

INFECTIOUS DISEASE REPORT 2015

WINDSOR-ESSEX COUNTY
HEALTH UNIT



WINDSOR AND ESSEX COUNTY



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List of Acronyms

CANSIM – Canadian Socio-Economic Information Database

CDI – *Clostridium difficile* infection

DEET – *N,N*-Diethyl-*meta*-toluamide or diethyltoluamide

HIV – Human immunodeficiency virus

HPPA – Health Promotion and Protection Act

HUS – Haemolytic uremic syndrome

iGAS – Invasive group A streptococcal disease

IMD – Invasive meningococcal disease

IPD – Invasive pneumococcal disease

iPHIS – Integrated Public Health Information System

IPD – Invasive pneumococcal disease

LTBI – Latent tuberculosis infection

MMR or MMRV – Measles, mumps, rubella vaccine or Measles, mumps, rubella, varicella vaccine

MOHLTC – Ontario Ministry of Health and Long-Term Care

PCV-7 or PCV-13 – 7- or 13- valent pneumococcal conjugate vaccine

PNEU-P-23 or PPV-23 – 23-valent pneumococcal polysaccharide vaccine

SARS – Severe acute respiratory syndrome

TB – Tuberculosis

VTEC – Verotoxin-producing *Escherichia coli*

WEC – Windsor-Essex County

WNV – West Nile Virus

Executive Summary

This report provides surveillance information regarding diseases that are reportable to the public health unit under the Health Protection and Promotion Act (HPPA). The information contained provides the evidence necessary to identify key trends in the reportable diseases covered under this report and health issues of local public health significance. Such evidence helps in the tailoring of public health efforts and the improvement of the health of Windsor-Essex County residents.

Information pertaining sexually-transmitted and blood-borne infections have been covered in an earlier report ([Sexually Transmitted and Blood-Borne Infections in Windsor and Essex County Report](#)). Institutional outbreaks of gastroenteritis, respiratory outbreaks in institutions and adverse events following immunization are not covered in this report.

Enteric disease refers to illness caused by bacteria, viruses or parasites, transmitted primarily through the consumption of contaminated food or water. In 2015, there were 219 cases of enteric illness in Windsor-Essex County. Salmonellosis had the greatest case burden of any enteric disease (84 cases in 2015). The number of new cases (incidence) of salmonellosis has steadily increased since 2006, and in 2015 the number of cases was greater than the five-year average. In recent years, the incidence of cyclosporiasis and cryptosporidiosis has also increased. Both of these diseases had case counts that were higher than their historical average. Increases in the incidence of cyclosporiasis and cryptosporidiosis were also observed in Ontario.

Vaccine-preventable diseases (VPDs) are infectious diseases caused by viruses or bacteria for which effective preventive vaccines exist. Nearly all of the diseases are contagious and can be spread through the cough or sneeze of an infected person. In 2015, there were 291 cases of VPDs in Windsor-Essex County. The most burdensome vaccine-preventable disease was influenza (182 cases for 2015/2016 season). The total case count for the 2015/2016 season was higher than the historical average. After influenza, the next leading VPD in 2015 was varicella (chickenpox). There were 39 cases of varicella (reported in aggregate), and counts for 2015 were much lower than the historical average. Due to under-reporting, case counts of influenza and varicella are likely to be underestimates of the true incidence in the population.

Vector-borne diseases are illnesses transmitted to humans by an animal (vector). Vectors include any animal that can transmit a pathogen to a human (host) such as insects, ticks, and mites. Zoonotic diseases are diseases that are spread from animals to humans through contact (direct or indirect) or through vectors capable of carrying zoonotic pathogens. In 2015, there were 12 cases of vector-borne disease and no cases of zoonotic disease (rabies) reported in

Windsor-Essex County. Lyme disease case counts for 2015 (six cases) were twice the five-year average, while WNV (four cases) and malarial case counts (two cases) were below the historical average.

Other reportable diseases (encephalitis and meningitis, invasive group a streptococcal disease (iGAS), tuberculosis, and legionellosis) accounted for 37 cases in 2015.

Overall Findings

Table 1. Case counts and crude incidence rates for 2015, and the respective five-year averages from 2010 to 2014, Windsor-Essex County

Disease	Number of cases (2015)	Average case counts (2010-2014)	Incidence rate (2015)	Average incidence rate (2010-2014)
Influenza ^A	182	161	88.0	64.6
Salmonellosis	84	73	1.9	1.7
<i>Campylobacter</i> enteritis	69	112	1.6	2.5
Varicella (Chickenpox) ^B	39	180	9.7	45.0
Invasive pneumococcal disease (IPD)	27	29	0.6	0.6
Giardiasis	25	27	0.6	0.6
Encephalitis and meningitis	18	11	4.5	2.8
Amebiasis	14	13	0.3	0.3
Invasive Group A streptococcal disease (iGAS)	12	14	0.3	0.3
Cyclosporiasis	11	3	0.2	0.1
Cryptosporidiosis	8	4	0.2	0.1
Lyme disease	6	3	0.1	0.1
West Nile Virus (WNV) illness	4	7	0.1	0.1
Verotoxin producing <i>E. Coli</i> (VTEC) infection including HUS (HUS)	4	3	0.1	0.1
Pertussis (whooping cough)	4	9	0.1	0.2
Tuberculosis	4	9	4	4.5
Legionellosis	3	5	0.1	0.1
Malaria	2	5	0.0	0.1
Mumps	1	1	0.0	0.0
Listeriosis	1	1	0.0	0.0
Botulism	1	0	0.0	0.0
Hepatitis A	1	1	0.0	0.0
Yersiniosis	1	5	0.0	0.1
Acute flaccid paralysis	0	0	0.0	0.0
Anthrax	0	0	0.0	0.0
Brucellosis	0	0	0.0	0.0
Cholera	0	0	0.0	0.0

Disease	Number of cases (2015)	Average case counts (2010-2014)	Incidence rate (2015)	Average incidence rate (2010-2014)
<i>Clostridium difficile</i> infection (CDI) in public hospitals ^c	0	0	0.0	0.0
Creutzfeldt-Jakob Disease, All Types	0	0	0.0	0.0
Diphtheria	0	0	0.0	0.0
Invasive <i>haemophilus influenzae</i> type B (Hib) disease	0	0	0.0	0.0
Hantavirus pulmonary syndrome	0	0	0.0	0.0
Hemorrhagic fevers - Ebola, Marburg And other viral causes	0	0	0.0	0.0
Lassa fever	0	0	0.0	0.0
Leprosy	0	0	0.0	0.0
Measles	0	0	0.0	0.0
Invasive meningococcal disease (IMD)	0	1	0.0	0.0
Paralytic shellfish poisoning	0	0	0.0	0.0
Paratyphoid fever	0	0	0.0	0.0
Acute Poliomyelitis (Polio)	0	0	0.0	0.0
Psittacosis/ornithosis	0	0	0.0	0.0
Q fever	0	0	0.0	0.0
Rabies	0	0	0.0	0.0
Rubella	0	0	0.0	0.0
Rubella, congenital syndrome	0	0	0.0	0.0
Severe acute respiratory syndrome (SARS)	0	0	0.0	0.0
Shigellosis	0	5	0.0	0.1
Smallpox	0	0	0.0	0.0
Tetanus	0	0	0.0	0.0
Trichinosis	0	0	0.0	0.0
Tularemia	0	0	0.0	0.0
Typhoid fever	0	1	0.0	0.0
Yellow fever	0	0	0.0	0.0

Note: Rates reported are crude incidence rates, and are per 100,000 population

^ACase counts for Influenza are for the surveillance season (September 1, 2015 to August 31, 2016), not the calendar year.

^BFor varicella (chickenpox), only case counts reported in aggregate are reported here

^CCounts for *clostridium difficile* infection (CDI) only considers cases associated with outbreaks in public hospitals

Introduction

Infectious diseases are illnesses caused by pathogenic microorganisms such as bacteria, viruses, parasites, or fungi. Infectious diseases can be spread to humans in many different ways, including: contact with animals, insect bites, consumption of contaminated food or water, sexual contact, contact with bodily fluids, through the air, or through contact with contaminated surfaces.

The *2015 Infectious Disease Report* summarizes the case counts and incidence rates for infectious diseases that were reported to Windsor-Essex County Health Unit. For diseases with sufficient case counts, the report also provides heat maps, and describes age and sex trends, seasonality, reported risk factors, hospitalizations and deaths.

Data on specific diseases are described alphabetically under the below categories.

- Enteric diseases
- Zoonotic and vector-borne diseases
- Vaccine-preventable diseases
- Other diseases

Only diseases with one or more cases in 2015 or one or more cases on average in the five years prior have been described individually. Information pertaining to sexually-transmitted diseases was covered in an earlier report ([Sexually Transmitted and Blood-Borne Infections in Windsor and Essex County Report, 2016](#)). Institutional outbreaks of gastroenteritis, respiratory outbreaks in institutions and adverse events following immunization are not covered in this report.

A list of the infectious diseases that must be reported to the local Medical Officer of Health under the Health Protection and Promotion Act (HPPA) is shown in Appendix F.

Enteric Diseases

Enteric disease refers to illness caused by bacteria, viruses or parasites that are characterized by diarrhea, nausea, vomiting, abdominal cramps, and/or fever. Infection is typically caused by consumption of contaminated food or water, contact with animals or their environment, or by contact with the feces of an infected person. Infected individuals may experience severe complications and may require hospitalization. Death can also result in some cases. The young, elderly, and those with weakened immune systems are usually at greater risk for more severe outcomes. Generally, the risk of acquiring enteric disease can be reduced by following proper hand hygiene, food safety and handling practices, and consuming water from safe sources.

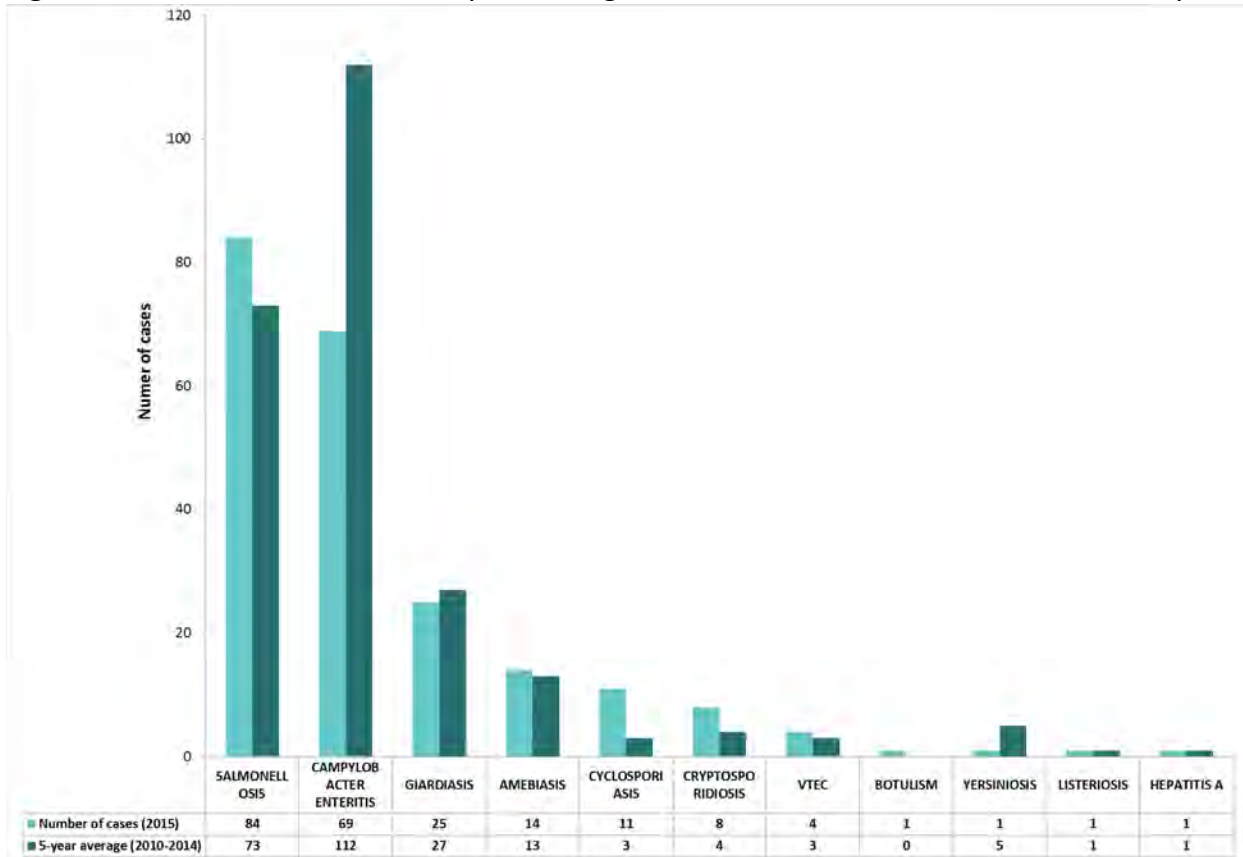
In 2015, there were 219 cases of enteric illness in Windsor-Essex County (see Figure 1). Of note for 2015, were salmonellosis, cyclosporiasis and campylobacter enteritis. In 2015, salmonellosis had the greatest case burden of any enteric disease (84 cases). The number of new cases (incidence) of salmonellosis has steadily increased since 2006, and in 2015 the number of cases was greater than the five-year average.

