compared to the Ontario age-standardized rate for 2013. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% confidence interval contains 1.00, the two rates are not statistically different from one another).

³Includes both confirmed and probable Lyme disease and West Nile virus cases.
Region of Waterloo Public Health Activities for Vector-Borne and Zoonotic Diseases

Region of Waterloo Public Health:

- Undertakes activities to reduce the occurrence of West Nile virus and Lyme disease and to prevent human rabies.
- Reduces the risk of exposure to Lyme disease and West Nile virus through public education, investigation of suspect human cases, vector surveillance, and the implementation of vector control measures.
- Raises awareness about diseases through the provision of information regarding the disease, its transmission, risk factors, and prevention strategies.
- Investigates all reported animal biting incidents, provides recommendations regarding post-exposure prophylaxis and dispenses rabies vaccine.
- Investigates and confirms human cases of malaria identified by health care providers and laboratories.
Lyme Disease

Background

- Lyme disease is an infection caused by the bacteria *Borrelia burgdorferi*. This bacterium is spread through the bite of blacklegged ticks, previously called deer ticks. These ticks can be found throughout Ontario, particularly in known endemic areas such as Long Point Provincial Park, Turkey Point Provincial Park, Rondeau Provincial Park, Point Pelee National Park, Prince Edward Point National Wildlife Area, Wainfleet Bog Conservation Area, and in the St. Lawrence Islands National Park area.

- The common symptoms of Lyme disease include a red bull’s eye rash (also called erythema migrans), fever, headache, muscle/joint pain, and fatigue. If untreated, the disease can progress to cause infections of the heart, brain and lining surrounding the brain, and inflammation of joints.

- Spending time outdoors in woody or grassy areas where blacklegged ticks are present; having exposed areas of skin while visiting places where such ticks are commonly found; and not removing blacklegged ticks attached to the body within 24 hours, could increase the risk of acquiring the infection.
Local Picture

Figure 13. Age-standardized Lyme disease\(^1\) incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013\(^2\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo probable cases</th>
<th>Waterloo confirmed cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>3</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>1</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>4</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>4</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>2013</td>
<td>1</td>
<td>5</td>
<td>1.0</td>
<td>2.3</td>
</tr>
</tbody>
</table>


\(^1\)Includes both confirmed and probable Lyme disease cases.

\(^2\)The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- In 2013, the rate of Lyme disease among Waterloo Region residents was 1.0 per 100,000 (N=6); this is higher than the previous five-year average annual rate for 2008-2012 (0.4 per 100,000).
- The local rate of Lyme disease was significantly lower than that of the province (SRR=0.42 [CI: 0.24-0.74]).
- None of the cases were locally acquired. At the present time, Waterloo Region is not an endemic area for the blacklegged tick.
- All Lyme disease cases in residents of Waterloo Region in 2013 occurred between the months of June and October, which is generally consistent with the previous five-year seasonality, where Lyme disease acquisition tended to occur in the warmer summer months (i.e., June to September).
- Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Malaria

Background
- Malaria is a common and life-threatening parasitic disease in many tropical and subtropical countries. The disease is transmitted by the female Anopheles mosquitoes.
- Malaria is currently endemic in over 100 countries, many of which are popular travel destinations. It is not endemic to Canada and cases diagnosed in Canada are acquired during travel to an endemic area.
- Infection may be marked by an acute fever and other clinical symptoms. Some forms of malaria may remain dormant in the liver and cause relapses in illness for up to five years after initial exposure.
- Travellers to endemic areas and persons returning to visit their country of origin in such areas are at increased risk for infection if anti-malarial medication and precautions to reduce mosquito bites are not taken.
- Young children, pregnant women and persons with human immunodeficiency virus (HIV) are most at risk from malaria and its complications.

Local Picture

Figure 14. Age-standardized malaria incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013


The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
In 2013, there were eight cases of malaria reported among residents of Waterloo Region. The incidence rate for 2013 was 1.3 per 100,000 which is similar to the previous five-year average annual rate for 2008-2012 (1.0 per 100,000).

The local malaria rate in 2013 was lower than the provincial rate; although, the difference was not statistically significant (SRR = 0.82 [CI: 0.42-1.59]).

Of the 2013 local cases with risk factor information available (N=8), seven of the cases reported travel to an area endemic for malaria; the eighth case reported living in an area endemic for malaria.

Due to the small number of cases and resulting instability in rates, caution should be used in interpreting this data.
Rabies

Background
- Rabies is a disease of the central nervous system that can affect humans and other mammals.
- Infection can occur if a rabid animal bites a person, if the saliva of a rabid animal enters a cut or scratch, or if the saliva comes in contact with the moist tissues of the mouth, nose or eyes.
- Although the risk of encountering a rabid animal in Ontario is low, rabies is almost invariably fatal, making prevention and control extremely important.
- Risk factors include coming in contact with animals, especially animals that are common rabies carriers, and travel to a rabies endemic country.

Local Picture
- There have been no reports of human cases of rabies in the Waterloo Region from 2008 to 2013.
- Although rare, the possibility of human rabies acquired from animal bites continues to exist, as rabies in animals can be found on occasion in Waterloo Region.
- One fatal rabies case was reported by the province in 2012, but this case contracted the disease outside of Canada.
West Nile Virus (WNV)

Background
- West Nile virus (WNV) is a virus transmitted through the bite of an infected mosquito (which becomes infected by feeding on an infected bird).
- The risk of infection is low with less than one per cent of people infected becoming ill enough to be hospitalized. Around one in five people will experience symptoms. Symptoms can include fever, headache, nausea/vomiting, body ache, skin rash and swollen glands.
- Anyone can be infected with WNV, but the elderly and those with a weakened immune system (e.g., having HIV/AIDS, undergoing chemotherapy or taking corticosteroids) are at greater risk.

Local Picture

Figure 15. Age-standardized West Nile virus\(^1\) incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013\(^2\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo probable cases</th>
<th>Waterloo confirmed cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2011</td>
<td>1</td>
<td>1</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>0</td>
<td>0.5</td>
<td>1.7</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

\(^1\)Includes both confirmed and probable West Nile virus cases.
\(^2\)The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- There were no cases of West Nile virus in Waterloo Region in 2013; there were 57 cases of West Nile virus reported in Ontario during the same time period.
- Due to the small number of cases locally and resulting instability in rates, caution should be used when interpreting the data.
Sexually Transmitted and Blood-borne Infections

For the purposes of this report, sexually transmitted and blood-borne infections include:

- Chlamydia
- Gonorrhea
- Hepatitis B
- Hepatitis C
- HIV/AIDS
- Syphilis (infectious and other)

Table 4. Numbers and age-standardized incidence rates per 100,000 for sexually transmitted and blood-borne infections, Waterloo Region & Ontario, 2013 and 2008-2012 (five-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2013 Standardized rate ratio (95% confidence interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2008-2012)</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>1,220</td>
<td>240.8</td>
<td>235.2</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>164</td>
<td>32.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>100</td>
<td>17.4</td>
<td>22.0</td>
</tr>
<tr>
<td>Syphilis, infectious³</td>
<td>21</td>
<td>3.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Syphilis, other⁴</td>
<td>20</td>
<td>3.4</td>
<td>4.2</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>14</td>
<td>2.5¹</td>
<td>2.8¹</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>0</td>
<td>0.0¹</td>
<td>0.7¹</td>
</tr>
</tbody>
</table>


¹Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

²Standardized rate ratio (SRR) refers to the ratio of the Waterloo Region age-standardized rate for 2013 compared to the Ontario age-standardized rate for 2013. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% confidence interval contains 1.00, the two rates are not statistically different from one another).

³Primary, secondary and early latent syphilis are all considered infectious (includes early latent; primary genital; primary other sites; secondary of skin and mucous membranes; secondary, other; infectious neurosyphilis and primary anal).

⁴Other syphilis includes all other types of syphilis such as late latent or unspecified (the other category excludes early congenital syphilis).
Region of Waterloo Public Health Activities for Sexually Transmitted and Blood-Borne Infections

Region of Waterloo Public Health:

- Provides sexual health clinics which offer free testing, treatment and counselling for sexually transmitted and blood-borne infections (for both cases and contacts of cases).
- Receives, investigates, and confirms reports of sexually transmitted and blood-borne infections in the Region.
- Actively promotes healthy sexuality through general preventive counselling, including risk reduction counselling, and the promotion and distribution of free condoms.
- Provides free and confidential testing for HIV, provides counselling (pre- and post test) regarding exposure, HIV disclosure requirements, risk reduction and safer/safe sex practices.
- Distributes free medication for sexually transmitted infections (STIs) to family physicians and nurse practitioners for the treatment of chlamydia, gonorrhea and syphilis.
- Developed and is implementing the ‘Sexual Health Youth Strategy’ in partnership with several community stakeholders. The strategy outlines a multi-year action plan to promote healthy sexuality among youth in Waterloo Region, and to provide strategic direction for youth sexual health education, programs, and services for implementation. It focuses on three key focus areas: access to programs and services, education, and parents.
- Collaborates with community partners to improve harm reduction programs and services. Harm reduction strategies are most effective against blood borne infections such as hepatitis C, B and HIV/AIDS.
- Provides needle syringe programs at several locations in Waterloo Region.
- Performs inspections of tattoo parlours in order to prevent the occurrence and transmission of infectious diseases.
- Provides free hepatitis B vaccine to students in Grade 7 through the Region of Waterloo Public Health school immunization program, as well as providing the vaccine to those at higher risk of acquiring hepatitis B.
Chlamydia

Background

- Chlamydia is one of the most common sexually transmitted infections (STIs). It is caused by a bacterium called *Chlamydia trachomatis*, and is both preventable and curable.
- Chlamydia is spread through unprotected anal, oral, or vaginal sex with an infected person. It can also be passed from an infected mother to her baby during delivery. A person remains infectious until properly treated.
- Chlamydia can occur in both men and women. Many may not have any symptoms, especially women. Women who have symptoms experience increased vaginal discharge and/or irritation, bleeding during or after sexual intercourse, pain during sex, and painful or burning urination. Untreated chlamydia can lead to sterility and complicated (ectopic) pregnancy in women. Men who have symptoms experience discharge and/or itching from the penis, pain or swelling in the testicles, and painful or burning urination.
- Those with multiple partners, who do not practice safer sex (e.g., use of condoms), and babies born to infected mothers are at higher risk. Men who have sex with men (MSM) are also at higher risk.
Chlamydia is the most commonly reported infectious disease in Waterloo Region and constitutes the vast majority of STI cases both locally (79.3 per cent) and provincially (76.3 per cent).

