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 2012. 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
ACKNOWLEDGEMENTS

This report was produced under the direction of Region of Waterloo Public Health’s iPHIS – Communicable Disease – Epidemiology (iCE) Committee and the iCE Strategic Committee. Staff in Public Health’s Infectious Diseases, Dental and Sexual Health (IDDSH) division and Health Protection and Investigation (HPI) division contributed to the collection, entry and cleaning of infectious disease data used in this report.

Region of Waterloo Public Health would also like to thank the C-EnterNet scientific team at the Public Health Agency of Canada for their input and support.

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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 2012, 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 2012, there were 2,541 cases of reportable infectious disease in Waterloo Region. The top five infectious diseases reported in 2012 were chlamydia, influenza, campylobacteriosis, salmonellosis and hepatitis C, which accounted for 78.2 per cent of all cases. Overall, rates of most reportable diseases in Waterloo Region were consistent with or lower than the provincial rates, while some disease rates were higher than the provincial average. Some variation occurs naturally, as disease rates are not expected to be uniform across populations; however, some of the variation could be due to differences in modifiable risk factors or behaviours where focused intervention may be possible.

Enteric Diseases

Among enteric diseases, campylobacteriosis, salmonellosis and giardiasis were the most frequently reported infectious diseases. With the exception of giardiasis and verotoxin-producing E. coli (VTEC), Waterloo Region rates of most enteric illnesses (including campylobacteriosis, cryptosporidiosis, hepatitis A, listeriosis, salmonellosis, shigellosis, and typhoid/paratyphoid) were similar to those of Ontario. Local giardiasis rates have historically been higher than those of the province, although the gap is narrowing; the local rate in 2012 is slightly higher but not statistically different from that of the provincial
rate. The most common self-reported risk factor for local giardiasis cases was recent international travel. Local rates of verotoxin-producing *E. coli* (VTEC) have also been higher than those provincially and, in 2012, there was an increase in the total number of VTEC cases due to family clusters (multiple family members becoming ill from a common source or through person-to-person spread). Analysis of identifiable risk factors suggests that consumption of undercooked ground beef, consumption of untreated water and unpasteurized milk, and poor food handling practices in the home were the most common risk factors. Region of Waterloo Public Health works to manage and control enteric diseases by following up on reported cases, providing information on enteric diseases, modes of transmission, risk factors and prevention strategies, performing routine food premise inspections, and collaborating with federal and provincial partners to identify and remove sources of contaminated food products from the consumer marketplace.

**Vector-borne Diseases and Rabies**

Vector-borne diseases and zoonotic diseases are not very common in Waterloo Region. The greatest burden of disease in this category in Waterloo Region in 2012 was attributed to malaria; all cases were due to travel to an endemic area. The rate of Lyme disease (cases of which were not locally acquired) remained stable and was lower than that of the province. There were three cases of West Nile Virus (WNV) reported in Region and the local WNV rate was significantly lower than that for Ontario. 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 rabies in animals can be found on occasion in Waterloo Region. Given that rabies is usually fatal, prevention is paramount. To prevent the transmission of rabies from animals to humans, Public Health's rabies program continues to investigate all reported animal biting incidents and will provide recommendations about post-exposure prophylaxis and dispense rabies vaccine when appropriate.

**Sexually Transmitted and Blood-borne Infections**

Among all sexually transmitted and blood-borne infections, chlamydia, hepatitis C and gonorrhea contributed the highest number of cases in Waterloo Region in 2012. As with previous years, chlamydia was the most common infectious disease in Waterloo Region, with particularly high rates among 15-24 year old females. Although chlamydia has been gradually increasing in recent years, there was a decrease in the local rate in 2012. The most common risk factors reported by chlamydia cases in 2012 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 infectious syphilis appears to have been gradually increasing over recent years; although, local rates continue to be lower than that of the province. Rates of gonorrhea, 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 exchange and other related services at several locations in the region.

**Vaccine-Preventable Diseases**

Influenza was the most common vaccine preventable disease for the 2012-2013 season and the rates for this last season were considerably higher than in recent years. The increased rate was also experienced provincially; although the local influenza season started early in Waterloo Region, local and provincial influenza rates were similar for the season overall. Risk factors for influenza cases in Waterloo Region included not being immunized, having an underlying medical condition, and being a resident of a long-term care facility. Region of Waterloo Public Health continues to provide influenza immunization clinics as part of Ontario’s Universal Immunization Program in strategically chosen locations, distributes vaccines to health care providers, works with long-term care and retirement homes to increase staff and resident immunization coverage rates, and follows up on influenza outbreaks in Waterloo Region.

Consistent with provincial rates and the cyclical nature of pertussis with peaks in disease every 4-6 years, there was an increase in pertussis cases in Waterloo Region in 2012 compared to recent years, largely among unimmunized or partially-immunized individuals. This may also be due, in part, to the waning effect of pertussis vaccine four to twelve years after vaccination. The significant increase in local pertussis cases seen in 2012 follows this pattern as the last peak in pertussis activity occurred in 2006-2007.

Invasive pneumococcal disease (IPD) rates have also been increasing and are higher than those provincially. The most common risk factors for invasive pneumococcal disease (IPD) include having an underlying or chronic illness and being partially or fully unimmunized (seventy-five percent of IPD cases with underlying risk factors and eligible
for vaccine were not immunized). As such, Public Health is working to promote immunization for IPD among priority and high-risk individuals through communication and education of health care providers. Targeted promotion of vaccine to those with risk factors is a priority for Public Health over the next year.

Rates of varicella, mumps, invasive meningococcal disease (IMD) and measles remained stable and similar to those of the province. Region of Waterloo Public Health supports the prevention of vaccine-preventable illnesses through the provision of routine immunization through health care providers and public health clinics (e.g. routine immunization and school-based immunization clinics), maintenance of immunization records of children enrolled in publicly funded elementary and secondary schools, as well as other health education and promotion activities to increase immunization coverage rates.

**Other Infectious Diseases**

Among other infectious diseases, rates for tuberculosis, encephalitis/meningitis and neonatal Group B streptococcal disease were stable compared to previous years and similar to those of the province. Although invasive Group A streptococcal disease (iGAS) contributes a significant burden of disease in Waterloo Region, local rates in recent years have been comparable to provincial rates.

Rates of legionellosis have been increasing in recent years, with the local rates mirroring the provincial increases. An important component of legionellosis prevention is proper maintenance of cooling towers. In 2012, 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 provincial and local legionellosis rates, as well as recommendations and resources for best practices for cooling tower maintenance.

**Outbreaks**

As can be seen with normal fluctuation, Waterloo Region experienced fewer enteric outbreaks in the 2012-2013 season compared to previous years. Most reportable enteric outbreaks occurred in child care centres and long-term care homes.

Both influenza and non-influenza respiratory outbreaks increased in 2012-2013 compared to previous seasons in Waterloo Region. This is reflective of the surge in influenza activity experienced both locally and provincially and demonstrates the unpredictable nature of influenza seasons. Most respiratory outbreaks occurred in long-term care homes. Region of Waterloo Public Health follows up on all outbreaks reported by child care centres, hospitals, residential/ group homes, long-term care homes and retirement homes. To specifically support operators in the proper management and
control of outbreaks, Public Health provides consultation to individual facilities and hosts infection prevention and control health education forums with staff from child care centres, long-term care homes and retirement homes.

**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 and personal service settings, immunization programs and vector born 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 2012 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>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
</tr>
<tr>
<td>C-EnterNet</td>
<td>Canada’s National Integrated Enteric Pathogen Surveillance System</td>
</tr>
<tr>
<td>CFIA</td>
<td>Canadian Food Inspection Agency</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>Flu</td>
<td>Influenza</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>Hep A</td>
<td>Hepatitis A</td>
</tr>
<tr>
<td>HiB</td>
<td>Haemophilus influenzae B</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>
</tr>
<tr>
<td>IDDSH</td>
<td>Infectious Diseases, Dental and Sexual Health</td>
</tr>
<tr>
<td>IDU</td>
<td>Intravenous drug user (often referred to as an injection drug user)</td>
</tr>
<tr>
<td>iGAS</td>
<td>Invasive Group A streptococcal disease</td>
</tr>
<tr>
<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>
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<td>Public Health Agency of Canada</td>
</tr>
<tr>
<td>PHO</td>
<td>Public Health Ontario</td>
</tr>
<tr>
<td>ROWPH</td>
<td>Region of Waterloo Public Health</td>
</tr>
<tr>
<td>SRR</td>
<td>Standardized Rate Ratio</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually Transmitted Infection</td>
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<td>Verotoxin producing <em>Escherichia coli</em></td>
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<td>WNV</td>
<td>West Nile Virus</td>
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</table>
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), 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 2012, presents Waterloo Region’s rates of reportable diseases for 2012, provides comparisons of rates to previous years (2007-2011) 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 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
- Outbreaks