The incidence of cyclosporiasis and cryptosporidiosis has also increased in recent years. In 2015, there were 11 cases of cyclosporiasis when only three were expected, and there were eight cases of cryptosporidiosis when only four were expected.

Campylobacter enteritis was the second-leading cause of enteric disease in 2015 (69 cases). However, case counts for *campylobacter* enteritis were much lower in 2015 when compared to the historical five-year average. Together, salmonellosis and *campylobacter* enteritis account for almost 70% of enteric disease cases reported in 2015.

In 2015, there were no confirmed cases of anthrax, brucellosis, cholera, *clostridium difficile* infection (CDI), hantavirus pulmonary syndrome, paralytic shellfish poisoning, paratyphoid fever, psittacosis/ornithosis, q fever, shigellosis, trichinosis, tularemia, typhoid fever, and yellow fever.

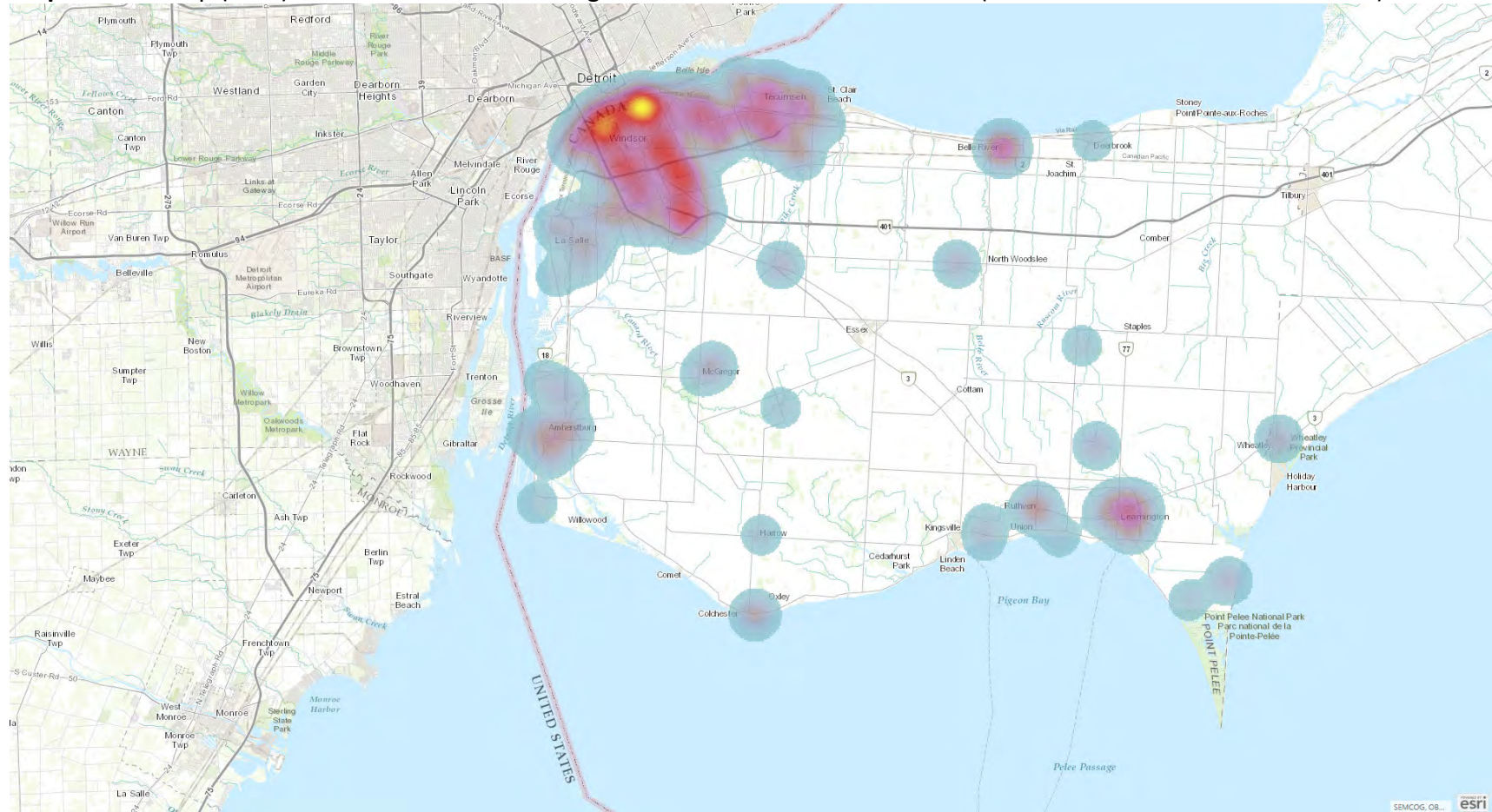
Figure 1. Number of cases and five-year average of enteric diseases, Windsor-Essex County



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

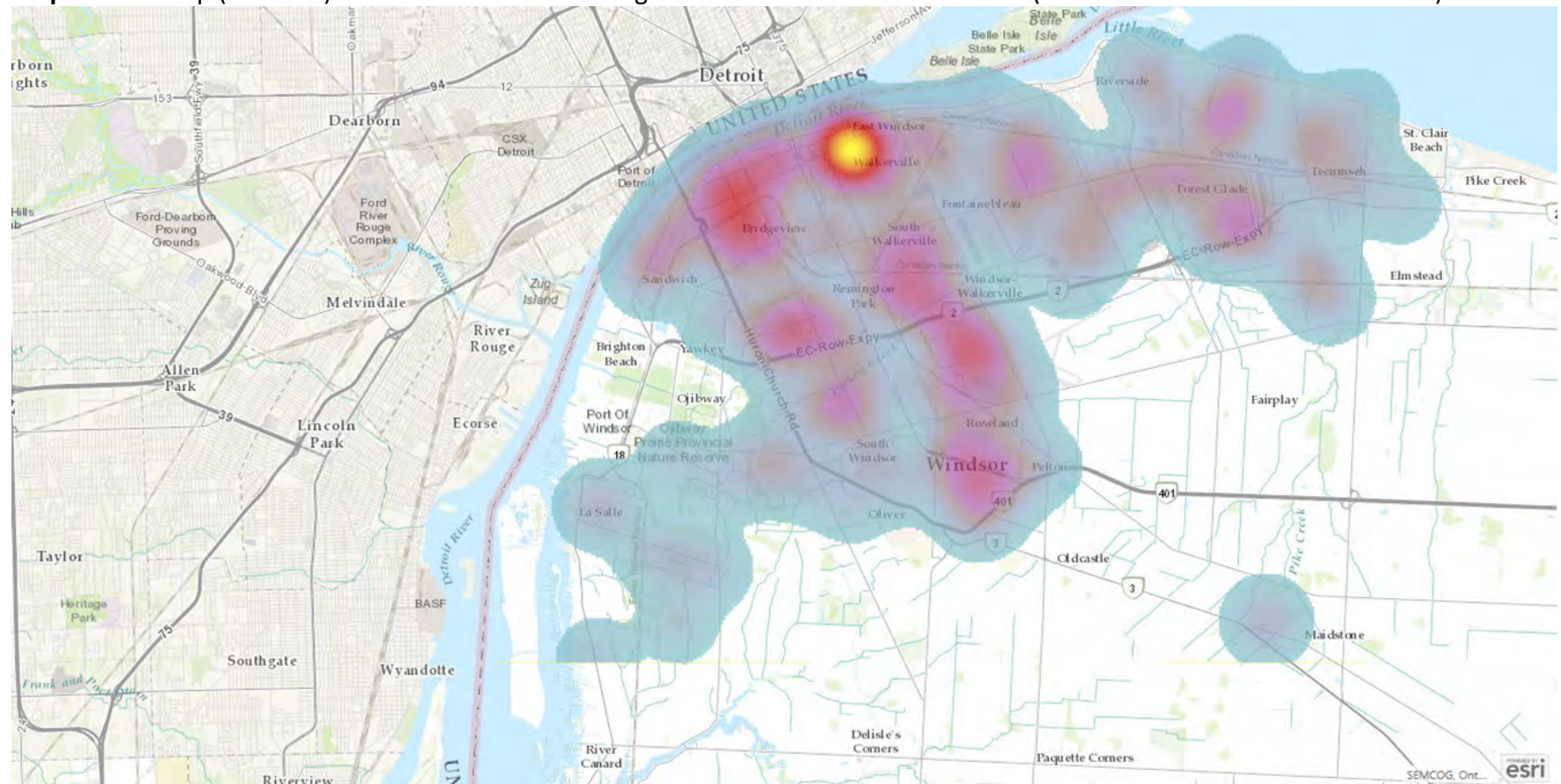
Geographic Distribution

Map 1. Heat map (WEC) - enteric disease cases diagnosed in WEC from 2012 to 2015 (based on address at time of illness)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Map 2. Heat map (Windsor) - enteric disease cases diagnosed in WEC from 2012 to 2015 (based on address at time of illness)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Amebiasis