In 2013, there were 1,220 chlamydia cases reported in Waterloo Region, with an incidence rate of 240.8 per 100,000. This rate is slightly higher than the previous five-year average for 2008-2012 (235.2 per 100,000) but lower than the chlamydia rate for the previous year (241.5 per 100,000 in 2012).

The local rate of chlamydia in 2013 was significantly lower than that of the province as a whole (SRR = 0.84 [CI: 0.79-0.88]); the local chlamydia incidence rate has been consistently significantly lower than the provincial rate since 2008.
Figure 17. Chlamydia cases and incidence rates per 100,000 among 15 to 24 year olds, by sex and year, Waterloo Region, 2008-2013

- Rates of chlamydia are particularly high among females in the 15 to 24 year age group; in 2013, females aged 20 to 24 years had the highest age-specific rate (1,598.0 per 100,000), followed by females aged 15 to 19 years (1,013.0 per 100,000).
- In 2013, males aged 20 to 24 years (826.4 per 100,000) had the highest age-specific rate, followed by males aged 25 to 29 years (430.6 per 100,000) and males aged 15 to 19 years (387.1 per 100,000).
- In 2013, 49 cases of chlamydia were concurrently infected with gonorrhea; co-infections were highest in the 20 to 24 year age group (N=20), followed by 15 to 19 year olds (N=9) and 25 to 29 year olds (N=8). Slightly more cases were female (N=27) than male (N=22).
- Among those who reported risk factor information in 2013 (N= 1,120), the most common self-reported risk factors of chlamydia cases in Waterloo Region included not using a condom (83.8 per cent), having more than one sexual partner in the last six months (35.7 per cent), and having a new sexual partner in the last two months (25.3 per cent).
Gonorrhea

Background

- Gonorrhea is one of the most common sexually transmitted infections (STIs). It is caused by a bacterium called *Neisseria gonorrhoeae*, and is both preventable and curable.
- Gonorrhea is spread through unprotected anal, oral or vaginal sex with an infected person. It can also be passed from an infected mother to her baby during birth.
- Gonorrhea can occur in both men and women. Many may not have any symptoms. The common symptoms that may occur for women include pain during urination, bleeding during or after sex, and white or yellow foul vaginal discharge. Symptoms that may be seen in men include discharge from the penis, itching around the penis, frequent or painful urination and pain or swelling in the testicles.
- If untreated, gonorrhea can lead to serious and permanent complications such as pelvic inflammatory disease in women and epididymitis (inflammation of the tubes of the testicles) in men. Gonorrhea can also spread to the blood and joints. Untreated gonorrhea can increase a person’s risk of acquiring or transmitting HIV.
- Risk factors for gonorrhea include not practicing safer sex (e.g., use of condoms) and having multiple partners.
## Local Picture

Figure 18. Age-standardized gonorrhea incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>171</td>
<td>34.6</td>
<td>33.4</td>
</tr>
<tr>
<td>2009</td>
<td>87</td>
<td>17.3</td>
<td>30.2</td>
</tr>
<tr>
<td>2010</td>
<td>105</td>
<td>21.0</td>
<td>33.4</td>
</tr>
<tr>
<td>2011</td>
<td>123</td>
<td>24.1</td>
<td>35.2</td>
</tr>
<tr>
<td>2012</td>
<td>88</td>
<td>17.4</td>
<td>33.9</td>
</tr>
<tr>
<td>2013</td>
<td>164</td>
<td>32.4</td>
<td>37.4</td>
</tr>
</tbody>
</table>


- In 2013, the rate of gonorrhea in Waterloo Region was 32.4 per 100,000 (N=164); this rate was higher than the previous five-year average annual rate for 2008-2012 (22.9 per 100,000).
- The local 2013 rate of gonorrhea was lower than that of the province, although the difference was not statistically significant (SRR = 0.87 [CI: 0.75-1.00]).
- Gonorrhea age-specific rates were highest among 20 to 24 year olds (139.8 per 100,000) followed by 25 to 29 year olds (91.3 per 100,000) and the 15 to 19 year olds (58.6 per 100,000); there were no notable differences between males and females.
- Of the 2013 Waterloo Region gonorrhea cases that reported risk factor information (N=146), the most commonly reported risk factors included not using a condom (75.3 per cent), having more than one sexual partner in the last six months (39.7 per cent), and having a new sexual partner in the past two months (26.0 per cent).
Hepatitis B

Background

- Hepatitis B infection is an infection of the liver caused by the hepatitis B virus (HBV). About six to ten per cent of all those infected in adulthood will carry the virus for life and can infect others. Chronic hepatitis can lead to cirrhosis and liver cancer. HBV is 100 times more infectious than HIV.
- Hepatitis B is spread through contact with infected blood, semen, and other body fluids, mainly through sexual contact with an infected person; sharing of contaminated needles, syringes or other injection drug equipment; needle stick/sharp instrument injuries; and transmission at birth. Babies born to hepatitis B carriers have a 90 per cent chance of developing the disease unless they are vaccinated immediately after birth.
- Symptoms may include feeling weak, nausea, vomiting, dark urine, and jaundice (yellowing of the skin and eyes).
- Those at risk of getting hepatitis B include people with multiple sexual partners; men who have sex with men; sexual partners of those infected; people who use injection drugs, those who received an unsterilized tattoo or body piercing; occupations with a high risk of exposure to blood and body fluids (e.g., healthcare workers, police officers, etc.); and those who have come from countries with high rates of HBV.
- There is a vaccine for hepatitis B which is an effective way to help prevent the infection.
Local Picture

Figure 19. Age-standardized hepatitis B incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013


\(^1\)The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- In 2013, there were no acute hepatitis B cases in Waterloo Region. There were 111 cases in all of Ontario (incidence rate of 0.8 cases per 100,000).
- From 2008 to 2011, the local hepatitis B incidence rate was not statistically different from that of the province; in 2012, the local rate was significantly lower than the provincial rate (SRR = 0.19 [CI: 0.08-0.45]).
- Due to the small number of cases and the resulting instability in rates, caution should be used when interpreting this data.
Hepatitis C

Background

- Hepatitis C infection is an infection of the liver caused by the hepatitis C virus (HCV). Up to 80 per cent of people with HCV become chronically infected. HCV is a slowly progressive disease that may lead to liver cirrhosis (scarring) or liver cancer.
- HCV spreads through contact with the blood of an infected person, mainly through: sharing of contaminated needles, syringes or other drug equipment; blood transfusions prior to 1992 before screening became available; unsafe tattoos/piercings; sexual contact with an infected person; and/or, being born to an infected mother.
- The early symptoms may include fatigue, loss of appetite, nausea, or jaundice (yellowing of the skin and/or eyes). Many infected people do not initially have symptoms and may look and feel well for many years.
- Those at risk of getting HCV include: current or past injection drug users; those who received blood or blood products or an organ transplant before 1992; those who received an unsterilized tattoo or body piercing; occupations with a high risk of exposure to blood and body fluids (e.g., healthcare workers, police officers, etc.); people with multiple sexual partners; sexual partners of those infected; and those born to an infected mother.
- There is no vaccine to prevent against HCV infection.
Local Picture

Figure 20. Age-standardized hepatitis C incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

- In Waterloo Region in 2013, the rate of HCV was 17.4 per 100,000 (N=100), making it the third most common reportable STI/blood-borne infection in Waterloo Region.
- Since 2010, local incidence rates of HCV have declined slowly; the rate in 2013 was lower than that of the previous five-year average annual rate for 2008-2012 (22.0 per 100,000).
- Local rates have been consistently and significantly lower than those of the province (SRR for 2013 = 0.60 [CI: 0.51-0.71]).
- In 2013, the rate among males was higher than that among females (22.1 and 14.7 per 100,000, respectively). The age-specific rate was highest among 20 to 24 year olds (34.3 per 100,000), followed by the 55 to 59 year olds (32.2 per 100,000) and 50 to 54 year olds (29.7 per 100,000). Age-specific rates were lowest in the youngest age groups (incidence rate of 0.0 per 100,000 in those less than 15 years of age).
- Of 2013 HCV cases in Waterloo Region that had risk factor information available (N=98), the most common risk factors reported included injection drug use (49.0 per cent), inhalation drug use (37.8 per cent), and receiving a tattoo or piercing (29.6 per cent).
HIV/AIDS

Background

- Human immunodeficiency virus (HIV) infection is a blood-borne infection that attacks the immune system (the body’s internal defence system). HIV can lead to acquired immunodeficiency syndrome (AIDS) which is a disease of the immune system that makes the person at risk of getting other infections and diseases.
- HIV is spread through direct blood-to-blood contact and direct contact with certain infected body fluids such as semen, and vaginal or rectal fluids.
- People at risk of getting HIV/AIDS include: people who have unprotected anal, oral or vaginal sex; those who have multiple sex partners; people who use injection drugs; people who received blood transfusions before 1985; and those born to an infected mother. Effective treatment of an HIV positive mother can lower the risk of her child becoming infected to less than two per cent.
- People infected with HIV may initially feel tired and have swollen lymph nodes. They can then be symptom free for years. Over time, the immune system continues to weaken and leads to the person becoming vulnerable to other infections.
Local Picture
Figure 21. Age-standardized HIV/AIDS incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013


\(^1\)The Waterloo Region rates for 2009 and 2011 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23\%) and should be interpreted with caution.