Disease-specific data is presented in alphabetical order within each section and follows a standard format. Diseases are described individually if one or more cases were reported during 2012, or if Public Health undertakes specific measures to prevent transmission of the disease.
## OVERALL FINDINGS

Table 1. Number and age-standardized rate per 100,000 for all reportable diseases, Waterloo Region, 2012 and 2007-2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>Disease</th>
<th># Cases 2012</th>
<th>2012 Rate per 100,000</th>
<th>5-year average rate per 100,000 (2007-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chlamydia</td>
<td>1208</td>
<td>240.6</td>
<td>222.6</td>
</tr>
<tr>
<td>2</td>
<td>Influenza</td>
<td>394</td>
<td>66.3</td>
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</tr>
<tr>
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<td>Campylobacter Enteritis</td>
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<td>Hepatitis C</td>
<td>116</td>
<td>20.2</td>
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<td>6</td>
<td>Gonorrhoea</td>
<td>88</td>
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<td>Invasive Pneumococcal Disease</td>
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<td>13.0</td>
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<tr>
<td>8</td>
<td>Pertussis (Whooping Cough)</td>
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<td>9</td>
<td>Giardiasis</td>
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<td>Varicella</td>
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<tr>
<td>12</td>
<td>Group A Streptococcal Disease, invasive (iGAS)</td>
<td>27</td>
<td>4.9</td>
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<tr>
<td>13</td>
<td>VTEC</td>
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<td>4.9</td>
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<td>Syphilis, Other</td>
<td>15</td>
<td>2.6</td>
<td>4.6</td>
</tr>
<tr>
<td>16</td>
<td>Cryptosporidiosis</td>
<td>13</td>
<td>2.7</td>
<td>4.3</td>
</tr>
<tr>
<td>17</td>
<td>Legionellosis</td>
<td>13</td>
<td>2.1</td>
<td>0.6</td>
</tr>
<tr>
<td>17</td>
<td>HIV/AIDS</td>
<td>10</td>
<td>2.0</td>
<td>3.3</td>
</tr>
<tr>
<td>17</td>
<td>Tuberculosis</td>
<td>10</td>
<td>1.7</td>
<td>2.7</td>
</tr>
<tr>
<td>18</td>
<td>Encephalitis-Meningitis</td>
<td>8</td>
<td>1.6</td>
<td>2.8</td>
</tr>
<tr>
<td>19</td>
<td>Hepatitis A</td>
<td>7</td>
<td>1.2</td>
<td>1.0</td>
</tr>
<tr>
<td>19</td>
<td>Shigellosis</td>
<td>7</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>20</td>
<td>Malaria</td>
<td>5</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>20</td>
<td>Typhoid-Paratyphoid</td>
<td>5</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>21</td>
<td>Lyme Disease</td>
<td>4</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>22</td>
<td>Cyclosporiosis</td>
<td>3</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>22</td>
<td>Mumps</td>
<td>3</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>22</td>
<td>West Nile Virus (WNV)</td>
<td>3</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>22</td>
<td>Yersiniosis</td>
<td>3</td>
<td>0.7</td>
<td>2.2</td>
</tr>
<tr>
<td>22</td>
<td>Brucellosis</td>
<td>1</td>
<td>0.2</td>
<td>0.03</td>
</tr>
<tr>
<td>23</td>
<td>Haemophilus Influenza B (Hib)</td>
<td>1</td>
<td>0.2</td>
<td>0.05</td>
</tr>
<tr>
<td>23</td>
<td>Hepatitis B</td>
<td>1</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>23</td>
<td>Listeriosis</td>
<td>1</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>24</td>
<td>Botulism</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>Creutzfeldt-Jakob Disease</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>Group B Streptococcal Disease, Neonatal</td>
<td>0</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>24</td>
<td>Invasive Meningococcal Disease</td>
<td>0</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td>24</td>
<td>Measles</td>
<td>0</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>24</td>
<td>Q Fever</td>
<td>0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
</tbody>
</table>

1 Rates are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
2 Influenza data is from the 2007-08 season to the 2012-13 season (September 1, 2007 to August 31, 2013).
3 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).
4 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).
5 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).
6 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
- Shigellosis
- Typhoid/Paratyphoid Fever
- Verotoxin producing *Escherichia Coli* (VTEC)
- Yersiniosis

### Table 2. Numbers and age-standardized rates per 100,000 for enteric diseases, Waterloo Region & Ontario, 2012 and 2007-2011 (5-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2012 Standardized Rate Ratio (95% Confidence Interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases in 2012</td>
<td>2012 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2007-2011)</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>149</td>
<td>28.3</td>
<td>30.5</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>120</td>
<td>23.3</td>
<td>23.2</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>62</td>
<td>11.8</td>
<td>14.2</td>
</tr>
<tr>
<td>Amebiasis         ³</td>
<td>34</td>
<td>6.4</td>
<td>5.3</td>
</tr>
<tr>
<td>VTEC</td>
<td>23</td>
<td>4.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>13</td>
<td>2.71</td>
<td>4.3</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>7</td>
<td>1.41</td>
<td>1.5</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>7</td>
<td>1.21</td>
<td>1.0</td>
</tr>
<tr>
<td>Typhoid-Paratyphoid</td>
<td>5</td>
<td>1.11</td>
<td>0.6¹</td>
</tr>
<tr>
<td>Yersiniosis</td>
<td>3</td>
<td>0.7¹</td>
<td>2.2</td>
</tr>
<tr>
<td>Cyclosporiasis</td>
<td>3</td>
<td>0.6¹</td>
<td>0.5¹</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>1</td>
<td>0.2¹</td>
<td>0.3¹</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 2012 compared to the Ontario age-standardized rate for 2012. The 95% confidence interval indicates the statistical significance of the

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SRR (if the 95% Confidence Interval contains one, the two rates are not statistically different from one another).

3 Includes 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 in order to prevent the occurrence and transmission of infectious and foodborne illness; the results of food premises inspections in the Waterloo Region are available on Public Health’s website.
- 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 assistance in interpreting results.
- Expanded the well water sample pick-up and drop-off locations 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 (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 amebiasis¹ incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

<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>2007</td>
<td>0</td>
<td>31</td>
<td>6.1</td>
<td>6.4</td>
</tr>
<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>1</td>
<td>21</td>
<td>4.1</td>
<td>5.6</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>33</td>
<td>6.4</td>
<td>5.7</td>
</tr>
</tbody>
</table>


¹ Includes both confirmed and probable amebiasis cases.
• In 2012 there were 34 cases of amebiasis in Waterloo Region (incidence rate of 6.4 per 100,000); this is slightly higher than the previous 5-year annual average rate for 2007-2011 of 5.3 per 100,000.

• In 2012, there were more cases among males (N=24) than females (N=10) and the age group with the highest age-specific rate was the 35-39 year age group (17.6 per 100,000).

• Of the 29 cases of amebiasis in Waterloo Region in 2012 that had exposure history available, 34% likely acquired their illness outside of Canada due to international travel or recent immigration.

• Amebiasis rates in the region were not significantly different from those of the province (SRR = 1.1 95% CI 0.8-1.6).
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 (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 was one case of brucellosis in Waterloo Region in 2012, and this was the first reported case in the region since 2008.
- The risk factor reported by the one brucellosis case in 2012 case was international travel in the 60 days prior to illness.
- In 2012, there were only 12 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/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 any symptoms (but can still pass the infection onto others).
- Anyone can become ill; however, infants and young children, pregnant women, the elderly, and people with weakened immune systems are at higher risk.

Local Picture

Figure 2. Age-standardized campylobacteriosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

Campylobacteriosis is the most common enteric (intestinal-related) illness in Waterloo Region and Ontario.

In 2012, there were 149 reported cases of campylobacteriosis in Waterloo Region (annual incidence rate of 28.3 cases per 100,000).

The current year’s incidence rate was similar to the previous 5-year annual average for 2007-2011 (30.5 per 100,000).

In 2012, the local rate of campylobacteriosis remained very similar to the provincial rate (SRR = 0.99 95% CI 0.8-1.2).

In 2012, cases of campylobacteriosis were evenly distributed among males (N=74) and females (N=75) and the highest rate occurred in the 0-4 year age group (72.7 per 100,000).

Risk factors reported by Waterloo Region campylobacteriosis cases in 2012 were varied, but of those with risk factor information available (N=129), the most common self-reported risk factors were travel outside of the province (26%), contact with recreational water (26%), and consumption of raw/undercooked foods (24%).
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, 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. Pets and farm animals can be a source of infection since cryptosporidiosis can also infect animals.