Background

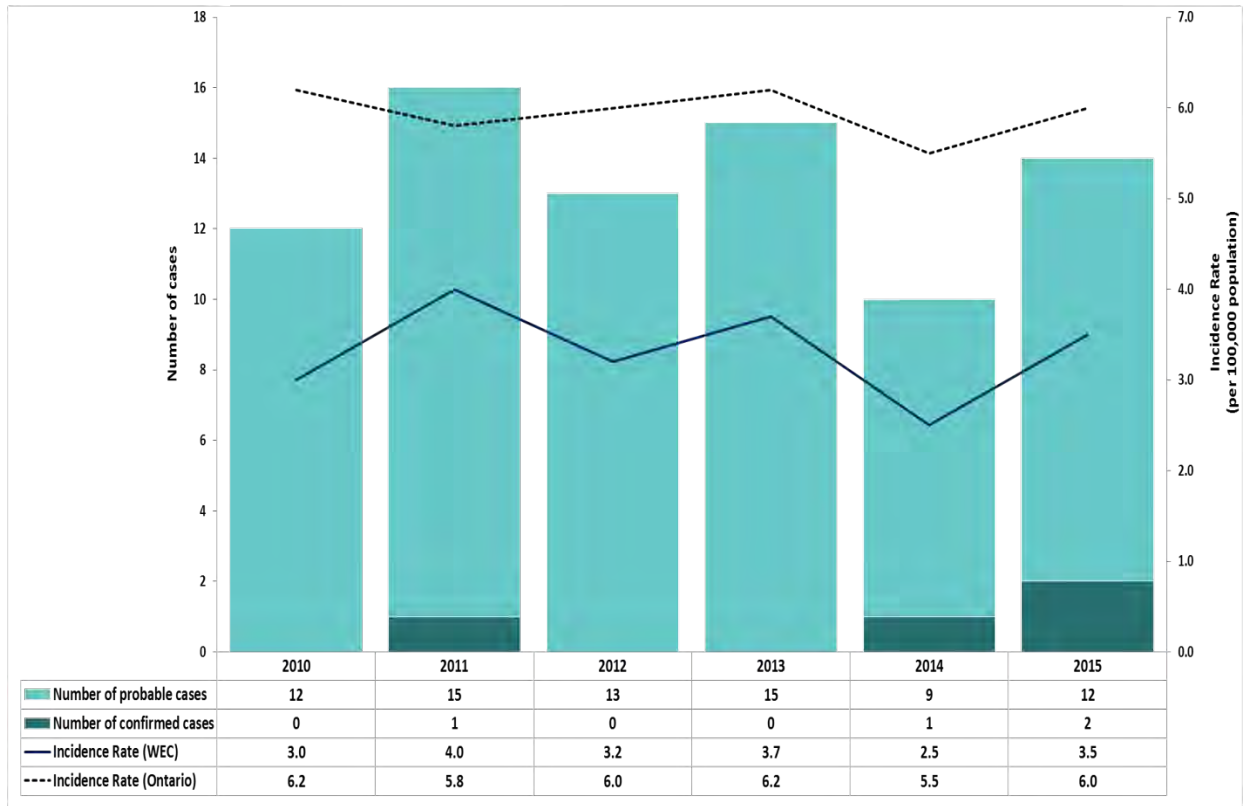
Amebiasis is a parasitic disease caused by the parasite *Entamoeba histolytica* (*E. histolytica*). Most infected individuals do not have any symptoms. However in some, infection may result in intestinal illness (e.g. diarrhea, abdominal cramps, vomiting), bowel lesions, and/or liver abscess. Transmission typically occurs through ingesting food or water contaminated with the stool of an infected individual or anal-oral contact. Treatment measures include maintaining adequate hydration and antibiotic therapy. Preventative measures include following proper hand hygiene, sanitary disposal of fecal material, adequate sanitation of drinking water, and the use of personal protective measures during sexual practices that may facilitate contact with or transmission of fecal matter.¹

Trends over time

Amebiasis is a common disease in Ontario. The provincial case definition of amebiasis was changed in early 2009 to include probable and confirmed cases. Prior to 2009, only confirmed cases were included in the definition.² For comparability to Ontario, only trends from 2010 are analyzed here.

In 2015, there were 14 cases of amebiasis in Windsor-Essex County (two confirmed cases and 12 probable cases). The number of new cases has remained fairly steady throughout the period from 2010 to 2015 (see Figure 2). The incidence rate of amebiasis in Windsor has been stable from 2010 to 2015, and has been lower than the rates for Ontario for the period. The incidence rate in Windsor-Essex County for 2015 was 3.5 cases per 100,000 population, compared to 6.0 cases per 100,000 population in Ontario.

Figure 2. Trends in confirmed and probable amebiasis cases by episode year, Windsor-Essex County and Ontario (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Consistent with the trends reported for Ontario³, the number of cases and incidence rate of amebiasis showed an increase between 20 and 49 years (see Table 2 and Figure 3). Overall, males accounted for 62.7% of cases between 2011 and 2015.

In males, high rates were observed in those younger than five years (5.7 cases per 100,000 population) and in those 20-39 years (6.0 cases per 100,000 population). In females, the highest rates were observed in those 40-49 years (4.9 cases per 100,000 population) and those above 70 years (4.0 cases per 100,000 population).

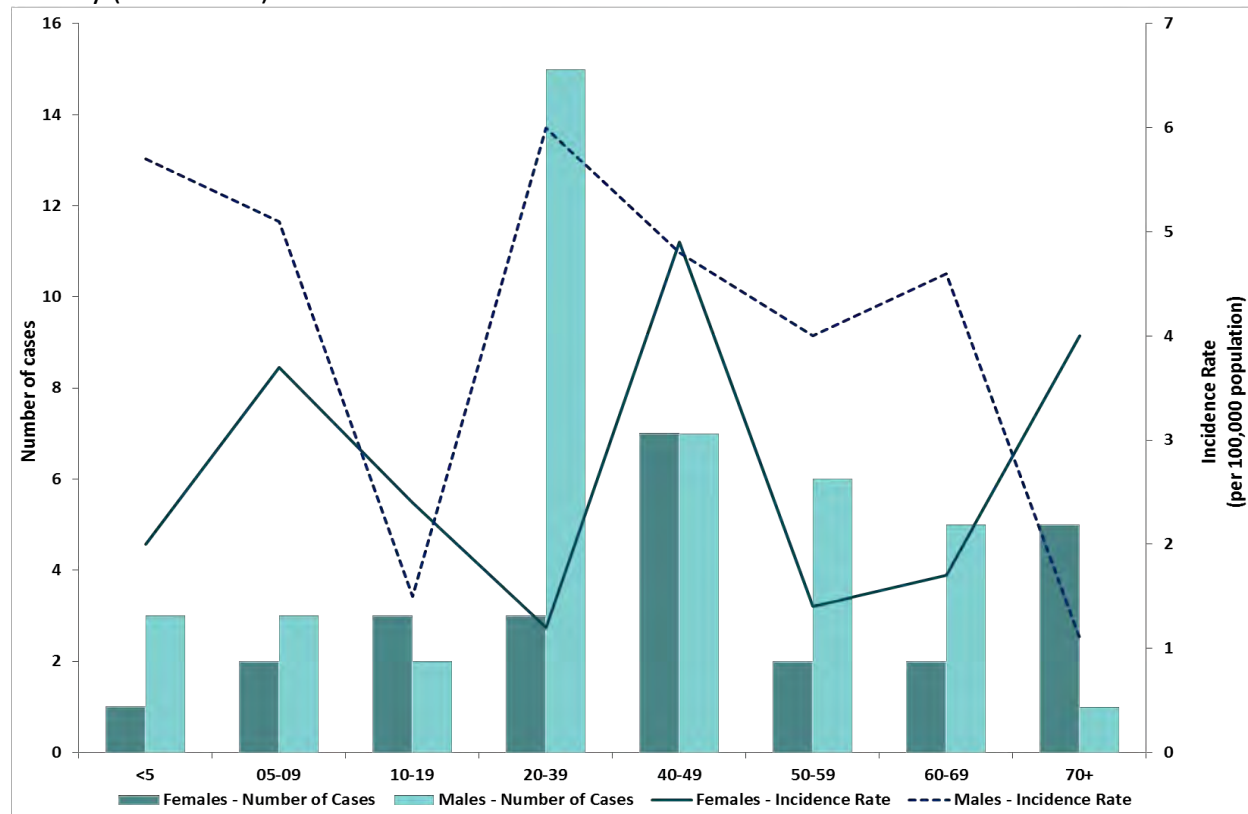
Table 2. Incidence of confirmed and probable amebiasis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	1	2.0	3	5.7	4	3.9
05-09	2	3.7	3	5.1	5	4.4
10-19	3	2.4	2	1.5	5	1.9
20-39	3	1.2	15	6.0	18	3.6
40-49	7	4.9	7	4.8	14	4.8
50-59	2	1.4	6	4.0	8	2.7
60-69	2	1.7	5	4.6	7	3.1
70+	5	4.0	1	1.1	6	2.7

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 3. Incidence of confirmed and probable amebiasis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

A notable seasonal trend was not observed in amebiasis case counts.

Risk Factors

Behavioural Risk Factors

Half of the amebiasis cases (from 2011 to 2015) questioned regarding travel status reported travel outside of the province in the two to four weeks prior to illness onset (50.0%, 22 cases). Besides the 'unknown' and 'other' risk factors, this was the only risk factor reported by 50% or more cases. The 'other' risk factor was reported by all seven cases asked about the risk factor (100.0%, 7 cases).

Medical Risk Factors

Twelve cases of amebiasis reported some 'other' medical risk factor (44.4%, 12/27).

Hospitalization/Deaths

In 2015, one case of amebiasis was hospitalized (7.1%, 1/14 cases). Prior to 2015, the last reported hospitalization of an amebiasis case was in 2011 (one case). There have been no deaths reported in amebiasis cases from 2011 to 2015.

Botulism

Background

Botulism is a disease caused by toxin produced from the bacterium *Clostridium botulinum*. Botulism occurs in three main forms: foodborne, wound, and intestinal. Foodborne botulism is caused by ingesting food containing the *C. botulinum* toxin; wound botulism is caused by the toxin produced by *C. botulinum* bacteria that has penetrated an open wound; intestinal botulism occurs from ingesting food contaminated with the bacteria, resulting in bacterial overgrowth in the intestines and toxin production.^{4,5}

All three forms can result in fatigue, weakness, dizziness, and headache. These symptoms may be followed by vomiting, diarrhea, poor vision, drooping of eyelids, dry mouth or throat, difficulty swallowing and speaking, difficulty breathing, and/or paralysis. In infants with intestinal botulism, symptoms may include constipation, loss of appetite, weakness, lethargy, altered cry, and loss of muscle tone and head control.^{4,5}

Treatment for botulism depends on the form of disease. Foodborne botulism is treated with a botulism antitoxin. Preventive measures for foodborne botulism include following safe food preparation and canning processes, refrigerating foods stored in oil, following storage and shelf-life recommendations on food labels, and avoiding consumption of canned or bottled foods that are dented, leaky, have bulging ends, or suspected to be tampered. For wound botulism, preventive measures also include avoidance of illicit injection drug use. In addition, for infant botulism, preventive measures include not feeding honey to infants less than one year of age.^{4,5}

Trends over time

Botulism is a rare disease in Ontario.⁴ In 2015, there was one confirmed case reported in Windsor-Essex County, representing an incidence rate of 0.2 cases per 100,000 population. In the period between 2006 and 2015, there were three confirmed cases reported locally (2009, 2012, and 2015). During this same period there were 30 cases reported in Ontario.