- In 2013, there were 14 HIV/AIDS cases in Waterloo Region with an incidence rate of 2.5 per 100,000). This rate was slightly lower than the previous five-year annual average rate for 2008-2012 (2.8 per 100,000).
- Local rates for HIV/AIDS have been consistently significantly lower than those of the province since 2008; in 2013, the local rate remained significantly lower than that for Ontario (SRR = 0.41 [CI: 0.29-0.59]).
- There appears to be an overall decreasing trend in provincial incidence rates of HIV.
- Of the HIV cases in 2013 in Waterloo Region, one case also had AIDS.
- In 2013, the rate among males (4.0 per 100,000) was higher than that among females (1.1 per 100,000) and all cases were 20 years of age or older.
- Due to the small number of cases and resulting instability in rates, caution should be used in interpreting this data.
Syphilis

Background

- Syphilis is a sexually transmitted infection (STI) caused by the *Treponema pallidum* bacterium.
- Syphilis is spread by unprotected vaginal, anal or oral sex. Syphilis can be transmitted during pregnancy from a mother to her unborn baby, and cause fetal deformity or stillbirth.
- Symptoms vary according to the progression of the infection. Initially, a painless sore or ulcer (called chancre) appears in the mouth, anus, penis, cervix or vagina. Other symptoms such as fever, hair loss, fatigue, and warts around the anus could also appear. Later stages of syphilis, which can be many years after the initial infection, can cause irreversible damage to the brain and spinal cord (neurosyphilis), heart, eyes and bones.
- Those at risk of getting syphilis include any sexually active person, particularly those with multiple partners, those who do not use condoms, men who have sex with men, people who use injection drugs, and babies born to infected mothers.
- Syphilis is considered infectious in the early latent, primary or secondary forms; otherwise, syphilis is generally considered to be non-infectious.
Local Picture

Figure 22. Age-standardized infectious syphilis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2008-2013

- In 2013, the age-standardized incidence rate of infectious syphilis in Waterloo Region was 3.9 per 100,000 (N=21); this is higher than the previous five-year annual average for 2008-2012 (2.2 per 100,000).
- Local infectious syphilis rates appear to have been generally increasing since 2008, and are gradually approaching the provincial rate.
- Waterloo Region rates have been consistently significantly lower than those of the province since 2008; in 2013, the local rate was lower than that of Ontario, although the difference was no longer significant (SRR = 0.74 [CI: 0.51-1.09]).
- Almost all infectious syphilis cases in 2013 were among males (N=19); the age-specific rate was highest among 20 to 24 year olds (19.6 per 100,000), followed by 45 to 49 year olds (7.3 per 100,000) and 25 to 29 year olds (7.0 per 100,000).
- Of the 2013 Waterloo Region cases with risk factor information available (N=20), the most common self-reported risk factors included not using a condom (80.0 per cent), having more than one sexual partner in the last six months and male cases

\(^1\)Primary, secondary and early latent syphilis are all considered infectious (includes early latent; primary genital; primary other sites; secondary of skin and mucous membranes; secondary, other; infectious neurosyphilis and primary anal)

\(^2\)The Waterloo Region rates for 2008-2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

having sex with other men (75.0 per cent each), and having one or more new sexual contacts in the past two months (45.0 per cent).

- Due to the small number of cases and resulting instability in rates, caution should be used in interpreting the infectious syphilis data.

Figure 23. Age-standardized other syphilis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2008-2013

![Graph showing incidence rates from 2008 to 2013]


\(^1\) Other syphilis includes all other types of syphilis such as late latent or unspecified (the other category excludes early congenital syphilis)

\(^2\) The Waterloo Region rates for 2010 and 2012 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- In Waterloo Region in 2013, there were 20 cases of non-infectious and unspecified syphilis with an incidence rate of 3.4 per 100,000. This rate is lower than the previous five-year annual average for 2008-2012 (4.2 per 100,000).
- Since 2008, local rates typically have been lower than those of the province; in 2013, the rate was similar to that of Ontario (SRR = 0.95 [CI: 0.61-1.49]).
- There were more non-infectious and unspecified syphilis cases among males (N=13) than females (N=7); all cases occurred among individuals aged 30 years or older.
- No cases of congenital syphilis were reported in Waterloo Region between 2008 and 2013.
- Due to the small number of cases and the resulting instability in rates, caution should be used in interpreting this data.
Vaccine Preventable Diseases

Vaccine preventable diseases presented in this section of the report include:

- Influenza
- Invasive meningococcal disease (IMD)
- Invasive pneumococcal disease (IPD)
- Measles
- Mumps
- Pertussis (whooping cough)

Table 5. Numbers and age-standardized incidence rates per 100,000 for vaccine preventable diseases, Waterloo Region & Ontario, 2013 and 2008-2012 (five-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th></th>
<th></th>
<th>2013 Standardized rate ratio (95% confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2008-2012)</td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
</tr>
<tr>
<td>Invasive pneumococcal disease</td>
<td>66</td>
<td>11.0</td>
<td>11.2</td>
<td>1,029</td>
<td>6.3</td>
</tr>
<tr>
<td>Varicella (hospitalizations)</td>
<td>40</td>
<td>8.2</td>
<td>16.2</td>
<td>1,808</td>
<td>15.9</td>
</tr>
<tr>
<td>Pertussis (whooping cough)</td>
<td>15</td>
<td>3.0(^1)</td>
<td>4.3(^1)</td>
<td>263</td>
<td>2.3</td>
</tr>
<tr>
<td>Mumps</td>
<td>0</td>
<td>0.0(^1)</td>
<td>0.8(^1)</td>
<td>21</td>
<td>0.2</td>
</tr>
<tr>
<td>Invasive meningococcal disease</td>
<td>0</td>
<td>0.0(^1)</td>
<td>0.5(^1)</td>
<td>22</td>
<td>0.2</td>
</tr>
<tr>
<td>Measles</td>
<td>0</td>
<td>0.0(^1)</td>
<td>0.3(^1)</td>
<td>15</td>
<td>0.1(^1)</td>
</tr>
</tbody>
</table>


\(^1\) Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

\(^2\) Standardized rate ratio (SRR) refers to the ratio of the Waterloo Region age-standardized rate for 2013 compared to the Ontario age-standardized rate for 2013. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% confidence interval contains 1.00, the two rates are not statistically different from one another).

\(^3\) Varicella ambulatory care visits from IntelliHEALTH are reported as a proxy measure to determine severity of disease. Ambulatory care visits include both visits to emergency departments as well as hospital outpatient visits.

Note: Influenza has not been included in this report due to its seasonal nature and the timing of the present report. Data for the influenza 2013-2014 season will be published in a future report. Current data can be found in the Local Influenza Surveillance Bulletins.
Region of Waterloo Public Health Activities for Vaccine Preventable Diseases

Region of Waterloo Public Health:

- Offers immunization at Region of Waterloo Public Health’s clinics and in school settings, to protect individuals against vaccine preventable diseases.
- Distributes vaccine to health care providers, including family physicians, hospitals, long-term care homes, retirement homes, and pharmacies.
- Enforces the Immunization of School Pupils Act to ensure all students attending school are immunized as per the Act.
- Collects and maintains the immunization records of children enrolled in licensed child care centres.
- Provides health education (e.g., via website, written resources, site visits, educational forums) for health care providers, including family physicians, long-term care homes, pharmacies, etc.
- Provides health promotion activities to increase immunization coverage rates, especially among priority and/or high risk populations.
- Receives, confirms, and investigates reports of vaccine preventable diseases from health providers and laboratories.
- Investigates contacts of confirmed cases of vaccine preventable diseases and recommends post-exposure prophylaxis or immunization as required.
- Reports confirmed and probable cases of vaccine preventable diseases, including adverse events following immunization, to the Ministry of Health and Long-Term Care.
- Conducts disease surveillance and provides timely updates on local disease status to area health care providers and other stakeholders as needed.
Invasive Meningococcal Disease (IMD)

Background
- Meningococcal disease is caused by the *Neisseria meningitidis* bacterium. About 10 per cent of people carry the bacteria in their throat or nose without feeling sick. In less common cases, the bacteria can cause serious diseases such as meningitis (inflammation of the lining surrounding the brain) and septicemia (widespread infection of the blood and organs).
- Invasive meningococcal disease (IMD) is spread from person to person, by coming in contact with infected mucus or saliva (through kissing, sharing food or drinks, etc.).
- IMD can cause high fever, neck stiffness, headache, vomiting, sensitivity to light, rash, confusion and in severe cases, coma.
- Children under one year of age and adolescents between 15 to 18 years are at a higher risk of acquiring IMD in addition to those in living in crowded conditions, having medical conditions involving the spleen or cochlear implants, and travellers to areas with high rates of IMD (e.g., sub-Saharan Africa).