Local Picture

Figure 3. Age-standardized cryptosporidiosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012


† The Waterloo Region rate for 2012 is unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there were 13 cases of cryptosporidiosis in Waterloo Region for an age-adjusted incidence rate of 2.7 per 100,000; this rate is lower than in previous years and is also lower than the previous 5-year annual average for 2007-2011 (4.3 per 100,000).
• Although for the previous 5-years, local incidence rates of cryptosporidiosis were consistently higher than those of the province, in 2012, local and provincial rates were similar (SRR = 1.1 95% CI 0.6-1.9).
• Cryptosporidiosis cases were evenly distributed between males (46.1%) and females (54%) in 2012 and the highest age-specific rate was among the 25-29 year age group (7.1 per 100,000).
• There were very few cases among older adults; there were no cases among individuals ≥50 years.
• Of those with risk factor information available (N=12), the most common self-reported risk factors for the cryptosporidiosis cases in 2012 included recreational water contact (75%) and travel in the last 12 days (67%).
• Due to the small number of cases in 2012 and resulting unstable rate, 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, 2007-2012

- In 2012, there were 3 cases of cyclosporiasis in Waterloo Region (incidence rate of 0.6 cases per 100,000); this rate is similar to that of the previous 5-year annual average rate for 2007-2011 (0.5 per 100,000).
- Local incidence rates in 2012 are similar to those of the province (SRR=1.1 95% CI 0.3-3.6) and have remained similar to or lower than provincial rates since 2007.
- 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 (such as 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, 2007-2012

- In Waterloo Region and Ontario, giardiasis was the third most common enteric disease reported in 2012.
- In 2012, there were 62 reported cases of giardiasis in Waterloo Region (incidence rate of 11.8 cases per 100,000).
• Rates have fluctuated in Waterloo Region since 2007; however, the rate in 2012 is slightly lower than the previous 5-year annual average for 2007-2011 of 14.2 per 100,000.

• Provincially, the rate of giardiasis has decreased consistently since 2007. Although the local rate in 2012 is higher than that of the province, this difference is not statistically different (SRR = 1.2 95% CI 0.9-1.6).

• Distribution of giardiasis cases by males and females was similar, although cases among males accounted for a slight majority (56.5%). The local rate of giardiasis in 2012 was highest among adults aged 35-39 and 40-44 years of age (25.1 per 100,000 for both) and also high among children aged 0-4 and 5-9 years of age (19.0 and 22.0 per 100,000 respectively). Rates in 2012 demonstrate a slight shift in epidemiology; during the previous five seasons, children in the 0-4 and 5-9 year age groups had the highest rates of giardiasis both locally and provincially. There was no marked seasonal trend in the incidence of giardiasis cases.

• Of those that had risk factor information available (N=53), the most common self-reported risk factors for giardiasis cases in Waterloo Region in 2012 were recent international travel (55%), consumption of raw unwashed fruits/vegetables (51%), and contact with animals (45%).
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, people with sexual contacts infected with hepatitis A, 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, 2007-2012


1 The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012, there were 7 reported cases of hepatitis A in Waterloo Region (incidence rate of 1.2)
Since 2007, the local rate of hepatitis A has remained relatively stable and the current year’s incidence rate is similar to that of the previous 5-year annual average rate for 2007-2011 (1.0 per 100,000).
In 2012, the local and provincial hepatitis A rates were similar (SRR = 1.2 95% CI 0.5-3.1).
In 2012, most cases occurred among females (71.4%); there were no notable differences by age group.
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 (water and soil).
- Some foods are more likely to carry *Listeria* than others. Those that present a higher risk include raw/unpasteurized milk, soft cheeses and ready-to-eat meats such as hot dogs, pâté and deli meats. Individuals at high risk, such as pregnant women, the elderly and those with weakened immune systems, should avoid these foods 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 miscarriage, stillbirth, premature delivery, and infection of the newborn.

Local Picture

Figure 7. Age-standardized listeriosis incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012


\(^{1}\) The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there was only one reported case of listeriosis in Waterloo Region.
• The rates of listeriosis have been fairly consistent over the last 5 years with the exception of 2008 which experienced a rise in cases due to a provincial outbreak (including Waterloo Region) related to Maple Leaf food products.
• Additionally, with the exception of 2008, local incidence rates have remained similar to or lower than provincial rates during the study period.
• 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, 2007-2012

Salmonellosis was the second most common enteric infection in Waterloo Region in 2012.
- In 2012, the local annual incidence rate of salmonellosis was 23.3 per 100,000 (N=120) which is very similar to that of the province (SRR = 1.0 95% CI 0.8-1.2).
Since 2008, the local rate has remained relatively stable; the current year’s rate is very similar to that of the previous 5-year average annual rate for 2007-2011 (23.2 per 100,000).

There were no notable differences of salmonellosis distribution by sex; the highest age-specific rate occurred among the 0-4 year age group which is consistent with the age distribution of the previous 5-years.

Of those with risk factor information available (N=110), the most common risk factors reported by the 2012 salmonellosis cases in Waterloo Region included consumption of raw/contaminated food items (43%), international travel (37%), and recreational water contact (34%).
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, 2007-2012

In 2012, there were 7 reported cases of shigellosis in Waterloo Region for an incidence rate of 1.4 per 100,000; this is similar to the average annual rate of the previous 5 years (1.5 per 100,000).

Local incidence rates have remained similar to or lower than provincial rates during the study period (SRR for 2012 = 0.6 95% CI 0.3-1.1).

Most cases were among males (85.7%).


† The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
- Due to the small numbers, seasonal trends were not apparent.
- 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 known as *Salmonella typhi*. Paratyphoid fever is a disease caused by bacteria called *Salmonella paratyphi*. These diseases are similar but typhoid fever tends to be more common and severe than paratyphoid fever.
- The bacterium that causes 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/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, 2007-2012


\(^1\) The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there were 5 cases of typhoid and paratyphoid reported in Waterloo Region (incidence rate of 1.1 per 100,000); this is slightly higher than the previous 5-year annual average for 2007-2011 (0.6 per 100,000).

• Local incidence rates have remained similar to or lower than provincial rates since 2007; in 2012, the local typhoid/paratyphoid rate was similar to that of the province (SRR = 1.2 95% CI 0.4-3.6).

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

• 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/milk products made from raw/unpasteurized milk, and drinking unpasteurized milk and fruit juices are risk factors for getting the infection.

**Local Picture**

Figure 11. Age-standardized VTEC incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

![Graph showing incidence rates of VTEC](image)


*The Waterloo Region rates for 2007-2011 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.*
• In 2012, the rate of VTEC in Waterloo Region was 4.9 per 100,000 (N=23); this is higher than the previous 5-year annual average for 2007-2011 (2.9 per 100,000).
• In 2012, the local incidence rate of VTEC was significantly higher than the provincial rate (SRR = 3.0 95% CI 1.5-5.8). Although local incidence rates were also higher than provincial rates from 2007-2011, these differences were not statistically significant.
• In 2012, most cases occurred among females (78.3%); the highest age-specific rates occurred in the 0-4 (19.0 per 100,000) and 5-9 (12.6 per 100,000) year age groups which is consistent with the age distribution of VTEC cases in the previous 5 years.
• The incidence of VTEC in 2012 was higher during the months of July and August which is consistent with the seasonality of the previous 5-years.
• VTEC cases for 2012 were examined for the most common risk factors. Although the source of illness for some of the cases could not be determined, consumption of undercooked ground beef, consumption of untreated water and unpasteurized milk, and poor food handling practices in the home were the most commonly reported risk factors. The increase in VTEC cases in 2012 was likely due to family clusters (multiple family members becoming ill from a common source or through person to person spread).
• Due to the small number of cases and resulting instability in rates in 2007-2011, 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 before handling the child. *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 (which is 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, 2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>18</td>
<td>3.6</td>
<td>2.4</td>
</tr>
<tr>
<td>2008</td>
<td>11</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>2009</td>
<td>7</td>
<td>1.3</td>
<td>2.1</td>
</tr>
<tr>
<td>2010</td>
<td>8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>2011</td>
<td>9</td>
<td>1.9</td>
<td>1.8</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>0.7</td>
<td>1.3</td>
</tr>
</tbody>
</table>


The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012, there were 3 cases of yersiniosis in Waterloo Region (incidence rate of 0.7 per 100,000); this is lower than the previous 5-year annual average for 2007-2011 (2.2 per 100,000).

Over the study period, the local rate of yersiniosis has decreased from a high of 3.6 cases per 100,000 in 2007 to 0.7 cases per 100,000 in 2012.

In 2012, the local incidence rates of yersiniosis was lower than that of the province, but this difference was not statistically different (SRR=0.5 95% CI 0.2-1.1).

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

Table 3. Numbers and age-standardized rates per 100,000 for vector-borne and zoonotic diseases, Waterloo Region & Ontario, 2012 and 2007-2011 (5-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2012 Standardized Rate Ratio² (95% Confidence Interval)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases 2012</td>
<td>2012 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2007-2011)</td>
</tr>
<tr>
<td>Malaria</td>
<td>5</td>
<td>0.9¹</td>
<td>1.0</td>
</tr>
<tr>
<td>Lyme Disease³</td>
<td>4</td>
<td>0.6¹</td>
<td>0.5¹</td>
</tr>
<tr>
<td>West Nile Virus (WNV)³</td>
<td>3</td>
<td>0.5¹</td>
<td>0.1¹</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 2012 compared to the Ontario age-standardized rate for 2012. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% Confidence Interval contains one, the two rates are not statistically different from one another)
³Includes both confirmed and probable Lyme disease and WNV 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 chances of getting the infection.