Hospitalization/Deaths

The cases reported between 2011 and 2015 were both hospitalized. There were no deaths reported in the two cases. The case fatality rate of botulism in Canada is less than 5%.⁴

Campylobacter enteritis

Background

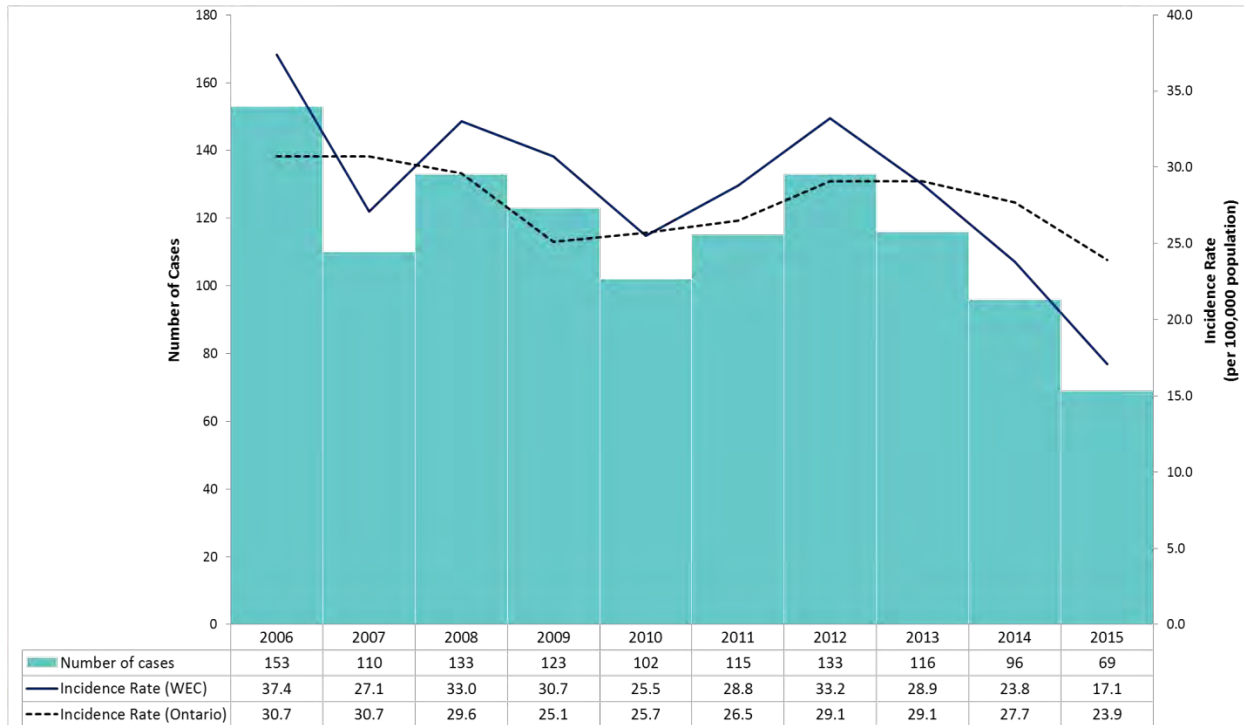
Campylobacter enteritis is a disease caused by the bacteria *Campylobacter*. It is one of the most common causes of food-borne diarrhea in Ontario.⁶ Two of the most frequently reported subspecies of *Campylobacter* reported in Ontario are *Campylobacter jejuni* and *Campylobacter coli*. Infection by *Campylobacter* can occur from ingesting undercooked meats and poultry, and by consuming raw or unpasteurized milk. Contact with infected animals is another source of infection transmission.

In infected individuals, symptoms may include mild to severe diarrhea, bloody diarrhea, stomach cramps, nausea, vomiting, fever, headache, and muscle pain. However, some infected individuals are asymptomatic.⁶ Most individuals with healthy immune systems will recover without treatment.⁶ Preventive measures include practicing safe food handling, following proper hand hygiene, cooking meats thoroughly, avoiding raw or unpasteurized dairy products, and avoiding drinking or swallowing water from lakes, rivers, and pools.⁶

Trends over time

In 2015, there were 69 confirmed cases of *Campylobacter* enteritis in Windsor-Essex County (see Figure 4). From 2006 to 2015, the annual incidence rate in Windsor-Essex County decreased by 54.3% (from 37.4 cases per 100,000 population in 2006 to 17.1 cases per 100,000 population in 2015). This decrease was greater than the observed 6.8% decrease in Ontario during the same period (from 30.7 cases per 100,000 population in 2006 to 23.9 cases per 100,000 population in 2015).

Figure 4. Trends in confirmed *Campylobacter* enteritis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Between 2011 and 2015, the highest rates of *Campylobacter* enteritis were observed in those younger than five years of age and adults over 50 years. Males had higher rates of disease for most age groups except the 40-49 year age group (see Table 3 and Figure 5).

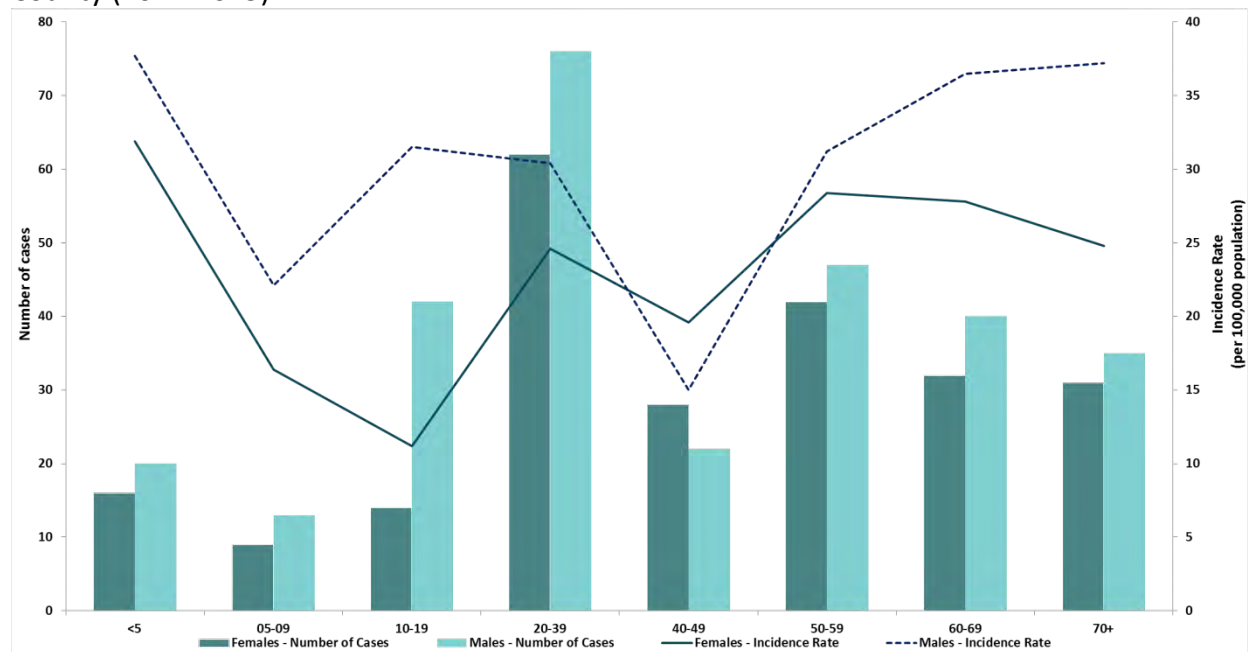
Table 3. Incidence of confirmed *Campylobacter* enteritis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	16	31.9	20	37.7	36	34.9
05-09	9	16.4	13	22.1	22	19.4
10-19	14	11.2	42	31.5	56	21.7
20-39	62	24.6	76	30.4	138	27.4
40-49	28	19.6	22	15.0	50	17.3
50-59	42	28.4	47	31.2	89	29.8
60-69	32	27.8	40	36.5	72	32.1
70+	31	24.8	35	37.2	66	30.2

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 5. Incidence of confirmed *Campylobacter* enteritis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

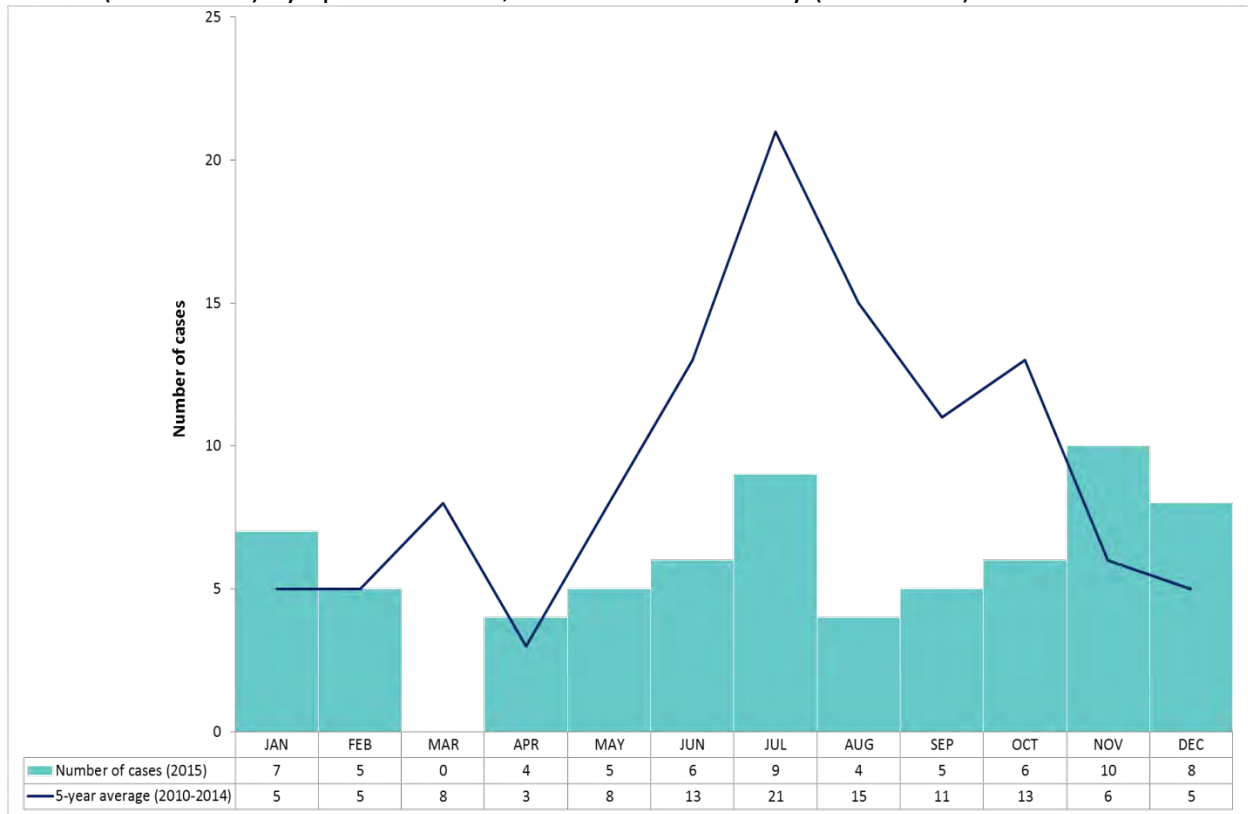
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In 2015, peaks in case counts were observed in July (nine cases) and November (10 cases). In 2015, case counts were below expected values for most months, except the months of

November, December, and January (see Figure 6). Based on the five-year average of case counts from 2010 to 2014, case counts of *Campylobacter* enteritis typically increase during the warmer months, peaking in July (21 cases in July on average).

Figure 6. Confirmed *Campylobacter* enteritis case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

The top risk factors for *Campylobacter* enteritis (other than ‘municipal water system’ and ‘unknown’) that were reported by cases between 2011 and 2015 include: consumption of eggs or food containing eggs (82.4%); consumption of chicken/chicken products (80.0%); consumption of raw fruits (76.3%); consumption of raw vegetables (66.7%); consumption of beef (64.0%); and contact with animals (58.6%). See Table 4.

Table 4. Behavioural risk factors reported by confirmed *Campylobacter* enteritis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'	Percentage of cases that reported 'Yes'
Consumption of eggs or food containing eggs	42	82.4
Consumption of chicken/chicken products	40	80.0
Consumption of raw fruits	29	76.3
Consumption of raw vegetables	26	66.7
Consumption of beef	32	64.0
Contact with animals	252	58.6
Other	131	91.0

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and ≥50% of the respondents stating 'Yes' are included in this table. The 'unknown' and 'municipal water system' risk factors were excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

When asked about medical risk factors, immunocompromisation was reported by 23.9% of confirmed cases between 2011 and 2015 (72/301 cases). 'Other' medical risk factors were reported by 54.2% of cases (96/177 cases).