Local Picture

Figure 24. Age-standardized invasive meningococcal disease (IMD) incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013


\(^1\)The Waterloo Region rates for 2008 to 2011 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013, there were no cases of IMD in Waterloo Region; this is less than the annual average of 2.8 cases for the previous five years.
• The province of Ontario had 22 cases of IMD cases in 2013 (0.2 per 100,000).
• Due to the small number of cases and resulting instability in rates, caution should be used in interpreting this data.
Invasive Pneumococcal Disease (IPD)

Background

- Invasive pneumococcal disease (IPD) is a serious infection which is caused by the bacterium known as *Streptococcus pneumoniae*. It can cause infections such as pneumonia (lungs), meningitis (the lining of the brain), and sepsis (infection of the blood).
- IPD can cause a number of symptoms including fever, chills, headache, ear pain, cough, chest pain, neck stiffness, and breathing difficulty.
- Risk factors for IPD include being under two years of age or over 65 years of age; chronic diseases of the lung, heart, kidney, or liver; diabetes; cancer; intravenous (IV) drug use; a weakened immune system (e.g., those with HIV/AIDS); smoking; and alcoholism.
- Many strains of IPD are preventable by immunization.

Local Picture

Figure 25. Age-standardized invasive pneumococcal disease (IPD) incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

• In Waterloo Region in 2013, there were 66 cases of IPD with an incidence rate of 11.0 per 100,000.
• The local IPD incidence rate experienced a decline between 2012 and 2013, where previously the local rate had been increasing since 2008. The incidence rate in 2013 is similar to the previous five-year annual average for 2008-2012 (11.2 per 100,000).
• Since 2008, the local rates have been consistently higher than those of the province, including in 2013 (SRR = 1.75 [CI: 1.26-2.42]).
• In 2013, in Waterloo Region, there were slightly more cases among males (59.1 per cent) than females.
• The oldest age groups had the highest age-specific rates; the age-specific incidence rate for those aged 65 years or older was 44.6 per 100,000.
• In 2013, there were seven deaths associated with IPD; this is similar to the number of IPD-associated deaths reported in the previous five years (the average annual number of deaths for 2008-2012 was 7.2).
• Among 2013 Waterloo Region cases that reported risk factors (N=66), the most common self-reported risk factors included: having a chronic illness or underlying medical condition (78.8 per cent), being under two years of age or over 65 years of age (53.0 per cent), being unimmunized (31.8 per cent), and being immunocompromised (15.2 per cent).
• Of the 2013 Waterloo Region IPD cases with known underlying risk factors that were eligible for vaccination to reduce their risk, 47.7 per cent were not immunized.
Measles

Background

- Measles, also known as rubeola or red measles, is a very contagious infection caused by the measles virus. It is easily spread from person to person by direct contact with nasal or throat secretions from an infected person. The infected person can spread the droplets while talking, coughing or sneezing.
- Symptoms can include fever, cough, runny nose and a rash that initially appears on the face and then spreads to the rest of the body. Complications of measles can involve ear infection, pneumonia (lung infection), and encephalitis (infection of the brain) which could lead to brain damage.
- All persons who have not had the disease or who have not been fully immunized are susceptible to acquiring the infection, particularly individuals who travel to measles endemic areas, young children, individuals with a chronic disease, and those with weakened immunity.

Local Picture

Figure 26. Age-standardized measles incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013


\(^1\)The Waterloo Region rate for 2009 is unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• There were no cases of measles in 2013 in Waterloo Region. Provincially, there were 15 cases of measles in 2013. In general, most cases of measles are acquired through travel, or in individuals who came to Ontario from other jurisdictions.

• In 2009 there was a small local outbreak of measles in six unimmunized or inadequately immunized persons. The disease was imported from an unimmunized child who had travelled outside of Canada. Increased immunization and isolation measures implemented by Region of Waterloo Public Health prevented further spread of this highly infectious disease.

• Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Mumps

Background
- Mumps is a viral infection caused by the mumps virus.
- Mumps is spread from person to person by coming in contact with an infected person’s saliva. Symptoms include fever, headache and swollen glands of the face. Complications can involve meningitis (infection of the lining of the brain), deafness and swollen testicles.
- All persons who have not had the disease or who have not been fully immunized are at risk of acquiring mumps.

Local Picture

Figure 27. Age-standardized mumps\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2008-2013

Source: iPHIS 2008-2013, MOHLTC, extracted April 9, 2014; Ontario Public Health Portal 2008-2013, downloaded April 2, 2014; Population estimates, IntelliHEALTH, MOHLTC, extracted November 21, 2013.\(^1\)Includes both confirmed and probable mumps cases.\(^2\)The Waterloo Region rates for 2009 to 2012 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013, there were no cases of mumps in Waterloo Region; there were 21 cases in all of Ontario (incidence rate of 0.2 per 100,000).

• In 2009, there was an increased incidence of mumps in Ontario and throughout Canada, mainly in university and college students. There were 12 cases in Waterloo Region; the cases were primarily young male university or college students and were in the cohort of individuals who would have been given only one dose of mumps vaccine.

• Due to the small number of cases and resulting instability in rates, caution should be used when interpreting this data.
Pertussis

Background

- Pertussis or whooping cough is a respiratory infection caused by the *Bordetella pertussis* bacterium. The disease can affect people of any age but it is more severe in children less than one year of age.
- It is spread from person to person through direct contact of respiratory secretions (e.g., cough of an infected person).
- It initially causes cold-like symptoms such as a runny nose and a cough. The cough then worsens progressing into coughing spells which can be severe leading to vomiting, feeling short of breath, gagging, and a ‘whoop’ like sound when the person takes a breath. Complications can include seizures, brain damage and pneumonia (lung infection).
- Pertussis is preventable through immunization and is part of the routine childhood immunization schedule and a booster dose is given to adolescents and adults.
- Anyone can get whooping cough but unimmunized or inadequately immunized individuals and those people living in the same household as someone with whooping cough are at higher risk of acquiring pertussis.
Local Picture

Figure 28. Age-standardized pertussis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo probable cases</th>
<th>Waterloo confirmed cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>16</td>
<td>3.5</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>6</td>
<td>3.7</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>6</td>
<td>1.0</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>49</td>
<td>2.3</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>22</td>
<td></td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>10</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
</tbody>
</table>


\(^1\)Includes both confirmed and probable pertussis cases.

\(^2\)The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- In 2013, there were 15 cases of pertussis in Waterloo Region (incidence rate of 3.0 per 100,000). This rate is lower than the previous five-year average of 4.3 per 100,000.
- The local pertussis incidence rate in 2013 was similar to the provincial rate (SRR = 1.31 [CI: 0.72-2.36]).
- The youngest age groups had the highest age-specific incidence rates in 2013; the highest rate was among 5 to 9 year olds (12.4 per 100,000) followed by 0 to 4 year olds and 10 to 14 year olds (both 6.5 per 100,000).
- In 2012, there was a significant increase in pertussis cases compared to previous years (incidence rate 14.7 per 100,000). Pertussis is naturally cyclic in nature, with peaks in disease every three to five years. Local cases were sporadic and not associated with an outbreak.
Varicella

Background

- Varicella infection (or chickenpox) is a common childhood illness caused by the varicella zoster virus. In adults, the virus can reactivate and cause a painful rash called shingles.
- Chickenpox can spread from person to person through the air by coughing or sneezing or by directly touching the rash (blisters). It is contagious from one to two days before the rash appears until the rash has scabbed over. The symptoms include fever, cough, sore throat, general aches, and a generalized itchy rash.
- Chickenpox usually gets better on its own without the use of any medication. Immunization is available for children who have not had chickenpox and there is also another vaccine (Zostavax) for adults above the age of 50, to prevent the occurrence of shingles.
- All persons who have not had varicella or who have not been fully immunized are at risk of acquiring the virus.

Local Picture

Figure 29. Age-standardized varicella\(^1\) ambulatory care\(^2\) visit rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013

![Graph showing varicella cases and rates per year from 2008 to 2013 for Waterloo Region and Ontario, with data points indicating a decrease in cases over the years.]

Source: Varicella Ambulatory Care Visits, IntelliHEALTH, MOHLTC, extracted July 15, 2014; Population estimates, IntelliHEALTH, MOHLTC, extracted Nov. 21, 2013.

\(^1\)Varicella ambulatory care visits from IntelliHEALTH are reported as a proxy measure to determine severity of disease.

\(^2\)Ambulatory care visits include both visits to emergency departments as well as hospital outpatient visits.
Local and provincial varicella data was sourced from the National Ambulatory Care Reporting System (NACRS) rather than the integrated Public Health Reporting System for reportable diseases (iPHIS). As such, only severe cases of varicella are captured in the following findings, rather than a true measure of total incidence.

In 2013, there were 40 ambulatory care visits for varicella in Waterloo Region (visit rate of 8.2 per 100,000).

In the previous five years, the varicella ambulatory care visits has generally declined over time; in 2013, the ambulatory visit rate for varicella was lower than the previous five-year annual average for 2008-2012 (16.2 per 100,000).

Since 2008, the local rates of varicella ambulatory care visits were consistently significantly lower than those of the province; in 2013, the local rate remained significantly lower than that for Ontario (SRR = 0.51 [CI: 0.41-0.65]).