Local Picture

Figure 13. Age-standardized Lyme disease¹ incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012²


¹ Includes both confirmed and probable Lyme disease cases; there were no probable cases of Lyme disease for Waterloo Region.
² The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012, the rate of Lyme disease among Waterloo Region residents was 0.6 per 100,000 (N=4); this is consistent with the previous 5-year average annual rate for 2007-2011 (0.5 per 100,000).

- The local rate of Lyme disease was lower than that of the province, but this difference was not statistically different (SRR=0.6 95% CI 0.3-1.2).
- None of the cases were locally acquired. At the present time, Waterloo Region is not an endemic area for the blacklegged tick.
- All Waterloo Region Lyme disease cases in 2012 occurred in the months of June, July and August which is consistent with the previous 5-year seasonality where Lyme disease acquisition tended to occur in the warmer summer months.
- 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, 2007-2012†

† The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there were 5 cases of malaria reported in Waterloo Region. The incidence rate for 2012 was 0.9 per 100,000 which is similar to the previous 5-year average annual rate for 2007-2011 (1.0 per 100,000).
• The local malaria rate in 2012 was lower than provincial rates, but this difference was not statistically different (SRR = 0.6 95% CI 0.3-1.1).
• Of the 2012 local cases with risk factor information available (N= 5), all cases reported travel to 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 2007-2012.
- 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 1% of people infected becoming ill enough to be hospitalized. Around 1 in 5 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, 2007-2012\(^2\)

\(^1\) Includes both confirmed and probable West Nile Virus cases.
\(^2\) The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• West Nile Virus activity is difficult to predict and had been declining in recent years. However, in 2012, there was resurgence in West Nile Virus activity across Ontario.
• In 2012, there were three confirmed cases of West Nile Virus infection among Waterloo Region residents (incidence rate of 0.5 per 100,000).
• The local rate in 2012 was significantly lower than the provincial rate (SRR = 0.3 95% CI 0.2-0.5).
• 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 rates per 100,000¹ for sexually transmitted and blood-borne infections, Waterloo Region & Ontario, 2012 and 2007-2011 (5-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2012 Standardized Rate Ratio² (95% Confidence Interval)³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases 2012</td>
<td>2012 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2007-2011)</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>1,208</td>
<td>240.6</td>
<td>222.6</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>116</td>
<td>20.2</td>
<td>23.4</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>88</td>
<td>17.4</td>
<td>25.5</td>
</tr>
<tr>
<td>Syphilis, Infectious³</td>
<td>18</td>
<td>3.6¹</td>
<td>1.7</td>
</tr>
<tr>
<td>Syphilis, Other⁴</td>
<td>15</td>
<td>2.6¹</td>
<td>4.6</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>10</td>
<td>2.0¹</td>
<td>3.3</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>1</td>
<td>0.1¹</td>
<td>0.9</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 2012 compared to the Ontario age-standardized rate for 2012. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% Confidence Interval contains one, 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 (ROWPH) 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 and needle supplies.
- 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.
- 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 exchange services 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 ROWPH’s 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) that is also preventable and curable. It is caused by a bacterium called *Chlamydia trachomatis*.
- 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. If untreated, it could lead to sterility and complicated (ectopic) pregnancy in women. Men who have symptoms experience discharge and/or itching from the penis, pain/swelling in the testicles, and painful or burning urination.
- Those not practising safe/safer sex (e.g. not using condoms or having multiple partners) and babies born to infected mothers are at higher risk. Men who have sex with men (MSM) are also at higher risk.

Local Picture

Figure 16. Age-standardized chlamydia incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012
• Chlamydia is the most commonly reported infectious disease in Waterloo Region and constitutes the vast majority of STI cases both locally (83.0%) and provincially (77.7%).
• In 2012, there were 1,208 chlamydia cases reported in Waterloo Region with an incidence rate of 240.6 per 100,000. This rate is slightly higher than the previous 5-year average for 2007-2011 but lower than the chlamydia rate for the previous year (2011).
• The local rate of chlamydia in 2012 was significantly lower than that of the province (SRR = 0.8 95% CI 0.75-0.83)

Figure 17. Chlamydia cases and incidence rates among 15-24 year olds, by sex and year, Waterloo Region, 2007-2012


• Rates of chlamydia are particularly high among females in the 15-24 year age group; in 2012, females 20-24 years (1,774.2 per 100,000) had the highest age-specific rate, followed by the 15-19 year age group (1,068.9 per 100,000).
• In 2012, males aged 20-24 (806.5 per 100,000) had the highest age-specific rate, followed by the 25-29 (546.2 per 100,000) and 15-19 (350.6 per 100,000) year age groups.
• In 2012, 28 cases of chlamydia were concurrently infected with gonorrhea; co-infections were highest in the 15-19, 20-24, and 25-29 year age groups and were evenly distributed among males and females.
Among those who reported risk factor information (N= 1,079), the most common self-reported risk factors of chlamydia cases in Waterloo Region in 2012 included not using a condom (89%), and having more than one sexual partner in the last six months (35%).
GONORRHEA

Background
- Gonorrhoea is a treatable sexually transmitted infection (STI) caused by a bacterium called *Neisseria gonorrhoeae*.
- Gonorrhoea 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.
- Gonorrhoea 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/after sex, and white or yellow foul vaginal discharge. Symptoms that are seen in men include discharge from the penis, itching around the penis, frequent/painful urination and pain/swelling in the testicles.
- If untreated, gonorrhoea could lead to serious and permanent complications such as pelvic inflammatory disease (PID) 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.
- Any sexually active person not practising safe/safer sex (e.g. having multiple partners or not using condoms) is at risk of gonorrhea. It can also be transmitted to a newborn baby born from an infected mother.

Local Picture
Figure 18. Age-standardized gonorrhea incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

• In 2012, the rate of gonorrhea in Waterloo Region was 17.4 per 100,000 (N=88); this is lower than the previous 5-year average annual rate for 2007-2011 (25.5 per 100,000).

• The local 2012 rate of gonorrhea was significantly lower than that of the province (SRR = 0.5 95% CI 0.4-0.6).

• Gonorrhea age-specific rates are highest among the 20-24 year age group (74.1 per 100,000) followed by the 15-19 (52.1 per 100,000) and 25-29 year age groups (47.2 per 100,000); there were no notable differences between males and females.

• Of the 2012 Waterloo Region gonorrhea cases that reported risk factor information (N=78), the most commonly reported risk factors included not using a condom (83%), and having more than one sexual partner in the last six months (50%).
HEPATITIS B

Background

- Hepatitis B infection is an infection of the liver caused by the hepatitis B virus (HBV). About 6-10% 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% 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; injection drug users; those who received an unsterilized tattoo or body piercing; occupations with a high risk of exposure to blood and body fluids (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, by year, Waterloo Region & Ontario, 2007-2012

[Graph showing incidence rates]


1 The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there was only one hepatitis B case with an incidence rate of 0.1 per 100,000. This rate is lower than the previous 5-year annual average rate for 2007-2011 (0.9 per 100,000).

• Although local rates have fluctuated around provincial rates since 2007, in 2012, the local rate was significantly lower than that of the province (SRR = 0.2 95% CI 0.1-0.5);

• 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% 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 injection 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.

Local Picture

Figure 20. Age-standardized hepatitis C incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

In Waterloo Region in 2012, the rate of HCV was 20.2 per 100,000 (N=116), making it the second most common of the STI/blood-borne infection infections in Waterloo Region.

Since 2007, local incidence rates of HCV have remained fairly stable; the rate in 2012 was similar to that of the previous 5-year average annual rate for 2007-2011 (23.4 per 100,000).

Local rates have also been consistently and significantly lower than those of the province (SRR for 2012 = 0.7 95% CI 0.6-0.8).

In 2012, the rate among males was higher than that among females (25.6 and 17.4 per 100,000, respectively). The age-specific rate was highest in the 45-49 year age group (20.6 per 100,000), followed by the 50-54 (18.06 per 100,000) and 40-44 year age groups (17.4 per 100,000). Age-specific rates were lowest in the youngest (<20 years; 0.0 per 100,000) and oldest age groups (>65+; 7.5 per 100,000).

Of 2012 HCV cases in Waterloo Region that had risk factor information available (N=111), the most common risk factors reported included injection drug use (70%), inhalation drug use (34%), and receiving a tattoo/piercing (34%).
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 secretions. People at risk of getting HIV/AIDS include people who have unprotected anal, oral or vaginal sex; those who have multiple sex partners; injection drug users; people who received blood transfusions before 1985; and those born to an infected mother (the baby can become infected during pregnancy, during birth or through breastfeeding).