Hospitalization/Deaths

Hospitalization was reported for eight confirmed *Campylobacter* enteritis cases from 2015 (11.6%, 8/69 cases). Between 2011 and 2014, the proportion of cases hospitalized ranged from 1.7% in 2011 (2/115 cases) to 11.2% in 2013 (13/116 cases). Between 2011 and 2015, there were no deaths reported in confirmed *Campylobacter* enteritis cases.

***Clostridium difficile* infection (CDI) outbreaks in public hospitals**

Background

Clostridium difficile is a bacterium that is found widely in the environment. It occurs naturally in some people and colonizes three to five percent of adults without causing any symptoms.⁷ The bacterium is found in human feces and spread through fecal-oral transmission or contact with contaminated surfaces. Infection can result in mild to severe diarrhea and inflammation of the bowel.

Clostridium difficile infection can be acquired in both hospital and community settings. Infection may occur when antibiotics kill normal bowel bacteria and allow *Clostridium difficile* bacteria to grow and produce toxins, which can damage the bowel and may cause diarrhea.^{7,8} Some preventative measures include practicing proper hand hygiene, carrying out environmental cleaning, and identification and isolation of suspected or known cases.^{8,9}

Trends over time and Deaths

Two outbreaks of *clostridium difficile* infection in local public health hospitals were reported in Windsor-Essex County in 2010 and 2014 (see Table 5). The 2010 outbreak resulted in nine infections in 65 people at risk (13.8% of people at risk). The 2014 outbreak resulted in five infections in 30 people at risk (16.7%). The 2010 outbreak resulted in two deaths (22.2%, 2/9 cases) and the 2014 outbreak resulted in one death (20%, 1/5 cases).

Table 5. Number of cases linked to CDI outbreaks in public hospitals and all-cause mortality, Windsor-Essex County (2009-2015)

Year of CDI Outbreak	Number of outbreaks	Number of cases linked to outbreaks	All-cause mortality (number of cases)	All-cause mortality (% of cases)
2010	1	9	2	22.2
2014	1	5	1	20.0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/11/25.

Age and sex

Cases of CDI associated with the above outbreaks ranged in age from 63 to 94 years. The majority of cases were over 80 years (85.7%, 12/14 cases). There were no differences in trends by sex.

Risk Factors

Antibiotic use was the top risk factor reported by cases asked about the risk factor (100.0%, 9/9 cases). Some 'other' risk factor was reported by five cases (100.0%, 5/5 cases).

Cryptosporidiosis

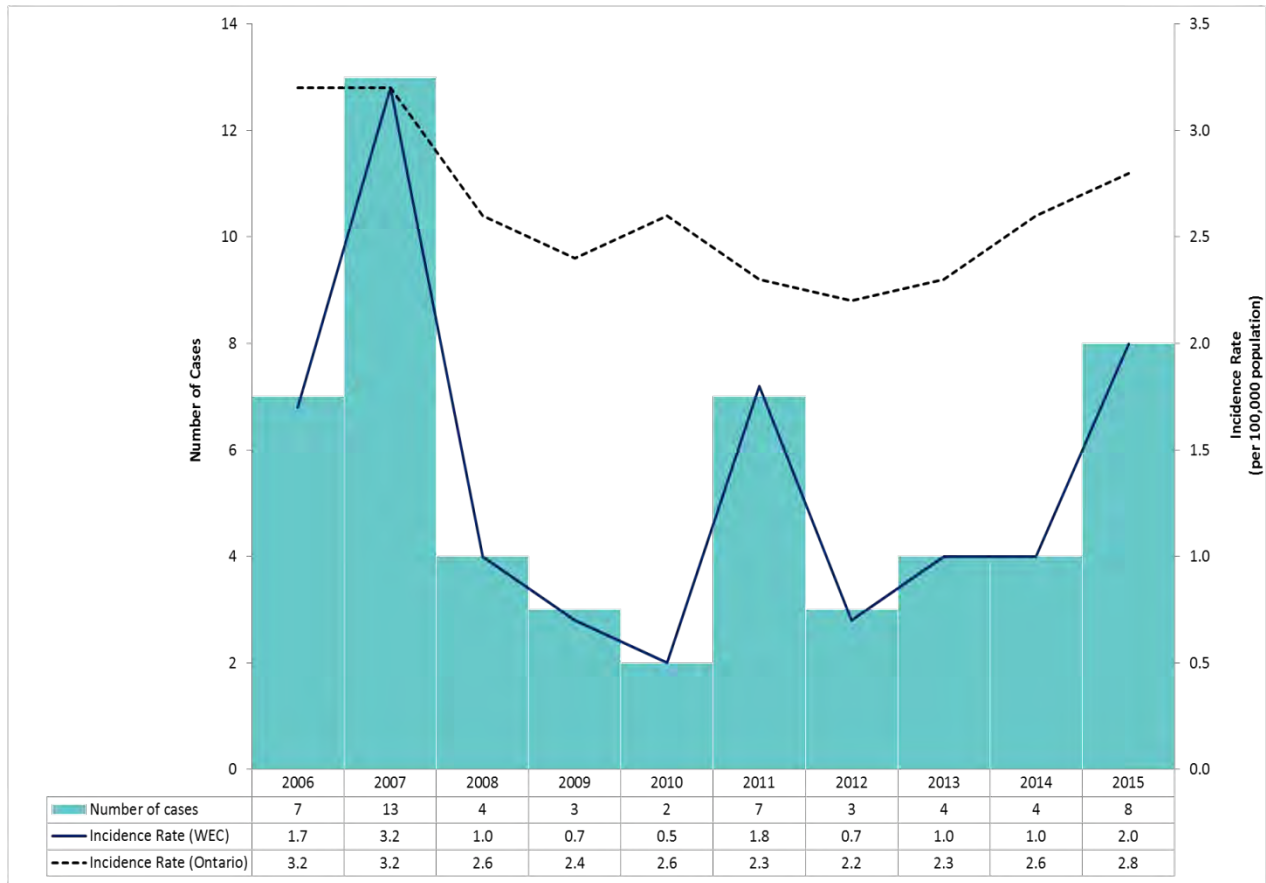
Background

Cryptosporidiosis is an infection caused by the parasite *Cryptosporidium parvum*. The parasite can live in the intestinal tract of animals including humans, and can present as gastroenteritis.¹⁰ It is one of the leading causes of waterborne disease in humans. Past outbreaks have been associated with exposure to recreational water, and lakes, and drinking unfiltered water and contaminated drinks. Symptoms of cryptosporidiosis can include watery diarrhea or loose stool, stomach cramps, nausea, vomiting, low-grade fever, and weight loss. Some infected individuals may not display any symptoms.¹¹ The disease can be life-threatening in those who are immunocompromised.¹⁰ Treatment focuses on resolving the symptoms of the disease, though otherwise healthy individuals can recover from the illness without any treatment. Preventive measures include consuming drinking water from safe sources, practicing proper hand hygiene, following good food safety practices, and avoiding recreational water use until symptoms have resolved.¹¹

Trends over time

In 2015, there were eight confirmed cases of cryptosporidiosis in Windsor-Essex County. This represented an incidence rate of 2.0 cases per 100,000 population. From 2010 to 2015, rates in Windsor-Essex County have increased by 300% (see Figure 7). However, the rates in Windsor-Essex County have remained lower than Ontario since 2008. In 2015, the rate for Windsor-Essex County was 28.6% lower than that of Ontario (2.8 cases per 100,000 population in Ontario).

Figure 7. Trends in confirmed cryptosporidiosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The majority of cryptosporidiosis cases reported between 2011 and 2015 were under 40 years of age (96.1%). Incidence rates were highest in children younger than ten years (4.2 cases per 100,000 population) and decreased with increasing age (see Table 6 and Figure 8). Males accounted for 69.2% of cases, and rates were higher in males than females. In children younger than ten years, males had a rate of 8.1 cases per 100,000 population. There were no female cases in this age group.

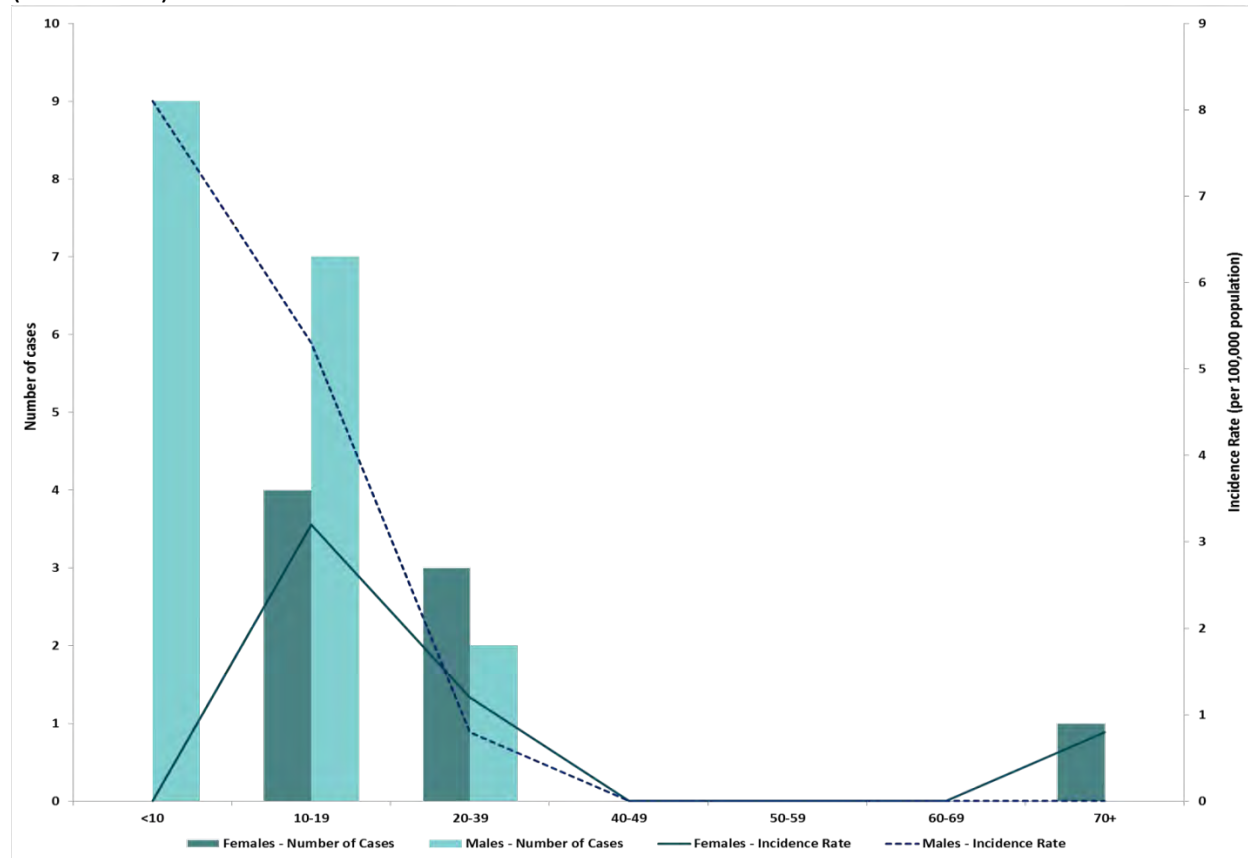
Table 6. Incidence of confirmed *cryptosporidiosis* cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	0	0.0	9	8.1	9	4.2
10-19	4	3.2	7	5.3	11	4.3
20-39	3	1.2	2	0.8	5	1.0
40-49	0	0.0	0	0.0	0	0.0
50-59	0	0.0	0	0.0	0	0.0
60-69	0	0.0	0	0.0	0	0.0
70+	1	0.8	0	0.0	1	0.5

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 8. Incidence of confirmed *cryptosporidiosis* cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Risk Factors

Behavioural Risk Factors

The top risk factors for cryptosporidiosis reported by cases between 2011 and 2015, include contact with animals (64.3%), travel outside of the province in the last 12 days (50.0%), and consumption of raw unwashed fruits/vegetables (50.0%). The risk factor 'other' was reported by 66.7% of cases. See Table 7.