In 2013, the younger age groups had the highest proportion of varicella ambulatory care visits; 45.0 per cent of varicella visits occurred in individuals less than 10 years of age.
Other Infectious Diseases

Reportable diseases categorized into this section include:

- Encephalitis/meningitis
- Group A streptococcal disease, invasive (iGAS)
- Group B streptococcal disease (neonatal)
- Legionellosis
- Tuberculosis (TB) – active and latent

Table 6. Numbers and age-standardized incidence rates per 100,000 for other infectious diseases, Waterloo Region & Ontario, 2013 and 2008-2012 (five-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2013 Standardized rate ratio (95% confidence interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2013</td>
<td>2013 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2008-2012)</td>
</tr>
<tr>
<td>Tuberculosis (latent)</td>
<td>353</td>
<td>64.8</td>
<td>67.0</td>
</tr>
<tr>
<td>Group A streptococcal disease, invasive</td>
<td>36</td>
<td>6.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Encephalitis/meningitis</td>
<td>14</td>
<td>2.3¹</td>
<td>2.6¹</td>
</tr>
<tr>
<td>Legionellosis</td>
<td>10</td>
<td>1.6¹</td>
<td>1.0¹</td>
</tr>
<tr>
<td>Tuberculosis (active)</td>
<td>8</td>
<td>1.6¹</td>
<td>2.4¹</td>
</tr>
<tr>
<td>Group B streptococcal disease, neonatal</td>
<td>2</td>
<td>0.5¹</td>
<td>0.1¹</td>
</tr>
</tbody>
</table>


¹Rates are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

²Standardized rate ratio (SRR) refers to the ratio of the Waterloo Region age-standardized rate for 2013 compared to the Ontario age-standardized rate for 2013. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% confidence interval contains 1.00, the two rates are not statistically different from one another).

³Viral and bacterial cases of encephalitis and meningitis are combined since most reported cases were undifferentiated; includes encephalitis primary viral, encephalitis/meningitis, meningitis (bacterial), meningitis (viral).
Region of Waterloo Public Health Activities for Tuberculosis (TB)

Region of Waterloo Public Health:
- Provides accessible and effective tuberculosis (TB) clinic services in partnership with a local group of respirologists.
- Provides a TB skin test clinic for medically indicated and third party testing.
- Manages all active TB cases reported to Region of Waterloo Public Health.
- Investigates and follows-up contacts of cases.
- Follows up on all immigrant notifications for medical surveillance.
- Provides early screening for populations at highest risk.
- Provides free medication to individuals with TB infection (active and latent).
- Reports confirmed and probable cases of tuberculosis to the Ministry of Health and Long-Term Care.
- Conducts disease surveillance and provides timely updates on local disease status to area health care providers and other stakeholders.
- Provides health education (e.g., via website, brochures, site visits, forums) for health care providers, including family physicians, long-term care homes, and retirement homes.

Region of Waterloo Public Health Activities for Encephalitis/Meningitis, Group A Streptococcal Disease, Neonatal Group B Streptococcal Disease, Legionellosis

Region of Waterloo Public Health:
- Receives, confirms, and investigates reports of these diseases from health providers and laboratories.
- Investigates contacts of confirmed cases of these diseases and recommends immunization and/or prophylaxis as required.
- Reports confirmed and probable cases of diseases to the Ministry of Health and Long-Term Care.
- Conducts disease surveillance and provide timely updates on local disease status to area health care providers and other stakeholders.
- Provides health education (e.g., via website, brochures, site visits, forums) for health care providers (physicians, hospitals, long-term care/retirement homes).
- In 2012 and 2013, Region of Waterloo Public Health distributed legionellosis information to hospitals, schools, long-term care homes, retirement homes, and other identified cooling tower operators within the Region. The information included the provincial and local legionellosis situation, a recommendation that best practices for cooling tower maintenance be followed, and best practice resources.
Infectious Diseases in Waterloo Region – Surveillance Report 2013

Encephalitis/Meningitis

Background

- Encephalitis refers to inflammation of the brain. Meningitis refers to inflammation of the meninges, which are membranes that surround the brain and spinal cord.
- These two conditions cause a range of symptoms including fever, headache, confusion, and/or muscle weakness. In severe cases, permanent brain damage or death may occur due to injury of nerve or brain cells.
- Meningitis and encephalitis may have a variety of infectious cases (viral, bacterial and fungal) and non-infectious causes (cancer, lupus, etc.). In many cases it is impossible to isolate a reason for the inflammation.
- The causes and risk factors vary by case. Those at higher risk include people with a weakened immune system, the elderly, persons who recently had a neurosurgical procedure, and those in contact with an infected person.

Local Picture

Figure 30. Age-standardized encephalitis and meningitis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>24</td>
<td>4.9</td>
<td>2.8</td>
</tr>
<tr>
<td>2009</td>
<td>6</td>
<td>1.1</td>
<td>1.9</td>
</tr>
<tr>
<td>2010</td>
<td>11</td>
<td>2.2</td>
<td>2.7</td>
</tr>
<tr>
<td>2011</td>
<td>16</td>
<td>3.3</td>
<td>1.8</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>1.7</td>
<td>2.4</td>
</tr>
<tr>
<td>2013</td>
<td>14</td>
<td>2.3</td>
<td>2.4</td>
</tr>
</tbody>
</table>


\(^1\)Viral and bacterial cases are combined since most reported cases were undifferentiated; includes encephalitis primary viral, encephalitis/meningitis, meningitis (bacterial), meningitis (viral).

\(^2\)The Waterloo Region rates for 2009 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013, there were 14 cases of encephalitis and meningitis in Waterloo Region with an incidence rate of 2.3 per 100,000; this rate is similar to the previous five-year annual average rate for 2008-2012 (2.6 per 100,000).
• The local rate for 2013 was similar to that of the province (SRR = 0.97 [CI: 0.57-1.67]); local rates have fluctuated around the provincial rate from 2008 to 2013.
• In 2013, 71.4 per cent of cases were over 40 years of age. There were no discernible trends in encephalitis and meningitis incidence between males and females.
Group A Streptococcal Disease, Invasive (iGAS)

Background

- Group A streptococcal bacterial (GAS) are very common causes of minor infections such as “strep throat,” cellulitis (bacterial infection below the skin), skin abscesses (boils) or impetigo (skin infection). Persons may also carry these bacteria on the skin or in their throat for periods of time without any symptoms or illness.

- More serious or invasive infections (iGAS) occur more rarely. These infections include necrotizing fasciitis (flesh eating disease), toxic shock syndrome (failure of all body systems) or sepsis (overwhelming infection of the blood stream).

- The symptoms with iGAS vary and depend on the affected area. They can include fever, sore throat, rash, or sores on the skin. In severe infections, the skin can be red, swollen, and very painful and can progress to blisters or necrosis (tissue death).

- Those most at risk for iGAS include the elderly, people with chronic disease such as cancer, diabetes, kidney, heart and lung disease, those with skin lesions, adults with a history of alcohol abuse, injection drug use, and those taking some specific medications such as steroids. Children with chickenpox have a higher risk of developing skin infections from group A strep.
Local Picture

Figure 31. Age-standardized invasive Group A streptococcal disease incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013

- In 2013 there were 36 cases of iGAS in Waterloo Region, for an incidence rate of 6.3 per 100,000. This rate is higher than the rate for the previous five-year 2008-2012 period (4.3 per 100,000).
- Local rates of iGAS have fluctuated around the provincial rate since 2008. In 2013, the local rate was higher than that of the province, but the difference was not statistically significant (SRR = 1.52 [CI: 1.00-2.31]).
- In Waterloo Region in 2013, over half of the cases occurred among males (58.3 per cent), and the highest age-specific rate occurred in those aged 65 years and older (14.4 per 100,000).
- There were three deaths associated with iGAS in Waterloo Region in 2013; this is similar to the number of deaths reported in the previous five years (average number of deaths for 2008-2012 was 3.2).
- In 2013, there was a peak of iGAS cases in Waterloo Region in May (N=7) and June (N=5). In general, according to the previous five-year average rates, cases

\(^1\)The Waterloo Region rate for 2011 is unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
occur regularly throughout the year, with slight increases in the winter months (November through April).

- Of the 2013 local cases, all 36 had risk factor information available. The most common self-reported risk factor among Waterloo Region iGAS cases in 2013 was having an underlying medical condition or chronic illness (45.5 per cent), followed by having diabetes, having a dermatological condition or wound causing a break in skin integrity, and use of injection drugs (9.1 per cent each).
Group B Streptococcal Disease (Neonatal)

Background
- Group B Streptococcus (GBS) are common bacteria often found in the vagina, rectum or urinary bladder of women. It is estimated that 10 to 35 per cent of pregnant women will have GBS in their vagina and/or rectum at any time. The bacteria usually do not harm the mother, but it can be transmitted to the newborn during delivery.
- Reported cases of neonatal GBS infections have been low due to routine screening of pregnant women between the 35th and 37th weeks of pregnancy. Additionally, antibiotics given to GBS positive mothers during labour are effective in preventing transmission.
- Risk factors for having a baby with GBS infection include: having a positive GBS screening/urine test during pregnancy, delivering early (less than 37 weeks), having fever during labor, and previously having had a child with GBS infection.

Local Picture

Figure 32. Age-standardized group B streptococcal disease incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013

![Graph showing age-standardized group B streptococcal disease incidence rates per 100,000, by year, Waterloo Region & Ontario, 2008-2013.]