- 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, 2007-2012


\(^1\)The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012, there were 10 HIV/AIDS cases in Waterloo Region with an incidence rate of 2.0 per 100,000). This rate is slightly lower than the previous 5-year annual average rate for 2007-2011 (3.3 per 100,000).
• Local rates for HIV/AIDS have been consistently lower than those of the province since 2007; in 2012, the local rate was significantly lower than that for Ontario (SRR = 0.3 95% CI 0.2-0.5).
• There appears to be an overall decreasing trend in provincial incidence rates of HIV.
• Of the HIV cases in 2012 in Waterloo Region, 10% (N=1) also had AIDS.
• In 2012, the rate among males (2.6 per 100,000) was higher than that among females (1.1 per 100,000) and all cases were among individuals >25 years of age.
• 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 could be transmitted during pregnancy from a mother to her unborn baby.
- Symptoms vary according to the progression of the infection. Initially, a painless sore/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 who do not practice safe/safer sex and men who have sex with men); injection drug users; 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 for Infectious Syphilis

Figure 22. Age-standardized infectious syphilis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2007-2012

![Graph showing syphilis incidence rates](image)


\(^1\)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 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012 the age-standardized incidence rate of infectious syphilis in Waterloo Region was 3.6 per 100,000 (N=18); this is higher than the previous 5-year annual average for 2007-2011 (1.7 per 100,000).

Local infectious syphilis rates appear to have been generally increasing since 2007.

Waterloo Region rates have been consistently lower than those of the province since 2007; in 2012, the local rate was significantly lower than that of Ontario (SRR = 0.6 95% CI 0.4-0.9).

Almost all infectious syphilis cases in 2012 were among males (88.9%); the age-specific rate was highest in the 35-39 year age group (10.0 per 100,000), followed by the 30-34 (1.8 per 100,000) and 25-29 (7.1 per 100,000) year age groups.

Of the 2012 Waterloo Region cases with risk factor information available (N=18), the most common self-reported risk factors included not using a condom (78%), and having more than one sexual partner in the six months before illness (67%).

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

Local Picture for Other Syphilis

Figure 23. Age-standardized other syphilis incidence rates, by year, Waterloo Region & Ontario, 2007-2012


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 2012 there were 15 cases of non-infectious and unspecified syphilis with an incidence rate of 2.6 per 100,000. This rate is lower than the previous 5-year annual average for 2007-2011 (4.6 per 100,000).
• Since 2007, local rates have been consistently lower than those of the province; in 2012, the rate was significantly lower compared to that of Ontario (SRR = 0.6 95% CI 0.4-0.9).
• There were more non-infectious and unspecified syphilis cases among males (73%) than females; all cases occurred among individuals >25 years of age.
• No cases of congenital syphilis were reported in Waterloo Region between 2007-2012.
• 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 rates per 100,0001 for vaccine preventable diseases, Waterloo Region & Ontario, 2012 and 2007-2011 (5-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2012 Standardized Rate Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Cases 2012</td>
<td>2012 Rate per 100,000</td>
<td>5-year average rate per 100,000 (2007-2011)</td>
</tr>
<tr>
<td>Influenza3</td>
<td>394</td>
<td>66.3</td>
<td>44.6</td>
</tr>
<tr>
<td>Pertussis (Whooping Cough)</td>
<td>70</td>
<td>14.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Invasive Pneumococcal Disease</td>
<td>79</td>
<td>13.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Varicella4</td>
<td>40</td>
<td>7.9</td>
<td>15.9</td>
</tr>
<tr>
<td>Mumps</td>
<td>3</td>
<td>0.61</td>
<td>0.91</td>
</tr>
<tr>
<td>Invasive Meningococcal Disease</td>
<td>0</td>
<td>0.01</td>
<td>0.71</td>
</tr>
<tr>
<td>Measles</td>
<td>0</td>
<td>0.01</td>
<td>0.41</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 2012 compared to the Ontario age-standardized rate for 2012. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% Confidence Interval contains one, the two rates are not statistically different from one another)

3 Influenza data is from the 2007-2008 season to the 2012-2013 season (September 1, 2007 to August 31, 2013)

4 Varicella ambulatory care visits from IntelliHEALTH are reported to determine severity of disease and because iPHIS reports varicella as aggregated case counts rather than individual cases.

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 as per the *Day Nurseries Act*.
- Offers community influenza immunization clinics as part of Ontario’s Universal Influenza Immunization Program.
- 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 provide timely updates on local disease status to area health care providers and other stakeholders as needed.
INFLUENZA

Background

- Influenza (commonly known as the “flu”) is a viral infection that circulates on a yearly basis causing seasonal outbreaks (October to April in Canada) of respiratory illness. The severity of the influenza season varies each year and can be mild to severe.
- The flu is spread by breathing in droplets that an infected person coughs or sneezes into the air. The influenza virus can also survive outside the body on unwashed hands, tissues or clothing, and on surfaces.
- Influenza symptoms can include headache, runny nose, sneezing, chills, cough, fever, loss of appetite, muscle aches and fatigue (feeling weak). Nausea, vomiting and diarrhea may also occur, particularly in children.
- Influenza vaccine is produced every year to provide protection against the strains of influenza that are expected to circulate that year.
- All individuals are at risk for contracting the influenza virus. Individuals who receive the seasonal vaccine are offered greater protection against the anticipated circulating strains. Certain segments of the population — such as older people, young children and those with underlying health conditions — may experience further complications.

Local Picture

Figure 24. Age-standardized influenza incidence rates per 100,000, by season, Waterloo Region & Ontario, 2007-2008 to 2012-13

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-8</td>
<td>225</td>
<td>44.0</td>
<td>39.4</td>
</tr>
<tr>
<td>2008-9</td>
<td>240</td>
<td>48.8</td>
<td>43.9</td>
</tr>
<tr>
<td>2009-10</td>
<td>238</td>
<td>49.3</td>
<td>64.2</td>
</tr>
<tr>
<td>2010-11</td>
<td>273</td>
<td>50.4</td>
<td>42.4</td>
</tr>
<tr>
<td>2011-12</td>
<td>160</td>
<td>30.2</td>
<td>29.8</td>
</tr>
<tr>
<td>2012-13</td>
<td>394</td>
<td>66.3</td>
<td>64.3</td>
</tr>
</tbody>
</table>

- Influenza accounts for the vast majority of vaccine preventable diseases reported in Waterloo Region (72.2%).
- During the 2012-2013 (Sept 1, 2012 to May 31, 2013) flu season, there were 394 laboratory confirmed cases of influenza in Waterloo Region. The incidence rate was 66.3 per 100,000. This is higher than the previous 5-year annual average rate for 2007-2011 (44.6 per 100,000).
- In 2012-2013, the influenza season started earlier than in other areas of the province and compared to previous seasons; however, the overall influenza rates for the 2012-2013 season for Waterloo Region and Ontario were similar (SRR=1.0 95% CI 0.9-1.1).
- The early activity and surge in cases and outbreaks seen in the 2012-2013 season are consistent with expected variations in annual seasonal influenza activity.
- Influenza A was the predominant circulating virus type for the 2012-2013 season overall; although, influenza B became more prevalent in the latter part of the season.
- Of the 2012-2013 season influenza cases in Waterloo Region with risk factor information available (N= 369), the most common self-reported risk factors included not being immunized for influenza (53%), having a chronic illness or underlying medical condition (40%) and being a resident of a nursing home or other chronic care facility (25%).
- During the 2012-2013 season, there were 13 deaths in Waterloo Region where influenza was at least a contributing cause of death.
INVASIVE MENINGOCOCCAL DISEASE (IMD)

Background

- Meningococcal disease is caused by the *Neisseria meningitidis* bacterium. About 10% 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 sharing food, drinks, toothbrushes, etc.; and also by not practicing good hand washing).
- IMD can cause high fever, neck stiffness, headache, vomiting, sensitivity to light, rash, confusion and in severe cases, coma.
- Children under 1 year of age and adolescents between 15 - 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 25. Age-standardized invasive meningococcal disease (IMD) incidence rates per 100,0001, by year, Waterloo Region & Ontario, 2007-2012


1 The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
• In 2012 there were no cases of IMD in Waterloo Region; this is less than the previous 5 years which experienced an average of 2 to 5 cases per year.
• The province of Ontario had 32 cases of IMD cases in 2012 (0.3 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 2 years of age and 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 26. Age-standardized invasive pneumococcal disease (IPD) incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

- In Waterloo Region in 2012, there were 79 cases of IPD with an incidence rate of 13.0 per 100,000.
- Since 2007, the local rate has shown an increasing trend and the current year's incidence rate is higher than the previous 5-year annual average for 2007-2011 (10.7 per 100,000)
• Since 2007, the local rates have been consistently higher than those of the province; in 2012, the age-standardized rate was significantly higher than that of Ontario (SRR = 1.7 95% CI 1.3-2.3).

• In 2012, in Waterloo Region, there were more cases among males (60.1%) than females.