Table 7. Behavioural risk factors reported by confirmed cryptosporidiosis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'	Percentage of cases that reported 'Yes'
Contact with animals	9	64.3
Travel outside of the province in the last 12 days	9	50.0
Consumption of raw unwashed fruits/vegetables	6	50.0
Other	4	66.7

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' are included in this table. The 'unknown' risk factor was excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

More than half of the cases asked about medical risk factors said yes to the some 'other' medical risk factor (62.5%, 5/8 cases).

Hospitalization/Deaths

From 2011 to 2015, hospitalization has been reported in only one case (in 2011). There have been no deaths reported in cases during this period.

Cyclosporiasis

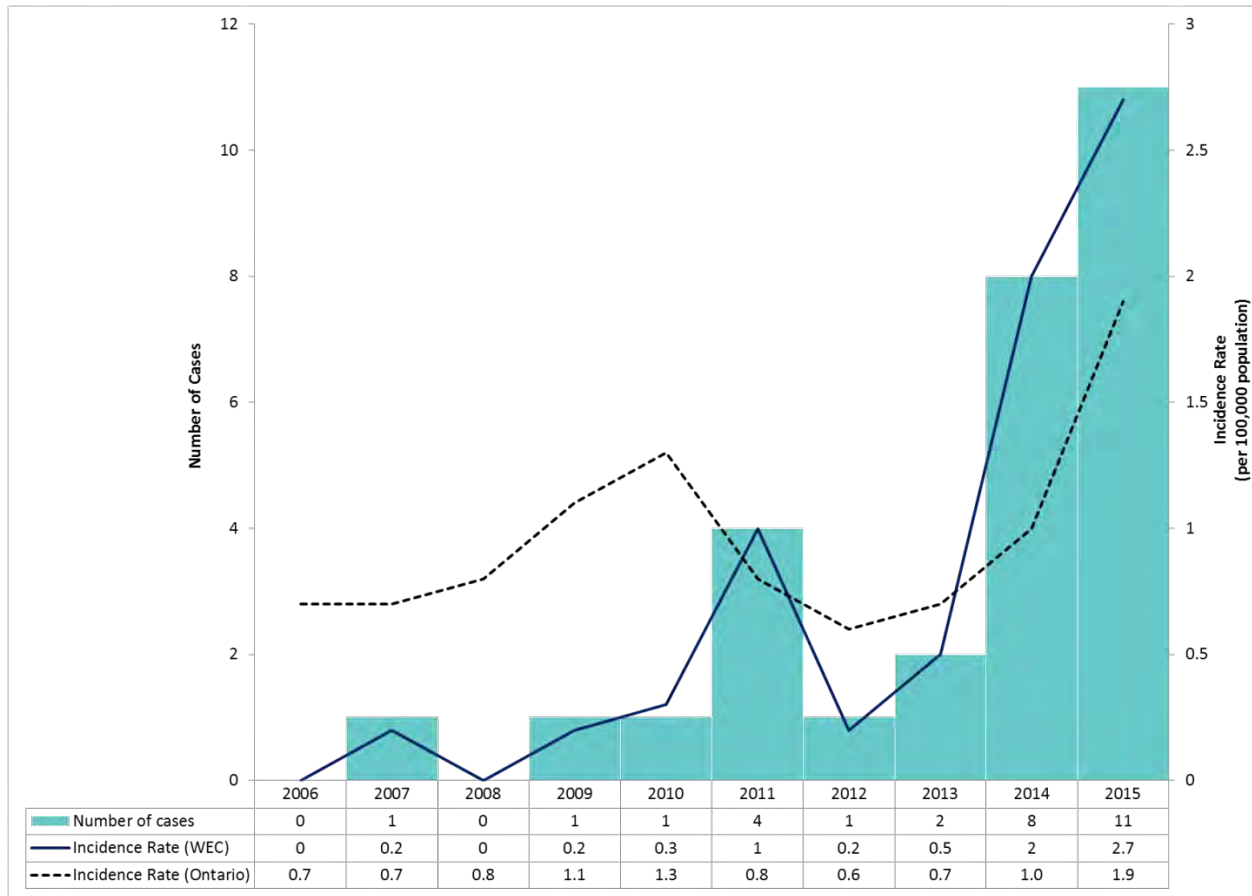
Background

Cyclosporiasis is an infection of the intestine caused by the parasite *Cyclospora cayetanesis*. Symptoms of cyclosporiasis include watery diarrhea, abdominal bloating and gas, fatigue, abdominal cramps, loss of appetite, weight loss, mild fever, and/or nausea. Symptoms may appear one to two weeks after consuming contaminated food or water, and may last a few days to a few months. Cyclosporiasis infection is acquired from consuming food or water that is contaminated with fecal matter, or swimming in contaminated water. Previous outbreaks of cyclosporiasis have been associated with fresh berries, snow and sugar snap peas, herbs and lettuce from countries where *Cyclospora* is endemic.¹² Direct person-to-person transmission of the infection is unlikely as the parasite can only infect others once it leaves the body through feces. It also requires about one to two weeks outside of the body to be able to spread.^{12,13} Prevention measures are similar to those of other enteric diseases (e.g. practicing good hand hygiene, thorough washing of food, drinking water from safe sources).¹⁴

Trends over time

Cyclospora parasite is not endemic in Ontario. All cases reported in Ontario are related to travel to tropical or subtropical regions or associated with foods imported from these regions.¹³ The incidence of cyclosporiasis in Windsor-Essex County has increased considerably from 2006 to 2015. In 2006, there were no confirmed cases. In 2015, there were 11 confirmed cases, representing an incidence rate of 2.7 cases per 100,000 population. This was 42% greater than the rate for Ontario (1.9 cases per 100,000 population). Rates in Windsor-Essex County have been greater than the rates in Ontario since 2014 (see Figure 9).

Figure 9. Trends in confirmed cyclosporiasis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The highest rates of cyclosporiasis were observed in adults 20 to 39 years (2.4 cases per 100,000 population) and 50 to 59 years of age (2.7 cases per 100,000 population). There were no clear trends by sex (see Table 8 and Figure 10).

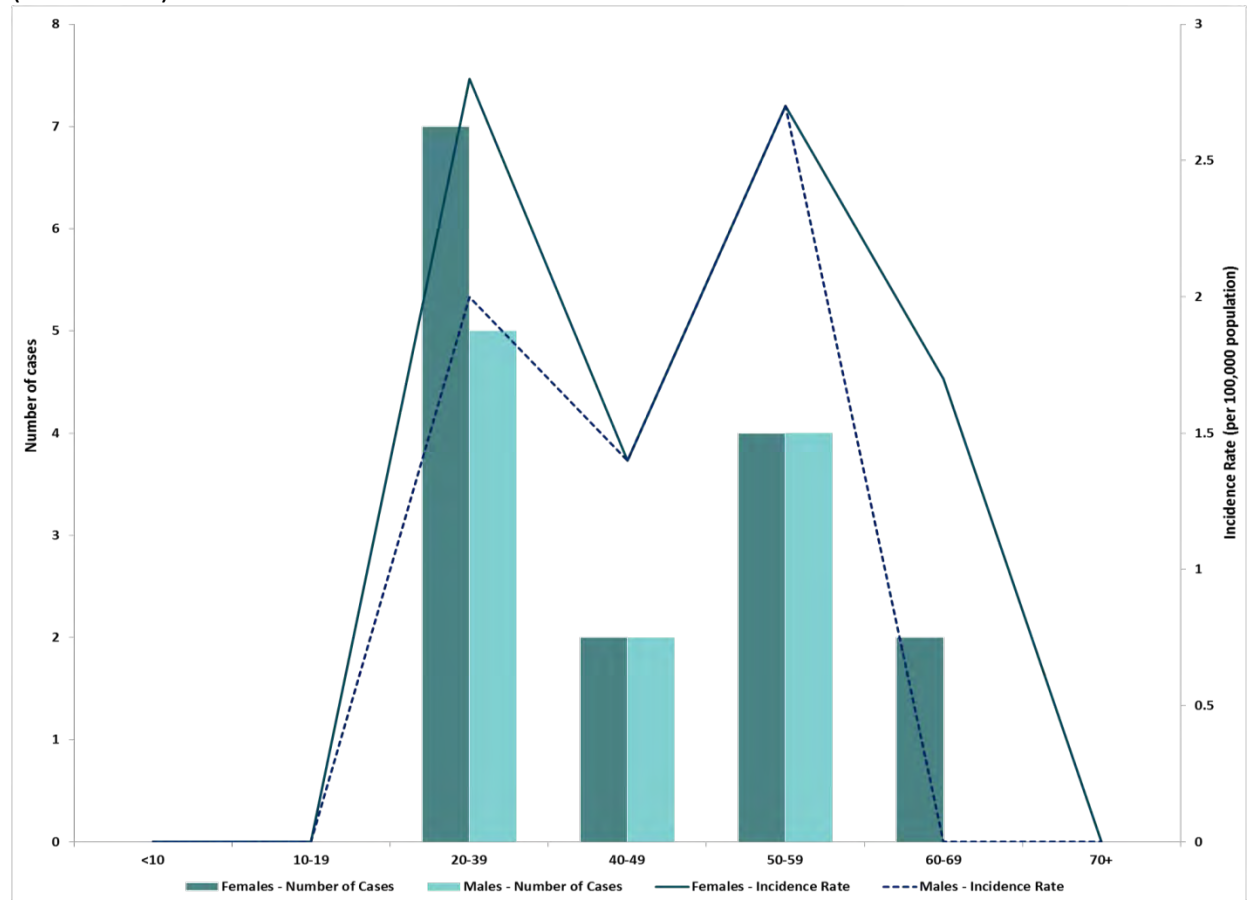
Table 8. Incidence of confirmed cyclosporiasis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	0	0.0	0	0.0	0	0.0
20-39	7	2.8	5	2.0	12	2.4
40-49	2	1.4	2	1.4	4	1.4
50-59	4	2.7	4	2.7	8	2.7
60-69	2	1.7	0	0.0	2	0.9
70+	0	0.0	0	0.0	0	0.0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 10. Incidence of confirmed cyclosporiasis cases by age and sex, Windsor-Essex County (2011-2015)