\(^1\)The Waterloo Region rates for 2008, 2011 and 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.
• In 2013 there were two cases of neonatal GBS; this is similar to the trends for the previous five years, where Waterloo Region only experienced three cases from 2008-2012.
• In Ontario in 2013 there were 59 cases of neonatal GBS; the provincial incidence rate has remained relatively stable since 2008.
• Due to small numbers and the resulting instability in rates, caution should be used in interpreting this data.
Legionellosis

Background

- Legionellosis is an infection which is caused by the bacterium known as *Legionella pneumophila*. This bacterium is naturally found in the environment (in water, soil and dust). Outbreaks have often involved hot tubs, water tanks, water fountains and cooling towers. Legionellosis is comprised of two diseases caused by the same bacterium: The more severe form, known as Legionnaire’s Disease, and the milder illness known as Pontiac Fever.
- It is spread by people inhaling the bacteria when they breathe in contaminated droplets of water in air. The bacteria are not spread from person-to-person.
- Legionnaires’ disease can have symptoms related to pneumonia (lung infection) which include: fever, chills, cough, muscle aches and headache. Pontiac Fever causes fever and muscle aches, but not pneumonia.
- Older adults (65 years or older), smokers, those with lung disease, weakened immune systems or kidney disease, and those with cancer are at higher risk of becoming infected.
The rate of legionellosis has been increasing province-wide in the last few years.

- In 2013, the incidence rate of legionellosis in Waterloo Region was 1.6 cases per 100,000 (N=10). This rate is higher than the previous five-year annual average rate for 2008-2012 (1.0 per 100,000).
- Although the local rate of legionellosis in 2013 was higher than that of the province, the difference was not significantly different (SRR=1.09 [CI: 0.56-2.13]).
- The majority of 2013 cases were males (70.0 per cent) and all cases occurred among adults 30 years of age or older; the highest age-specific rate occurred among 55 to 59 year olds (8.8 per 100,000).
- Of the 2013 Waterloo Region legionellosis cases with risk factor information available (N=7), the most common risk factors reported were: being a smoker and recent exposure to aerosolized water.
- Due to small numbers and the resulting instability in rates, caution should be used in interpreting this data.
Tuberculosis

Background

- Tuberculosis (TB) is a curable infectious disease caused by a bacterium called *mycobacterium tuberculosis*. TB disease usually affects the lungs (pulmonary or respiratory TB); however, the bacteria can travel through the blood and infect other parts of the body (extrapulmonary or non-respiratory TB).

- Active TB disease occurs when the body’s immune system is unable to stop the growth and spread of the bacteria after the individual becomes infected. Latent TB infection (LTBI), or inactive TB, occurs when a person is infected, but is neither ill nor contagious from the infection. Five to ten per cent of individuals with inactive TB later develop the active form of the disease.

- Risk factors for acquiring TB disease include:
  - Having lived or being born in an endemic country
  - Immunosuppression or underlying medical conditions (e.g., human immunodeficiency virus)
  - Close contact with an individual infected with respiratory TB
  - Inadequate treatment of a previous TB infection
  - Priority populations are at greater risk (e.g., person experiencing homelessness, the under-housed, persons who use substances, aboriginal persons)

- LTBI is most likely to develop into active TB within the first two years of becoming infected. Risk factors that also increase the likelihood of LTBI developing into active TB include:
  - Immunosuppression or underlying medical conditions (e.g., human immunodeficiency virus, organ transplant)
  - Treatment with certain medications (e.g., glucocorticoids, tumour necrosis factor-alpha inhibitors)
  - Having diabetes
  - Being under weight
  - Being under five years of age when first infected
  - Smoking cigarettes daily
  - Heavy alcohol consumption
Local Picture

Figure 34. Age-standardized active tuberculosis incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>13</td>
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</tr>
<tr>
<td>2013</td>
<td>8</td>
<td>1.6</td>
<td>3.9</td>
</tr>
</tbody>
</table>


\(^1\)The Waterloo Region rates for 2008 to 2013 are unstable due to small numbers (Relative Standard Error [RSE] >23%) and should be interpreted with caution.

- In 2013 there were eight cases of active TB in Waterloo Region with an incidence rate of 1.6 per 100,000. This rate is lower than the previous five-year annual average rate for 2008-2012 (2.4 per 100,000).
- Local rates of active TB have been consistently significantly lower than those of the province since 2008; in 2013, the local active TB rate remained significantly lower than that for Ontario (SRR = 0.36 [CI: 0.23-0.55]).
- Active TB was most common among 20 to 34 year olds in Waterloo Region in 2013.
- There were no TB-related deaths in Waterloo Region in 2013.
- Of the eight active TB cases in 2013, six were born outside of Canada:
  - Africa (1 case)
  - Asia (5 cases)
- Of the five active TB cases in 2013 with treatment information available, four had completed their treatment regimen and one case was still being treated.
- None of the 2013 cases demonstrated resistance to one or more TB drugs.
- The most common risk factor among 2013 active TB cases in Waterloo Region of those that reported risk factors (N=6) was living in an endemic country (75.0 per cent).
- In Waterloo Region in 2013, there were 353 cases of LTBI for an annual incidence rate of 64.8 per 100,000.
- In 2013, the local rate of LTBI was statistically similar to that of Ontario (SRR = 0.99 [CI: 0.89-1.10]).
- In 2013 there were more LTBI cases among females (N=217) than males (N=136). Most cases occurred in people aged 15 years or older.
References


Appendix A: Glossary of Terms

**Accurate Episode Date:** Accurate Episode Date corresponds to the earliest date on record for the case according to iPHIS hierarchy: Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date.

**Active Transmission:** The spread of an infectious agent from one person to another.

**Age Standardization:** A method of adjusting rates to minimize the effects that different age compositions have on populations. This method is used when comparing two or more populations with potentially different age distributions. For example, an older population would be more likely to have higher rates of chronic diseases compared to a younger population. Standardizing controls for these differences. For the purposes of this report, the standard 1991 Canadian population was used as the standard.

**Agent of Disease:** A factor whether microorganism, chemical substance, radiation or nutrient whose presence or absence is essential for the onset of disease. A disease may require more than one agent to develop.

**Asymptomatic:** A person infected with an illness or disease who does not exhibit any symptoms.

**Average:** See “Mean”.

**Burden of Disease:** The amount of ill health from a specific cause, such as disease or injury, in a population. It can be measured by financial cost, mortality, morbidity, or lost healthy years.

**Case:** A case is an individual with an episode of a reportable disease. For each reportable disease there is a case definition which outlines the criteria to confirm that episode of disease. Case definitions are determined by the Ministry of Health and Long-Term Care.

**Carrier:** A person or animal without evident clinical disease (signs or symptoms) who harbours an infectious agent and is able to transmit the agent to others.

**Co-infection:** Having two infections at the same time. The progression of both (or either) disease(s) may be more severe as a result of the infection with the other disease. A person with a co-infection is counted as two separate cases.
**Confidence Interval:** A calculated range of values in which the actual value (such as mean, proportion or rate) is contained with a certain degree of confidence. For the purposes of this report 95 per cent confidence intervals were used, meaning that there is a 95 per cent probability that the actual value falls within this range.

**Contact:** A person who may have acquired an infection from a case.

**Endemic:** The constant presence of a disease or infectious agent within a geographic area or population group. It may also refer to a disease that is usually present at a relatively high prevalence and incidence rate in comparison with other areas or populations.

**Immunocompromised:** Incapable of developing a normal immune response, usually as a result of disease (e.g., cancer), irradiation, malnutrition, or immunosuppressive medication.

**Incidence:** The number of new events (such as new cases of a disease) among a population within a specific point in time.

**Incidence Rate:** The rate at which new events, or new cases, occur in a specified time in a defined population that is “at risk” of experiencing the condition or event.

**Incubation Period:** The time from the moment of exposure to an infectious agent until signs and symptoms of the disease appear.

**Indirect Transmission:** The transmission of an infectious agent carried from a reservoir to a susceptible host by air particles or by living (vector) or non-living (vehicle) intermediaries.

**Infectious Disease:** An illness that results from the transmission of an infectious agent or its toxins from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector or inanimate objects.

**Mean:** The mean or average is the sum of all the individual values in a set of measurements divided by the total number of values in the set of measurements.

**Non-endemic:** A disease or infectious agent that is rarely observed within a geographic area or population group. It may also refer to a disease that is not usually present at a relatively high prevalence and incidence rate in comparison with other areas or populations.
**Outbreak:** When the occurrence of cases of a disease or condition is in excess of the expected number of cases in a localized area over a given period of time. There is no set number of cases required to declare an outbreak as it varies by disease and local conditions.

**Prevalence:** The number of individuals with a disease or condition in a specific population at a designated time.

**Proportion:** A proportion is a type of ratio in which the numerator is included in the denominator. A proportion is calculated by dividing the number of people with a common characteristic at a given time period by the total population that shares the same event in the same time period.

**Range:** The range describes the spread of scores. It often represents the difference between the largest and smallest items in a set of numerical values. In this report, it is used to describe the highest and lowest numerical values.

**Relative Standard Error (RSE):** A relative standard error is the standard error divided by the mean and expressed as a percentage. Rates with an RSE >23% are considered unstable and should be interpreted with caution.