• In general, the older age groups had the highest age-specific rates; the 65+ age group had the highest age-specific rate (47.7 per 100,000).

• In 2012, there were 3 deaths in which IPD was at least a contributing cause; this is lower than the number of IPD-associated deaths reported in the previous 5-years (the average number of deaths for 2007-2011 was 7).

• Among 2012 Waterloo Region cases that reported risk factors (N=74), the most common, self-reported risk factors included: having a chronic/underlying illness (68%), being partially or unimmunized (41%) and being immunocompromised (20%).

• Seventy-five per cent of 2012 Waterloo Region IPD cases with underlying risk factors and eligible for vaccine were not immunized.
MEASLES

Background

- Measles (also known as rubeola or red measles) is a very contagious infection caused by a virus (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 27. Age-standardized measles incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012


1 The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.

- There were no cases of measles in 2012 in Waterloo Region.
- 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.

- Provincially, there were only 3 cases of measles in 2012.
- 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 28. Age-standardized mumps\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2007-2012


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

\(^2\) The Waterloo Region rates for 2007-2012 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012 there were 3 cases of mumps in Waterloo Region with an incidence rate of 0.6 per 100,000; this rate is lower than the previous 5-year annual average rate for 2007-2011 (0.9 per 100,000)

Although the local rate for 2012 is higher than that of the province, this difference is not statistically significant (SRR = 2.9 95% CI 0.5-18.6)

In 2009, there was an increased incidence of mumps in Ontario and throughout Canada, mainly in university and college students. There were 13 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 (from a 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/adults.
- Anyone can get whooping cough but unimmunized/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 29. Age-standardized pertussis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2007-2012

<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>2007</td>
<td>0</td>
<td>25</td>
<td>5.5</td>
<td>8.7</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>16</td>
<td>3.5</td>
<td>7.7</td>
</tr>
<tr>
<td>2009</td>
<td>2</td>
<td>6</td>
<td>1.7</td>
<td>3.7</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2011</td>
<td>4</td>
<td>6</td>
<td>1.5</td>
<td>2.3</td>
</tr>
<tr>
<td>2012</td>
<td>21</td>
<td>49</td>
<td>14.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>


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

\(^2\) The Waterloo Region rates for 2007-2011 are unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
- Pertussis is naturally cyclic in nature, with peaks in disease every 3-5 years.
- In 2012, there was a significant increase in pertussis cases compared to previous years (incidence rate 14.4 per 100,000; N=70); this is higher than the previous 5-year annual average rate for 2007-2011 (2.4 per 100,000).
- The provincial pertussis incidence rate also increased but the local rates for 2012 were significantly higher than that of the province (SRR = 1.6 95% CI 1.2-2.2).
- Local cases were sporadic and not associated with an outbreak.
- The younger age groups were those with the highest age-specific incidence rates in 2012; the highest rate was among 0-4 year olds (69.6 per 100,000) followed by the 5-9 year age group (40.8 per 100,000).
- Of the 2012 Waterloo Region cases with risk factor information available (N=67), the most commonly self-reported risk factors included being unimmunized (31%), being partially/incompletely immunized (28%), and having close contact with another case (24%).
- The increase in pertussis cases in Waterloo Region in 2012 may be in part due to the waning effect of pertussis vaccine four to twelve years after vaccination. The significant increase in local pertussis cases locally in 2012 follows this pattern as the last peak in pertussis activity occurred in 2006-2007.
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 1 to 2 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 30. Age-standardized varicella\(^1\) outpatient visit rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>61</td>
<td>13.4</td>
<td>27.2</td>
</tr>
<tr>
<td>2008</td>
<td>70</td>
<td>15.2</td>
<td>25.7</td>
</tr>
<tr>
<td>2009</td>
<td>65</td>
<td>14.1</td>
<td>23.0</td>
</tr>
<tr>
<td>2010</td>
<td>91</td>
<td>19.5</td>
<td>25.1</td>
</tr>
<tr>
<td>2011</td>
<td>81</td>
<td>17.3</td>
<td>22.9</td>
</tr>
<tr>
<td>2012</td>
<td>71</td>
<td>14.5</td>
<td>21.3</td>
</tr>
</tbody>
</table>

Source: Varicella Ambulatory Care Visits, IntelliHEALTH, MOHLTC, extracted August 15, 2013; Population estimates, IntelliHEALTH, MOHLTC, extracted June 5, 2013
\(^1\)Varicella ambulatory care visits from IntelliHEALTH are reported to determine severity of disease and because iPHealth reports varicella as aggregated case counts rather than individual cases.
• Local and provincial data was sourced from the National Ambulatory Care Reporting System (NACRS) rather than the integrated Public Health Reporting System for reportable diseases because iPHIS only reports aggregated case counts rather than individual cases. As such, only of severe cases of varicella are captured in the following findings rather than a true measure of incidence.
• In 2012, there were 71 ambulatory care visits for varicella (visit rate of 14.5 per 100,000).
• In the past 5 years, the varicella ambulatory care visits has varied, but the past few years have seen a decrease; in 2012, the rate for varicella was lower than the previous 5-year annual average for 2007-2011 (15.9 per 100,000).
• Since 2007, the local rates of varicella ambulatory care visits were consistently lower than those of the province; in 2012, the local rate was significantly lower than that for Ontario (SRR = 0.7 95% CI 0.6-0.8).
• In 2012, the younger age groups had the highest numbers of varicella ambulatory care visits; 46% of varicella visits occurred in age groups <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)

Table 6. Numbers and age-standardized rates per 100,000\(^1\) for other infectious diseases, Waterloo Region & Ontario, 2012 and 2007-2011 (5-year annual average)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Waterloo Region</th>
<th>Ontario</th>
<th>2012 Standardized Rate Ratio (95% Confidence Interval)(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cases 2012</td>
<td># Cases 2012</td>
<td>Rate per 100,000</td>
<td>5-year average rate per 100,000 (2007-2011)</td>
</tr>
<tr>
<td>Group A Streptococcal Disease, invasive (iGAS)</td>
<td>27</td>
<td>4.9</td>
<td>4.4</td>
</tr>
<tr>
<td>Legionellosis</td>
<td>13</td>
<td>2.1(^1)</td>
<td>0.6(^1)</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>10</td>
<td>1.7(^1)</td>
<td>2.7</td>
</tr>
<tr>
<td>Encephalitis-Meningitis(^3)</td>
<td>8</td>
<td>1.6(^1)</td>
<td>2.8</td>
</tr>
<tr>
<td>Group B Streptococcal Disease, Neonatal</td>
<td>0</td>
<td>0.0(^1)</td>
<td>0.3(^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 2012 compared to the Ontario age-standardized rate for 2012. The 95% confidence interval indicates the statistical significance of the SRR (if the 95% Confidence Interval contains one, the two rates are not statistically different from one another)
\(^3\)Viral 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 Other Infectious Diseases

Tuberculosis (TB)
Region of Waterloo Public Health:
- Provides accessible and effective clinic services (tuberculosis and skin test clinic).
- 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 all individuals with TB infection or disease.
• 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.

Other Diseases (Encephalitis/Meningitis, Group A Streptococcal Disease, 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.
• Provide health education (e.g. via website, brochures, site visits, forums) for health care providers, including family physicians, long-term care homes, and retirement homes.
• In 2012, 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.
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 cause. 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 31. Age-standardized encephalitis and meningitis\(^1\) incidence rates per 100,000\(^2\), by year, Waterloo Region & Ontario, 2007-2012

![Graph showing incidence rates of encephalitis and meningitis](image)


\(^1\)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 2007-2012 are unstable due to small numbers (Relative Standard Error \([RSE]\) > 23%) and should be interpreted with caution.
• In 2012, there were 8 cases of encephalitis and meningitis in Waterloo Region with an incidence rate of 1.6 per 100,000); this rate is lower than the previous 5-year annual average rate for 2007-2011 (2.8 per 100,000)
• The local rate for 2012 was lower than that of the province but this difference was not significantly different (SRR = 0.7 95% CI 0.4-1.3); local rates have fluctuated around the provincial rate throughout the six-year study period.
• In 2012, most cases occurred among the 0-4 year age group (age-specific incidence rate of 19.0 per 100,000)
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 carry this 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, 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 32. Age-standardized invasive Group A streptococcal disease incidence rates per 100,000, by year, Waterloo Region & Ontario, 2007-2012

![Graph showing incidence rates](chart.png)


1 The Waterloo Region rates for 2011 is unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012 there were 27 cases of iGAS in Waterloo Region with an incidence rate of 4.9 per 100,000. This rate is similar to the rate for the previous 5-year 2007-2011 period (4.4 per 100,000).

Local rates of iGAS have fluctuated around the provincial rate since 2007 but have tended to be higher than provincial rates. In 2012, the local rate was higher than that of the province but this difference was not statistically significant (SRR = 1.2 95% CI 0.8-1.9).