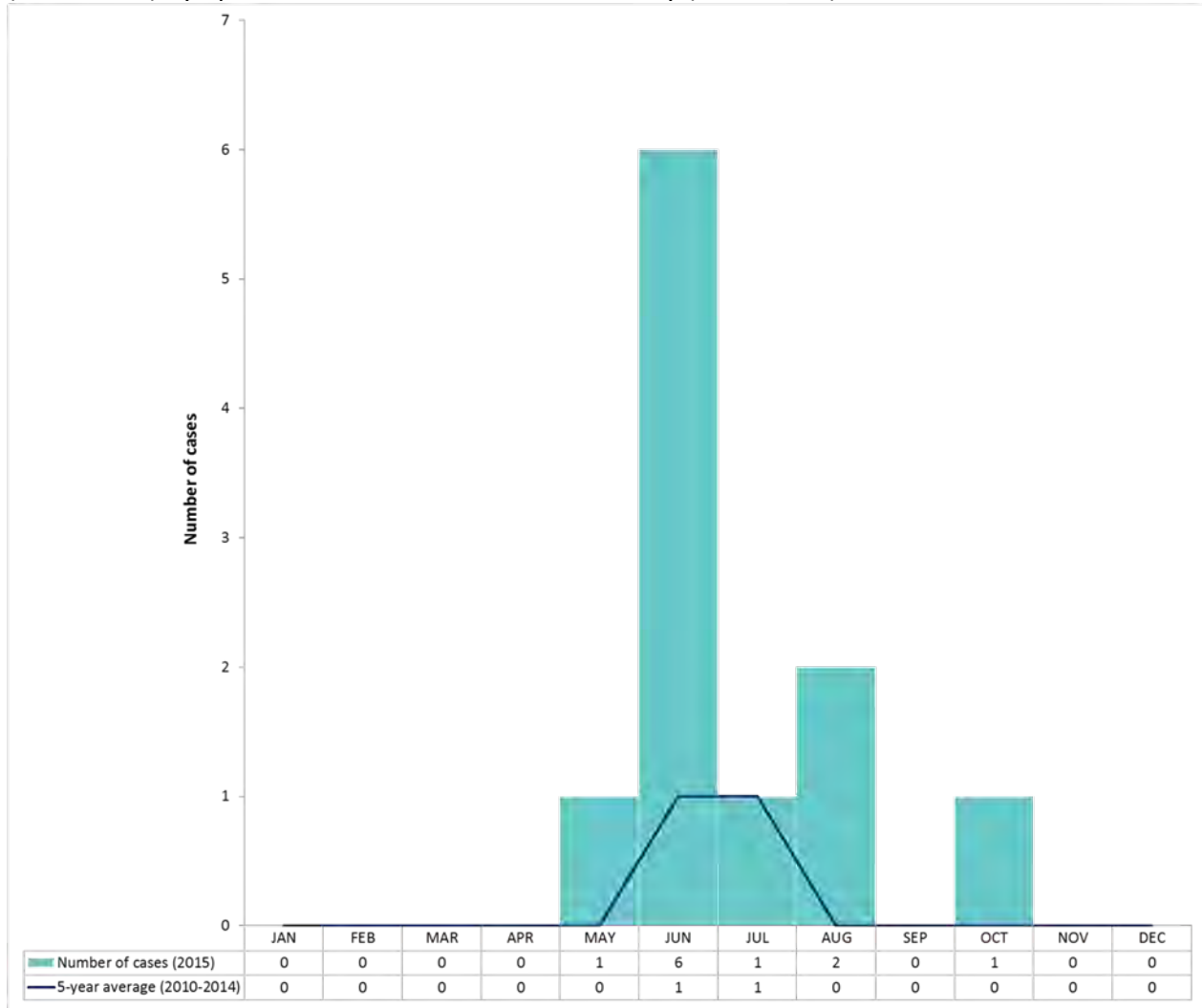
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Case counts of cyclosporiasis showed a seasonal pattern. Most cases occurred in the warmer months (see Figure 11). Cases between May and August accounted for 90.9% of cases for all of 2015 (10/11 cases). Case counts peaked in June (six cases) and were higher than expected values for the month based on the average of case counts from 2010 to 2014 (average of one case in June).

Figure 11. Confirmed cyclosporiasis case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Outbreaks

In 2015, there were two provincial outbreaks of cyclosporiasis with cases from Windsor-Essex County. From 2011 to 2015, there were four provincial outbreaks of cyclosporiasis with cases in Windsor-Essex County. There were no localized outbreaks of cyclosporiasis during this period.

Risk Factors

Behavioural Risk Factors

The top risk factors for cyclosporiasis reported by cases from 2011 to 2015 include: consumption of raw fruits (87.5%); consumption of spinach (77.8%); consumption of raw vegetables (62.5%); travel outside of the province in the 2 to 14 days prior to illness (60.0%); consumption of strawberries (55.6%); and consumption of romaine lettuce (55.6%). The 'other' risk factor was reported by 75.0% of cases. See Table 9.

Table 9. Behavioural risk factors reported by confirmed cyclosporiasis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'	Percentage of cases that reported 'Yes'
Consumption of raw fruits	7	87.5
Consumption of spinach	7	77.8
Consumption of raw vegetables	5	62.5
Travel outside province in the 2-14 days prior to illness	6	60.0
Consumption of strawberries	5	55.6
Consumption of romaine lettuce	5	55.6
Other	6	75.0

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

Eight out of 16 cases of cyclosporiasis from 2011 to 2015 reported some 'other' medical risk factor (50.0%, 8/16 cases).

Hospitalization/Deaths

There were no hospitalizations or deaths reported in cyclosporiasis cases from 2011 to 2015.

Giardiasis

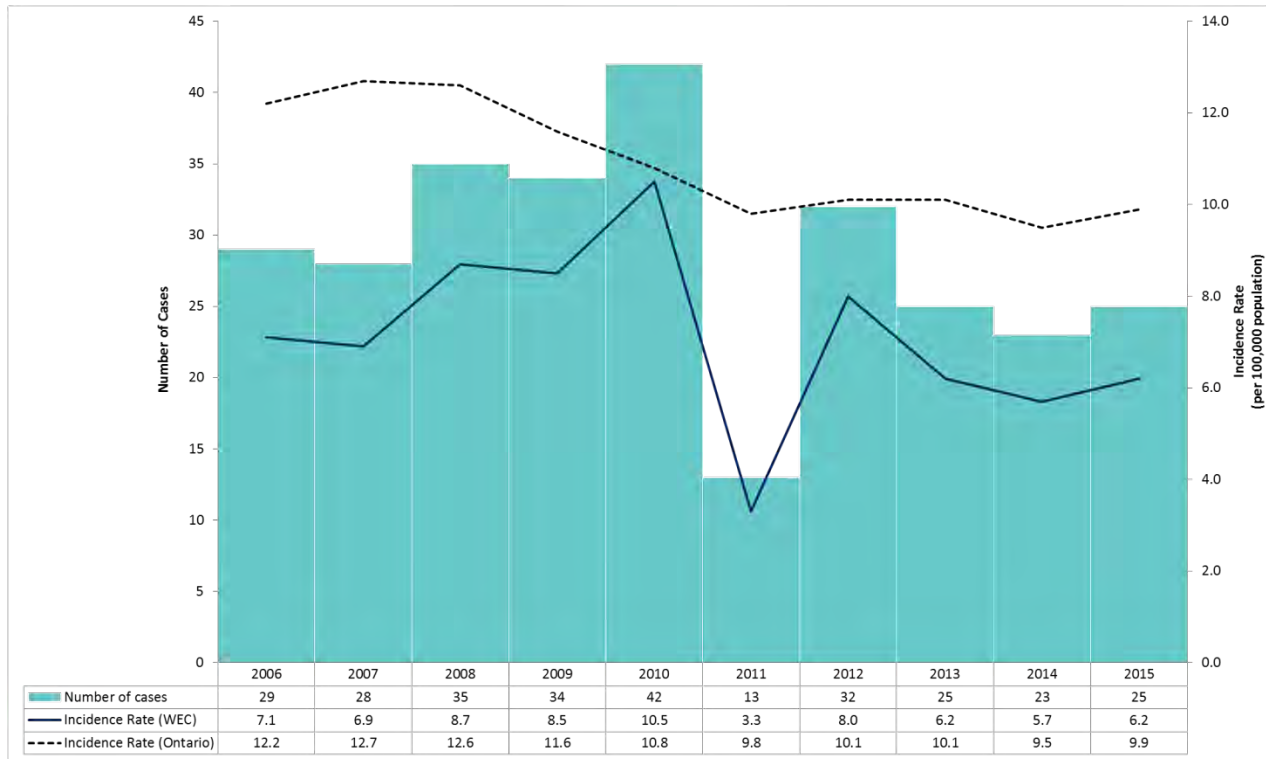
Background

Giardiasis is a diarrheal disease caused by the parasite *Giardia lamblia* (also known as *G. intestinalis*, *G. duodenalis*). Giardia infection may cause a variety of intestinal symptoms, including diarrhea, bloating, abdominal cramps, frequent loose and pale greasy stools, fatigue and weight loss. Symptoms usually appear 7 to 10 days after infection and may last two to six weeks. Infection can occur from consumption of contaminated drinking or recreational water, consumption of raw or undercooked food that is contaminated, hand-to-mouth transfer of the parasite from the feces of an infected individual, and exposure to feces through sexual contact. Treatment may include rehydration and anti-parasitic medication if indicated. Prevention measures include practicing good hand hygiene, avoiding drinking water from shallow wells, rivers, lakes, or streams, and avoiding swallowing water while swimming in rivers, lakes, or pools.^{15,16}

Trends over time

In 2015, there were 25 confirmed cases of giardiasis in Windsor-Essex County, representing an incidence rate of 6.2 cases per 100,000 population. With the exception of 2011, the annual incidence rate in Windsor-Essex County has been relatively stable from 2006 to 2015. During this period, incidence rates in Windsor-Essex County have been lower than the rates in Ontario (see Figure 12). The rate in Windsor-Essex County for 2015 was 37.4% lower than the rate for Ontario (9.9 cases per 100,000 population).

Figure 12. Trends in confirmed giardiasis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The highest rates of giardiasis were observed in males 20-29 years (9.2 cases per 100,000 population). Rates showed a decrease after 69 years. Males accounted for 61.5% of all cases between 2011 and 2015 (see Table 10 and Figure 13).

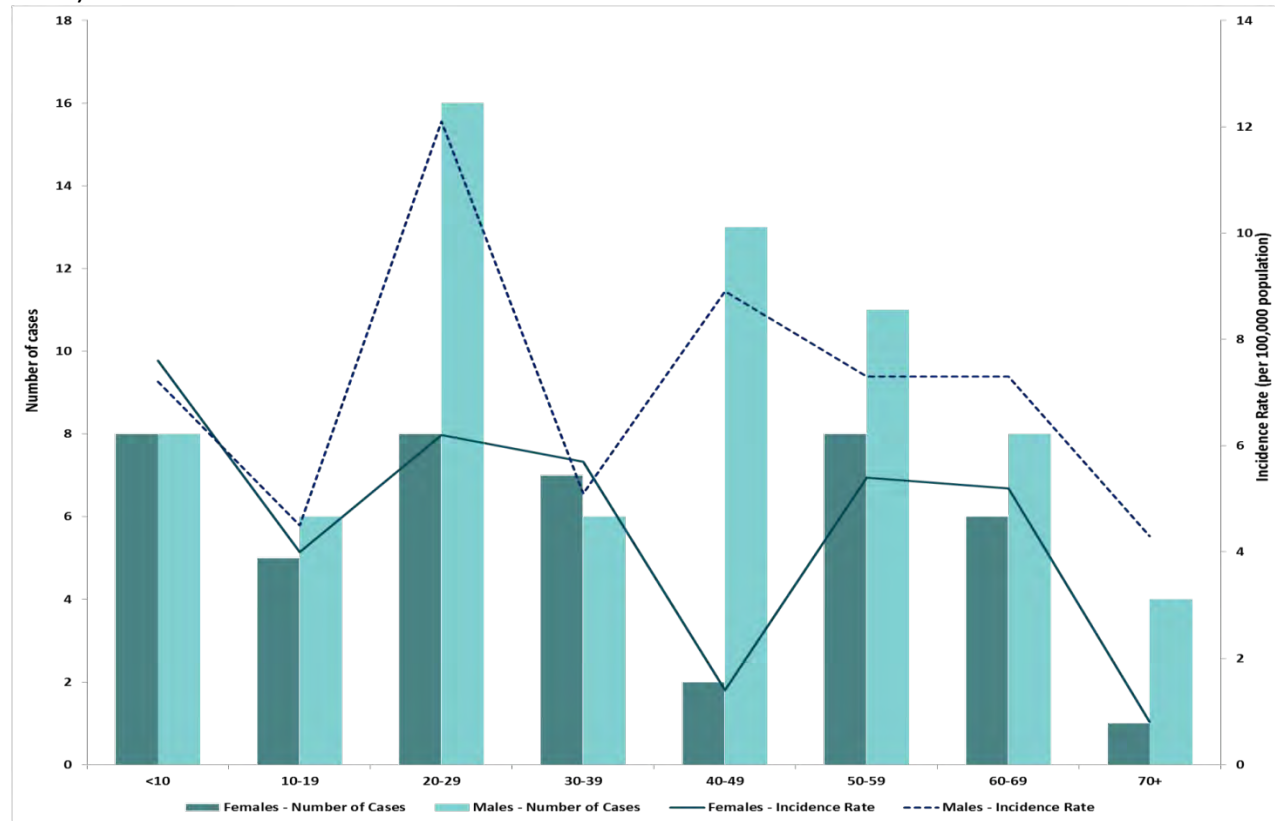
Table 10. Incidence of confirmed giardiasis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	8	7.6	8	7.2	16	7.4
10-19	5	4.0	6	4.5	11	4.3
20-29	8	6.2	16	12.1	24	9.2
30-39	7	5.7	6	5.1	13	5.4
40-49	2	1.4	13	8.9	15	5.2
50-59	8	5.4	11	7.3	19	6.4
60-69	6	5.2	8	7.3	14	6.2
70+	1	0.8	4	4.3	5	2.3