**Reportable Disease:** A human disease that is required to be reported to public health authorities in Ontario according to Regulation 559/91 (Specification of Reportable Diseases) made under the Health Protection and Promotion Act (HPPA) (available at [http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm)). Under this legislation, physicians, laboratories, hospital administrators, principals of schools and superintendents of institutions must notify local health units about the occurrence or suspected occurrence of these diseases.

**Risk Factor:** An aspect of someone’s behaviour or lifestyle, a characteristic that a person was born with, or an event that s/he has been exposed to that is associated with acquiring a disease.

**Risk Setting:** The place or environment where the case may have acquired the infection. Risk settings reported by cases include: hospital, long-term care home, residential facility, retirement home, child care facility and community setting.

**Socio-demographic:** A variety of individual characteristics that may influence health status. Socio-demographic factors include age, sex, ethnicity, marital status, socioeconomic status and others.

**Sporadic:** When a disease occurs infrequently and irregularly. This term is also used to refer to non-outbreak associated cases of disease.
**Standardized Rate Ratio (SRR):** An SRR is the ratio of the age-standardized rate of cases observed in one population compared to the age-standardized rate of cases that occurred in another population. The 95 per cent confidence interval indicates the statistical significance of the SRR. If the 95 per cent confidence interval contains one, the two rates are not statistically different from one another.

**Surveillance:** The ongoing, systematic collection, collation, analysis, and interpretation of data with prompt dissemination of the results to those who need to know, particularly those who are in a position to take action.

**Trends:** Trends are changes in frequencies, proportions or rates of a disease, or an event observed over time. Trends may be irregular, flat, or move in one direction.

**Travel-associated:** In this report, travel-associated refers to cases of disease that were acquired during travel outside of Canada.

**Vector-borne disease:** A class of miscellaneous diseases which are transmitted to humans by vectors, predominately insects (e.g., mosquito-borne diseases caused by viruses, bacteria, etc.).

**Vector:** A living creature, typically an animal, which carries an infectious pathogen to a susceptible host. It is an intermediary without evident clinical disease who harbours an infectious agent and is able to transmit the agent to others.

**Zoonotic pathogen:** An agent of disease (e.g., bacteria or virus) that can be transmitted between animals and humans.
Appendix B: Data Sources and Methodology

Data Sources
All information related to cases of infectious disease for Waterloo Region included in this report was collected by Region of Waterloo Public Health under the authority of the Health Protection and Promotion Act (HPPA), which mandates health care practitioners to notify the Medical Officer of Health (MOH) where the patient resides of all confirmed and probable cases of reportable disease. Case reports are investigated by Public Health staff as part of their routine activities.

Cases are entered into a provincially-mandated information and surveillance (monitoring) system, the integrated Public Health Information System (iPHIS), maintained by Public Health Ontario (PHO) and the Public Health Protection and Prevention Branch of the Ontario Ministry of Health and Long-term Care (MOHLTC). The only data included in this report that was not extracted from iPHIS was ambulatory care visits for varicella which was sourced from the National Ambulatory Care Reporting System (NACRS) and obtained through the IntelliHEALTH Ontario portal.

Sporadic Cases
All sporadic infectious disease data for Waterloo Region with accurate episode dates between January 1, 2008 and December 31, 2013 were extracted from iPHIS between April 9 and April 14, 2014 (except for HIV which was extracted by encounter date, tuberculosis which was extracted by diagnosis date, and varicella ambulatory care visits which were extracted from IntelliHEALTH Ontario on July 15, 2014). Accurate Episode Date corresponds to the earliest date on record for the case according to iPHIS hierarchy: Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date.

Unless otherwise noted, all cases reported in this report are confirmed as described by the Infectious Diseases Protocol of the Ontario Public Health Standards (2013). However, with revisions to case definitions of all reportable diseases in 2009, some cases that had previously met the confirmed case definition were then required to be reported as probable cases. For amebiasis, Lyme disease, mumps, pertussis, and West Nile virus, the impact of the change was substantial. Thus, for this report, both confirmed and probable cases of the above-mentioned diseases are included in the analysis to ensure valid comparisons of historical trends in incidence.

Syphilis case classifications for infectious and other categories were taken from the December 2009 Provincial Epidemiological Infectious Diseases Summary on the Ontario Public Health Portal. Primary, secondary and early latent syphilis are all
considered infectious (includes early latent; primary genital; primary other sites; secondary of skin and mucous membranes; secondary, other; infectious neurosyphilis; and primary anal). Other syphilis includes all other types of syphilis such as late latent; neurosyphilis, non-infectious; or unspecified (the other category excludes early congenital syphilis).

Provincial case summaries are compiled by Public Health Ontario. Provincial data was downloaded from the Ontario Public Health Portal and includes all infectious diseases reported in the province of Ontario with an accurate episode date between January 1, 2008 and December 31, 2013.

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

**Exposure Data**

Exposure and risk factor information were included for diseases which demonstrated consistently higher rates than the province, diseases that demonstrated increasing local rates, as well as diseases that caused a significant burden of disease in 2013. When reporting exposure or risk factor proportions, those that were lost to follow-up and did not have exposure or risk factor information available were excluded from the denominator. In addition, more than one risk factor can be reported by a case resulting in proportions that do not sum to 100 per cent.

For every case of infectious disease reported to Region of Waterloo Public Health, detailed case follow-up is conducted by Public Health staff. A pre-defined set of exposure or risk factor information is collected and input into iPHIS. However, exposure and risk factor information can be missing for individuals that were lost to follow-up.

It is also important to note that risk factors in iPHIS are self-reported and may not necessarily reflect the true exposure history of the individual. In addition, the risk factor and exposure setting variables in iPHIS provide investigators with a pre-defined set of categories of risk factors from which to choose which may not be adequate or specific enough to represent all potential risk factors and exposures for a disease.

**Population Data**

Incidence rates were calculated using population estimates and projections obtained from the Ontario MOHLTC, Public Health Planning Data Base (PHPDB). The PHPDB is
an information resource provided by the Health Data Branch of the Ontario MOHLTC. Queries on PHPDB are completed via an online portal called IntelliHEALTH. Population estimates for 2008 to 2012 are post-censal estimates based on the 2006 census counts adjusted for net under-coverage and changes in the population between Census Day and July 1. Census subdivision post-censal estimates are extrapolated by applying the growth rates by age and sex of each census division to the adjust census counts of each census subdivision.

The 2013 population data is a projection, not an estimate. Population projections are demographic, founded on assumptions about births, deaths, and migration over the projection period. Assumptions are based on the analysis of the long-term and the most recent trends of these components, as well as expectations of future direction. The population estimates and projections in this report may differ from those presented elsewhere due to differences in methodology. Population data used in this report was downloaded from IntelliHEALTH on November 21, 2013 and reflect the latest population estimates and projections at the time of this report.

**Methodology**

All diseases were extracted from iPHIS by accurate episode date (except for HIV which was extracted from iPHIS by encounter date, tuberculosis which was extracted from iPHIS by diagnosis date, and varicella ambulatory care visits which were extracted from IntelliHEALTH Ontario). All reportable diseases with one or more cases reported in the last five years in Waterloo Region were included in analysis. Cases that resided in Waterloo Region and met the provincial surveillance case definition were included. All data were reviewed by Public Health staff to ensure final case counts were accurate.

Varicella ambulatory care visits were extracted for Waterloo Region and Ontario for 2007-2012 from IntelliHEALTH's Ambulatory All Visit All Tables which is sourced from the National Ambulatory Care Reporting System (NACRS). Ambulatory care visits include emergency visits as well as other hospital-based outpatient clinics. Visits were filtered to include only unscheduled emergency visits (Ambulatory Case Type = EMG). Ambulatory care visits were used instead of iPHIS reportable disease counts because iPHIS reports varicella as aggregated case counts rather than individual cases. Additionally, monitoring ambulatory care visits rather than reported cases helps to determine which varicella cases are more severe in nature. It must be noted that ambulatory care visit rates are not comparable to the incidence rates reported for other reportable diseases and that varicella counts presented in this report are an underestimate of the true number of cases.
For each reportable infectious disease, data on the number of cases and incidence rates were presented. Where relevant, disease case counts and rates were further broken down by:

- Sex (male and female – analysis by gender does not include those with unknown, transgender or other gender)
- Age group (0-4, 5-9, 10-14, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, and 65+ years)
- Seasonality (month)

Note that latent tuberculosis infection (LTBI) was the only exception to this standard method of analysis; LTBI cases were only reported for 2013, due to an inability to confirm case counts through normal data quality assurance processes for cases from 2008 to 2012. LTBI case counts and rates were still broken down by sex, age group and seasonality as relevant.

As age can be a factor in whether a person acquires a disease and how the disease progresses, it is necessary to control for differences in age distribution when comparing two populations. Age-standardization is a technique that minimizes the effect of differences in age between populations so that findings can be attributed to factors other than age. For this report, when comparisons between Waterloo Region and Ontario were made, rates were directly age-standardized using the 1991 Canadian Standard population from Statistics Canada. For each disease, age-standardized incidence rates were presented for Waterloo Region and Ontario on an annual basis and refer to the number of new cases of disease per 100,000 population. The age groups (in years) used for direct age-standardization were: 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, and 90+. Cases that had missing age were not included in the calculation of the age-standardization.

Standardized Rate Ratios (SRR) with 95 per cent confidence intervals were also calculated for all reportable diseases, where possible. The SRR reported is the ratio of the age-standardized rate of cases observed in Waterloo compared to the age-standardized rate of cases that occurred in Ontario. The 95 per cent confidence interval indicates the statistical significance of the SRR. If the 95 per cent confidence interval contains the value ‘one’ in its range, the two rates are not statistically different from one another.