In Waterloo Region in 2012, the majority of cases occurred among females (63%) and the age groups with the highest age-specific rates occurred in the 40-44 year age group (10.1 per 100,000).

There were 5 deaths associated with iGAS in Waterloo Region 2012; this is slightly higher than the number of deaths reported in the previous 5 years (average number of deaths for 2007-2011 is 2.8).

In 2012, there was no pronounced seasonal trend of iGAS cases in Waterloo Region although the highest number of cases occurred in the months of January and February. In general, according the previous 5-year average rates, cases occur regularly throughout the year, with slight increases in the winter months (November through April).

Among cases with risk factor information available (N=23), the most common self-reported risk factor among Waterloo Region iGAS cases in 2012 was having an underlying medical condition or chronic illness (74%).
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 - 35% 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 (<37 weeks), having fever during labor, and previously having had a child with GBS infection.

**Local Picture**
Figure 33. Age-standardized Group B streptococcal disease incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Waterloo cases</th>
<th>Waterloo rate</th>
<th>Ontario rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2</td>
<td>0.9</td>
<td>0.5</td>
</tr>
<tr>
<td>2008</td>
<td>2</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>2011</td>
<td>1</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

\(^1\)The Waterloo Region rates for 2007-2012 is unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
In 2012 there were no cases of neonatal GBS; this is similar to the trends for the previous 5-years from 2007-2011 where Waterloo Region has only experienced 5 cases in total.

In Ontario in 2012 there were 52 cases of neonatal GBS; the provincial incidence rate has remained relatively stable since 2007.

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 made up of two diseases: The more severe is Legionnaire’s Disease and the milder illness is called Pontiac Fever.
- It is spread by people inhaling the bacteria when they breathe in contaminated droplets of water in air. The bacteria is 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).
- The elderly (> 65 years); smokers; those with lung disease, weakened immune systems, kidney disease; and those with cancer are at higher risk of becoming infected.

Local Picture
Figure 34. Age-standardized legionellosis incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2007-2012

\(^1\)The Waterloo Region rates for 2007-2012 is unstable due to small numbers (Relative Standard Error [RSE] > 23%) and should be interpreted with caution.
The rates of legionellosis have been increasing province-wide in the last years.

In 2012, the incidence rate of legionellosis in Waterloo Region was 2.1 cases per 100,000 (N=13). This rate is higher than the previous 5-year annual average rate for 2007-2011 (0.6 per 100,000).

Although the local rate of legionellosis in 2012 was higher than that of the province, this difference is not significantly different (SRR=2.0 95% CI 0.9-4.2).

Almost all of the 2012 cases were males (85%) and all cases occurred among adults ≥ 30 years of age; the highest age-specific rate occurred in the 60-64 year age group (14.6 per 100,000).

Of the 2012 Waterloo Region legionellosis cases with risk factor information available (N=10), the most common risk factors reported include smoking (60%) and recent exposure to aerosolized water (40%).

Due to small numbers and the resulting instability in rates, caution should be used in interpreting this data.

Waterloo Region Legionellosis cases in 2011 and 2012 were examined to determine if there were any clusters or epidemiological links among cases; no common sources of exposure were found.
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. Inactive (or latent) TB disease 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 TB disease include:
  - Having lived (or being born) in an endemic country
  - Immunosupression 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)

Local Picture

Figure 35. Age-standardized active tuberculosis incidence rates per 100,000\(^1\), by year, Waterloo Region & Ontario, 2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>18</td>
<td>3.6</td>
</tr>
<tr>
<td>2008</td>
<td>13</td>
<td>2.5</td>
</tr>
<tr>
<td>2009</td>
<td>17</td>
<td>4.8</td>
</tr>
<tr>
<td>2010</td>
<td>9</td>
<td>1.6</td>
</tr>
<tr>
<td>2011</td>
<td>12</td>
<td>2.5</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>1.7</td>
</tr>
</tbody>
</table>

In 2012 there were 10 cases of active TB in Waterloo Region with an incidence rate of 1.7 per 100,000. This rate is lower than the previous 5-year annual average rate for 2007-2011 (2.7 per 100,000).

Local rates of active TB have been consistently lower than those of the province since 2007; in 2012, the local active TB rate was significantly lower than that for Ontario (SRR = 0.4 95% CI 0.3-0.6).

Active TB was most common among males 20 to 29 years of age in Waterloo Region in 2012.

There were no TB-related deaths in Waterloo Region in 2012.

Of the 10 active TB cases in 2012, nine were born outside of Canada:
  - Africa (4 cases)
  - Asia (4 cases)
  - Europe (1 case)

Eight of the ten (80%) active TB cases completed their treatment regimen; two cases were still being treated.

None of the 2012 cases demonstrated resistance to one or more TB drugs.

The most common risk factors among 2012 active TB cases in Waterloo Region of those that reported risk factors (N=6) included living in an endemic country (83%), having a chronic illness or underlying medical condition (33%), low body weight (33%), and having latent TB that was not adequately treated (33%).
OUTBREAKS

Region of Waterloo Public Health Activities for Outbreaks

- Region of Waterloo Public Health follows up on all enteric and respiratory outbreaks reported by child care centres, hospitals, residential/group homes, long-term care homes and retirement homes.
- The health unit supports these providers in investigating the source of the outbreak and implementing appropriate infection prevention and control practices to minimize the spread of illness as per Ministry of Health and Long-Term Care guidelines.
- Other activities that contribute to outbreak management including:
  - Consultation with individual facilities (e.g. long-term care homes, retirement homes)
  - Education sessions to increase health care worker immunization rates
  - Hosting health education forums with staff from local facilities
ENTERIC OUTBREAKS

Local Picture
Figure 36. Number of enteric outbreaks by month and year, Waterloo Region, 2007-2008 to 2012-2013

*2012-2013 data is partial from September 1, 2012 to May 31, 2013
iPHIS 2007-2013, MOHLTC, extracted July 29, 2013

*As can be seen with normal fluctuation, Waterloo Region experienced fewer enteric outbreaks in the 2012-2013 season compared to previous years.
*A total of 40 enteric outbreaks occurred between September 1, 2012 and May 31, 2013 which is lower than the number of enteric outbreaks experienced in previous seasons; the previous 5-season average for 2007-8 to 2011-12 was 64 enteric outbreaks.
*In the 2012-2013 season enteric outbreaks didn’t demonstrate a pronounced seasonal trend compared to the previous five years where traditionally, most outbreaks occurred between the months of December and March.
Table 7. Proportion of enteric outbreaks by exposure setting, Waterloo Region, 2012-2013*

<table>
<thead>
<tr>
<th>Exposure Setting</th>
<th>Number</th>
<th>Proportion of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Care Facility</td>
<td>20</td>
<td>50.0%</td>
</tr>
<tr>
<td>Long-Term Care Home</td>
<td>11</td>
<td>27.5%</td>
</tr>
<tr>
<td>Hospital</td>
<td>3</td>
<td>7.5%</td>
</tr>
<tr>
<td>Retirement Home</td>
<td>3</td>
<td>7.5%</td>
</tr>
<tr>
<td>Group Home</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Community</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*2012-2013 data is partial from September 1, 2012 to May 31, 2013
iPHIS 2012-2013, MOHLTC, extracted July 29, 2013

- Most (50%) of the 2012 enteric outbreaks occurred in child-care centres, followed by long-term care homes (28%).
- When a responsible organism could be identified, the most frequently detected agent was norovirus (28%).
RESPIRATORY OUTBREAKS

Figure 37. Number of non-influenza respiratory outbreaks, by month and year, Waterloo Region, 2007-2008 to 2012-2013*

*2012-2013 data is partial from September 1, 2012 to May 31, 2013
iPHIS 2007-2013, MOHLTC, extracted July 29, 2013

Table 8. Proportion of non-influenza respiratory outbreaks by exposure setting, Waterloo Region, 2012-2013

<table>
<thead>
<tr>
<th>Exposure Setting</th>
<th>Number</th>
<th>Proportion of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Care Home</td>
<td>18</td>
<td>72.0%</td>
</tr>
<tr>
<td>Retirement Home</td>
<td>7</td>
<td>28.0%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>25</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

- During the 2012-2013 season, there were 25 non-influenza respiratory outbreaks in Waterloo Region; this is higher than the average number of outbreaks that occurred in the previous 5-seasons (17.8).
- In 2012-2013, non-influenza outbreaks peaked in the months of December to March which is similar to the seasonality of the previous 5-season average.
- Most non-influenza outbreaks in 2012-2013 occurred in long-term care homes (72%).
During the 2012-2013 influenza season, there were 34 influenza outbreaks in Waterloo Region; this is considerably higher than the average number for the previous 5 seasons (8.8) and is consistent with the increased influenza activity seen locally and province-wide in 2012-2013.

In the 2012-2013 season, influenza outbreaks peaked in November; in the previous five seasons, influenza outbreaks peaked in January through March.

Most 2012-2013 influenza outbreaks in Waterloo Region occurred in long-term care homes (71%), followed by retirement homes (24%).
REFERENCES


Borchardt M, Spencer SK, Burney A, Kieke Jr., Lambertini E, Loge FJ. (2012). Viruses in non-disinfected drinking water from municipal wells and community incidence of acute gastrointestinal illness. *Environmental Health Perspectives*, ehponline.org, [http://dx.doi.org/10.1289/ehp.1104499](http://dx.doi.org/10.1289/ehp.1104499)


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.elaws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm](http://www.elaws.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% confidence interval indicates the statistical significance of the SRR. If the 95% 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 (ROWPH) 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).

Sporadic Cases
All sporadic infectious disease data for Waterloo Region with an accurate episode date between January 1, 2007 and December 31, 2012 was extracted from iPHIS between July 13 and July 29, 2013 (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). Influenza case counts with an accurate episode date between September 1, 2007 and May 31, 2012 and were analyzed by seasonal year (September 1st of any given year to August 31st of the following year; influenza data is partial up to May 31, 2013 for the 2012-2013 season). 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 (2009). 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. 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 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 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 episode accurate date between January 1, 2007 and December 31, 2012. Influenza data is up to May 31, 2012.

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 ROWPH and the MOHLTC at the date of data extraction recorded with the stipulation that these data are provisional and subject to change. Additionally, provincial data for 2012 are preliminary and may change as a result of further data cleaning.

Outbreaks
Outbreak data is included in this report for enteric and respiratory diseases, both influenza and non-influenza respiratory outbreaks. For every confirmed outbreak, staff in Public Health complete detailed outbreak summary reports that document information pertaining to the outbreak, including the aetiological agent, duration of the outbreak, reporting information, exposure setting, control measures and specimen information if available. An outbreak is defined as the occurrence of two or more cases of illness linked to each other in terms of time, exposure to source, and most often location. All data were reviewed by Public Health staff to ensure that final counts and outbreak information were accurate.

For this report, outbreak data for Waterloo Region was extracted from the iPHIS database. All outbreak records (outbreaks with a reportable enteric or respiratory disease identified as the aetiological agent) that met the provincial surveillance case definition and had a reported date between September 1, 2007 and May 31, 2013 were extracted. All outbreak data was analyzed by seasonal year (September 1st of any given year to August 31st of the following year) and is partial up to May 31, 2012 for the 2012/13 season.

Exposure Data
Exposure and risk factor information were included for diseases which demonstrated consistently higher rates than the province, disease that demonstrated continually increasing rates or diseases that caused a significant burden of disease in 2012. 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 so proportions do not sum to 100%.

For every case of infectious disease reported to ROWPH, detailed case follow-up is conducted by ROWPH 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. In addition, risk and exposure information are collected for enteric illnesses from C-EnterNet. C-EnterNet is a partnership between ROWPH and the Public Health Agency of Canada (PHAC) to collect and analyze in-depth risk factor data on enteric illnesses in Waterloo Region. For enteric
diseases, exposure data was extracted from the C-EnterNet database and combined with iPHIS exposure data to determine overall exposure details.

It is also important to note that risk factors in iPHIS and C-EnterNet 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 2007 to 2011 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 2012 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 June 5, 2013 and reflects the latest population estimates and projections at the time of this report.

**Methodology**

All diseases (except for varicella) were extracted from iPHIS by accurate episode date except for tuberculosis which was extracted by diagnosis date and HIV data which was extracted by encounter date. All diseases with one or more cases reported in Waterloo Region in 2012, with the exception of influenza, with dates between January 1, 2007 and December 31, 2012 were included in this report. Influenza and enteric and respiratory outbreak data was analyzed by season (September 1st of a given year to August 31st of the following year) from the 2007-2008 season to the 2012-2013 season. 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 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 sexual orientation)
- Age group (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, and 65+ years)
- Seasonality (month)

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 18 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, and 65+. 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% confidence interval indicates the statistical significance of the SRR. If the 95% confidence interval contains one, the two rates are not statistically different from one another.

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

Exposure and risk factor information were included for diseases which demonstrated consistently higher rates than the province, diseases that demonstrated continually
increasing rates, or diseases that caused a significant burden of disease in 2012. Cases that were lost to follow-up and did not have exposure or risk factor information available were excluded from the denominator when calculating proportions of cases exposed. In addition, more than one risk factor can be reported by a case so proportions do not sum to 100%.

Annual average rates for 2007-2011 were also calculated which were simply the average of the age-standardized rates for each year from 2007 to 2011. Age-standardized rates for 2012 were compared to the previous 5-year annual average rate for 2007-2011 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, allowing a provincial comparison. 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 ROWPH 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 (i.e. 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.

It is important to note that the number of outbreaks does not necessarily reflect the magnitude of individual outbreak investigations or burden of outbreak-related illness. Institutional outbreaks are likely well reported compared with other outbreaks because institutions often have infection control staff on-site, there are usually a large number of persons affected, and the agent, most often a virus transmitted person-to-person, is relatively easy to diagnose. However, prior to 2012, only long-term care homes were required to report outbreaks to Public Health; retirement homes were not required to report outbreaks which affects the comparison between 2012 and previous years. Similarly, community outbreaks are not required to be reported to Public Health. At times Public Health will become aware of them due to (voluntary) reports if a number of people become ill (e.g. group of people who ate a common meal or attended a common event. Therefore, the data presented in this report would reflect an underestimation of the true burden of community outbreaks.

For some diseases, case definitions have changed over time. As of April 28, 2009, new provincial case definitions for reportable diseases came into effect. 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 as ambulatory care visits represent the more severe varicella cases, thus underestimating the true number of varicella cases occurring locally and provincially.

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 (2012)

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:

- Acquired Immunodeficiency Syndrome (AIDS) S
  - Amebiasis
  - Anthrax H
  - Botulism H
  - Brucellosis H
  - Campylobacter Enteritis H
  - Chancroid
  - Chickenpox (Varicella)
  - Chlamydia Trachomatis Infection S
  - Cholera H
  - Clostridium difficile associated disease (CDAD) outbreaks in public hospitals H
  - Cryptosporidiosis H
  - Cyanocobalamin H
  - Cytomegalovirus infection, congenital H
  - Diphtheria H
  - Encephalitis, including:
    - i. primary, viral
    - ii. post-infectious
    - iii. vaccine-related
    - iv. adolescent or young adult
  - Enteritis S
  - Food Poisoning, all causes H
  - Gastroenteritis, institutional outbreaks H
  - Giardiasis, except symptomatic cases H
  - Gonorrhea S
  - Group A Streptococcal Disease, invasive H
  - Group B Streptococcal Disease, neonatal H
  - Haemophilus Influenzae B Disease, invasive H
  - Hantavirus Pulmonary Syndrome H
  - Hemorrhagic Fever, including:
    - i. Ebola virus disease
    - ii. Marburg virus disease
    - iii. other viral causes
  - Hepatitis, viral
    - i. Hepatitis A H
    - ii. Hepatitis B S
    - iii. Hepatitis C S
    - iv. Hepatitis D (Delta Hepatitis) H
  - Herpes, neonatal S
  - Influenza H
  - Lassa Fever H
  - Legionellosis H
  - Leprosy H
  - Leptospirosis H
  - Lyme Disease H
  - Malaria H
  - Measles H
  - Meningitis, acute
    - i. bacterial
    - ii. viral
    - iii. other
  - Meningococcic disease, invasive H
  - Mumps H
  - Ophthalmia neonatorum H
  - Paratyphoid fever E
  - Pertussis (Whooping Cough) H
  - Plague H
  - Pneumococcal disease, invasive H
  - Poliomyelitis, acute H
  - Psittacosis / Ornithosis H
  - Q Fever H
  - Rabies H
  - Respiratory Infection Outbreaks in Institutions H
  - Rubella H
  - Rubella, congenital syndrome H
  - Salmonellosis H
  - Severe Acute Respiratory Syndrome (SARS) H
  - Shigellosis H
  - Smallpox H
  - Syphilis S
  - Tetanus H
  - Transmissible Spongiform Encephalopathy, including
    - i. Creutzfeldt-Jakob Disease, all types
    - ii. Gerstmann-Sträussler-Scheinker Syndrome
    - iii. Fatal Familial Insomnia
    - iv. Kuru
  - Trichinosis H
  - Tuberculosis H
  - Typhus H
  - Typhoid Fever H
  - Verocytotoxin-producing E. coli infection indicator conditions include Hemolytic Uremic Syndrome (HUS) H
  - West Nile Virus Illness (WNV) H
  - Yellow Fever H
  - Yersiniosis H

Reporting to Region of Waterloo Public Health - Weekdays 8:30 - 4:30pm
- Infectious Diseases & Tuberculosis Control 519-883-2006, ext. 5275
- Health Protection & Investigation 519-883-2008, ext. 5147
- 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 immediately to the Medical Officer of Health. (Other diseases are to be reported by the next business day.)