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

Annual average rates for 2008 to 2012 were also calculated which were defined as the average of the age-standardized rates for each year from 2008 to 2012. Age-standardized rates for 2013 were compared to the previous five-year annual average rate for 2008 to 2012 but these differences are not implied to be statistically different.

Proportions and rates were rounded to one decimal place. As much as possible, data were presented in a consistent format with a figure highlighting the age-standardized overall rates for Waterloo Region and Ontario. Select diseases were highlighted with further in-depth analysis (e.g., mortality, risk factors). These diseases were selected for a variety of reasons including: local rates were significantly different than provincial rates, there are emerging issues related to the disease such as a provincial or local campaign, or because Region of Waterloo Public Health has undertaken specific measures related to the prevention or containment of the disease.

**Data Limitations**
The published literature reveals variation in infectious disease reporting completeness. According to a review of the literature by Doyle (2002), reporting completeness was significantly greater for TB, AIDS and sexually transmitted diseases as a group than for all other reportable diseases combined. Other studies estimate that for each reported case of enteric illness, there are at least several hundred undiagnosed or unreported cases in the community (Majowicz, 2005). Individuals that experience less severe manifestations of a disease may not experience symptoms, or only mild symptoms and may not seek medical assistance or be tested for the presence of a disease. Disease reports rely on a passive surveillance system, wherein laboratories, physicians, other health care providers and institution administrators are entrusted to know the regulations, recognize a disease that is on the reportable disease list, and inform public health.

In some instances, the number of reported cases may change in subsequent years due to periodic data quality assurance checks and corrections that result in the reclassification of cases (i.e., case status). In addition, there may be a lag in reporting of some cases due to the time required to collect a specimen, carry out a diagnostic test and inform the local public health department and Ontario MOHLTC which could lead to future changes in the number of reported cases. Chance, as well as statistical artifacts, may also account for some of the variation in infectious disease incidence over time and for different geographic areas (within Ontario).
While the provincial case summaries allowed for local data comparisons with Ontario rates, comparisons with other health units can be problematic due to inconsistencies in data collection and reporting across health units. Also, some cases may be double-counted among people who move to other health units. This double-counting is not an issue with the provincial data due to regular efforts to resolve inter-health unit duplicate records.

For some diseases, case definitions have changed over time. As of April 28, 2009, new provincial case definitions for reportable diseases came into effect. The Ontario MOHLTC released the new case definitions as an appendix to the Infectious Diseases Protocol, 2009 (Ontario Ministry of Health and Long-Term Care, 2009). Ontario's new case definitions were updated to reflect the changing epidemiology of infectious diseases and the use of newer laboratory technologies. These updates impacted the classification of cases for several diseases, and may influence the incidence of some diseases during the year 2009. Both confirmed and probable cases of amebiasis, Lyme disease, mumps, pertussis, and West Nile virus were included to adjust for these changes. However, for other diseases, an observed increase or decrease in disease incidence during this period may not reflect a true change in incidence.

Due to the unavailability of case level data for varicella in iPHIS, ambulatory care visits from IntelliHEALTH were used instead. However, incidence and ambulatory care visits cannot be compared directly since ambulatory care visits represent the more severe varicella cases, thus underestimating the true number of varicella cases occurring locally and provincially.

Case reports of influenza and respiratory and gastrointestinal outbreaks were not included in this report due to their seasonal nature (generally their season runs from September to May) and the timing of the extraction of the data for the report. Information on influenza can be found in the local influenza surveillance bulletins and information on the respiratory and gastrointestinal seasons will be presented in a separate report later in the year.

Finally, the data presented in this report only relate to data collected on cases residing in Waterloo Region. Therefore, caution should be used when attempting to generalize these results beyond Waterloo Region.
## Appendix C: List of Reportable Diseases (2014)

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

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<tr>
<td>Brucellosis</td>
<td>Meningitis, acute</td>
</tr>
<tr>
<td>Campylobacter Enteritis</td>
<td>i.</td>
</tr>
<tr>
<td>Chancroid</td>
<td></td>
</tr>
<tr>
<td>Chickenpox (Varicella)</td>
<td>i.</td>
</tr>
<tr>
<td>Chlamydia Trachomatis Infection</td>
<td></td>
</tr>
<tr>
<td>Cholera</td>
<td>ii.</td>
</tr>
<tr>
<td>Clostridium difficile associated disease (CDAD)</td>
<td>other</td>
</tr>
<tr>
<td>outbreaks in public hospitals</td>
<td></td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td></td>
</tr>
<tr>
<td>Cyclosporiasis</td>
<td></td>
</tr>
<tr>
<td>Diphtheria</td>
<td></td>
</tr>
<tr>
<td>Encephalitis, including:</td>
<td></td>
</tr>
<tr>
<td>i. primary, viral</td>
<td></td>
</tr>
<tr>
<td>ii. post-infectious</td>
<td></td>
</tr>
<tr>
<td>iii. vaccine-related</td>
<td></td>
</tr>
<tr>
<td>iv. subacute sclerosing panencephalitis</td>
<td></td>
</tr>
<tr>
<td>v. unspecified</td>
<td></td>
</tr>
<tr>
<td>Food Poisoning, all causes</td>
<td></td>
</tr>
<tr>
<td>Gastroenteritis, institutional outbreaks</td>
<td></td>
</tr>
<tr>
<td>Giardiasis, except asymptomatic cases</td>
<td></td>
</tr>
<tr>
<td>Gonorrhea</td>
<td></td>
</tr>
<tr>
<td>Group A Streptococcal Disease, invasive</td>
<td></td>
</tr>
<tr>
<td>Group B Streptococcal Disease, neonatal</td>
<td></td>
</tr>
<tr>
<td>Haemophilus Influenza b Disease, invasive</td>
<td></td>
</tr>
<tr>
<td>Hantavirus Pulmonary Syndrome</td>
<td></td>
</tr>
<tr>
<td>Hemorrhagic Fever, including:</td>
<td></td>
</tr>
<tr>
<td>i. Ebola virus disease</td>
<td></td>
</tr>
<tr>
<td>ii. Marburg virus disease</td>
<td></td>
</tr>
<tr>
<td>iii. other viral causes</td>
<td></td>
</tr>
<tr>
<td>Hepatitis, viral</td>
<td></td>
</tr>
<tr>
<td>i. Hepatitis A</td>
<td></td>
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<tr>
<td>ii. Hepatitis B</td>
<td></td>
</tr>
<tr>
<td>iii. Hepatitis C</td>
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<tr>
<td>Influenza</td>
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<tr>
<td>Lassa Fever</td>
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<tr>
<td>Legionellosis</td>
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<tr>
<td>Leprosy</td>
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<td>Listeriosis</td>
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<tr>
<td>Lyme Disease</td>
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<tr>
<td>Malaria</td>
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<tr>
<td>Measles</td>
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<tr>
<td>Meningitis, acute</td>
<td></td>
</tr>
<tr>
<td>i. bacterial</td>
<td></td>
</tr>
<tr>
<td>ii. viral</td>
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<tr>
<td>iii. other</td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
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<tr>
<td>Ophthalmia neonatorum</td>
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<tr>
<td>Paralytic Shellfish Poisoning</td>
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<tr>
<td>Paratyphoid fever</td>
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<tr>
<td>Pertussis (Whooping Cough)</td>
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<tr>
<td>Plague</td>
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<tr>
<td>Pneumococcal disease, invasive</td>
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<tr>
<td>Poliomyelitis, acute</td>
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<tr>
<td>Psittacosis / Ornithosis</td>
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<tr>
<td>Q Fever</td>
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<tr>
<td>Rabies</td>
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<tr>
<td>Respiratory infection Outbreaks in Institutions</td>
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<tr>
<td>Rubella</td>
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<tr>
<td>Rubella, congenital syndrome</td>
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<tr>
<td>Salmonellosis</td>
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<tr>
<td>Severe Acute Respiratory Syndrome (SARS)</td>
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<tr>
<td>Shigellosis</td>
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<tr>
<td>Smallpox</td>
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<tr>
<td>Transmissible Spongiform Encephalopathy including</td>
<td></td>
</tr>
<tr>
<td>i. Creutzfeldt-Jakob Disease, all types</td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
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<tr>
<td>Tetanus</td>
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<tr>
<td>Trichinosis</td>
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<tr>
<td>Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>i. active infection</td>
<td></td>
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<tr>
<td>ii. latent infection (positive TB skin test)</td>
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<tr>
<td>Tularemia</td>
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<tr>
<td>Typhoid Fever</td>
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<tr>
<td>Verotoxin – producing E. coli infection indicator conditions</td>
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<tr>
<td>include Hemolytic Uremic Syndrome (HUS)</td>
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<tr>
<td>West Nile Virus Illness (WNV)</td>
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<tr>
<td>Yellow Fever</td>
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<td>Yersinia</td>
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</tbody>
</table>

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**Reporting to Region of Waterloo Public Health**: Weekdays 8:30 - 4:30pm  
I – Infectious Diseases & Tuberculosis Control 519-575-4400, ext. 5275  
H – Health Protection & Investigation 519-575-4400, ext. 5147  
S – Sexual Health & Harm Reduction 519-883-2267  
Fax # 519.883.2248  
Emergency after hours/weekends/holidays #: 519.575-4400  

*Note: disease marked ✓ (and respiratory infection outbreaks in institutions) should be reported to the Medical Officer of Health. (Other diseases are to be reported by the next business day.)*