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 13. Incidence of confirmed giardiasis cases by age and sex, Windsor-Essex County (2011-2015)



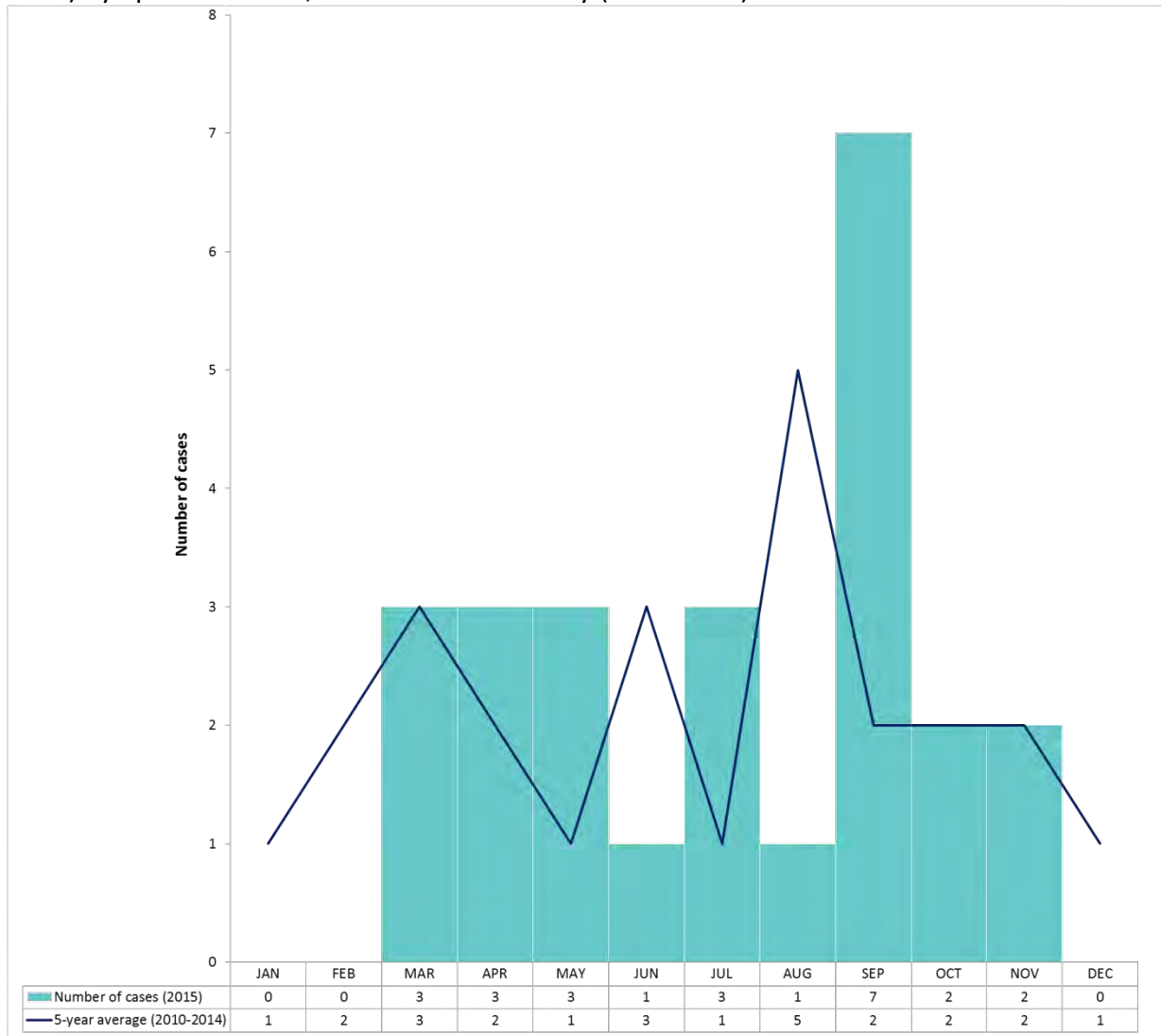
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In 2015, cases had episode dates between March and November. A peak in case counts above expected levels is typically expected in August (five cases on average). However, in 2015 the peak was observed in September. Seven cases had episode dates during this month, when only two cases were expected (see Figure 14).

Figure 14. Confirmed giardiasis case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

Besides the 'unknown' and 'municipal water system' risk factors, the top risk factors reported by giardiasis cases between 2011 and 2015 include consumption of raw fruits (83.3%),

consumption of raw vegetables (83.3%), and contact with animals (58.4%). The ‘other’ risk factor was reported by 94.4% of cases (17/18 cases).

Table 11. Behavioural risk factors reported by confirmed giardiasis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported ‘Yes’	Percentage of cases that reported ‘Yes’
Consumption of raw fruits	5	83.3
Consumption of raw vegetables	5	83.3
Contact with animals	52	58.4
Other	17	94.4

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and ≥50% of the respondents stating ‘Yes’ are included in this table. The unknown ‘and’ municipal water system risk factors were excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

Thirty-eight cases of giardiasis between 2011 and 2015 reported some ‘other’ medical risk factor (55.1%, 38/69 cases).

Hospitalization/Deaths

In 2015, there was one hospitalization in a giardiasis case. Between 2011 and 2015, the proportion of cases hospitalized has ranged from no cases in 2011 to 12.0% of cases in 2013 (3/25 cases). No deaths have been reported in giardiasis cases from 2011 to 2015.

Hepatitis A

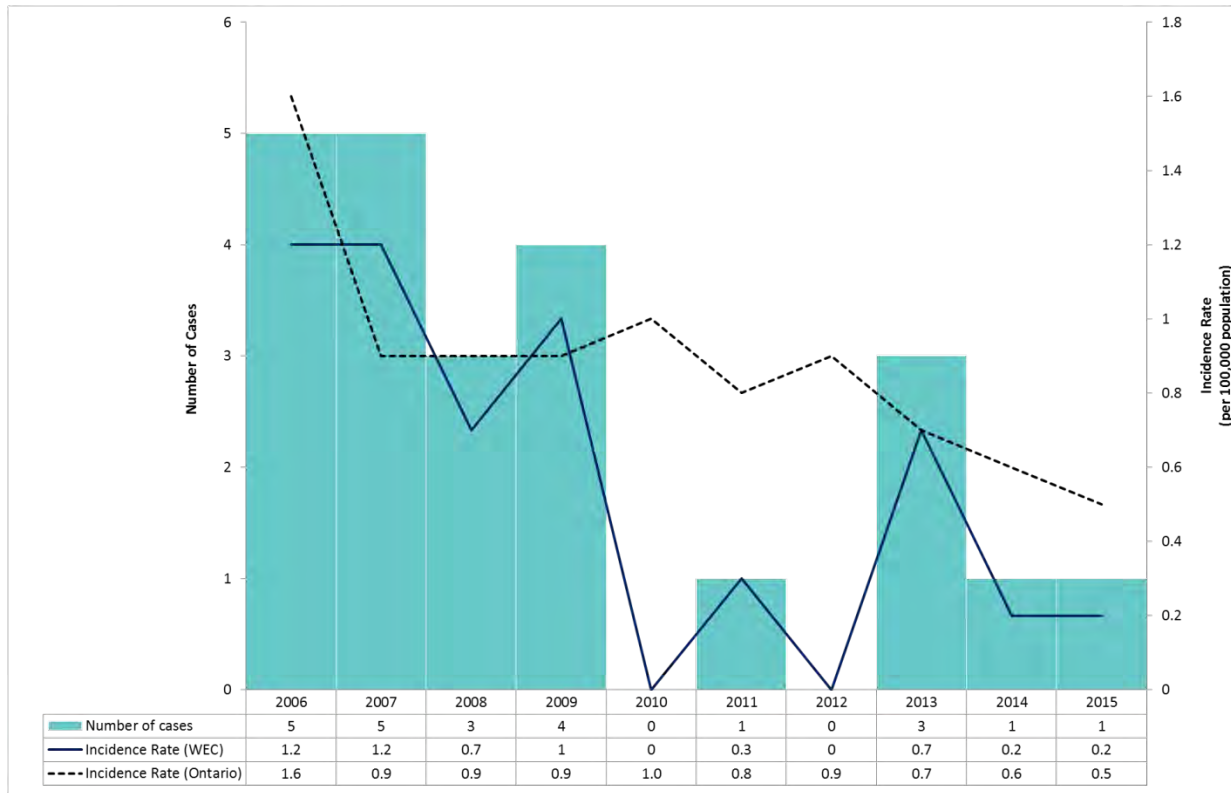
Background

Hepatitis A is an infection of the liver caused by the Hepatitis A virus. The infection is transferred from person-to-person through the fecal-oral route, with most infections resulting from the consumption of food or water contaminated by the feces of infected persons. Symptoms usually appear a month after exposure to the virus, and may include fever, nausea, discomfort, loss of appetite, and abdominal discomfort followed by jaundice. The risk of Hepatitis A infection is high in travelers to endemic areas, men who have sex with men, those engaging in sexual contact with ill individuals, injection drug users, and children in day care settings. Currently, there is no medication to treat the infection. Rest and avoidance of alcohol is indicated for those who are ill. Hepatitis A vaccination is recommended for travelers to endemic areas and those who live with high risk persons. In Ontario, the vaccine is publicly funded for those who may be at high risk of acquiring the disease, and a single dose is also available to those who may have been exposed to the virus. Proper personal and hand washing hygiene is a key measure in prevention of Hepatitis A transmission.¹⁷⁻¹⁹

Trends over time

In 2015, there was one case of Hepatitis A in Windsor-Essex County. The incidence rate of Hepatitis A in Windsor-Essex County has decreased considerably from 1.2 cases per 100,000 population in 2006 to 0.2 cases per 100,000 population in 2015 (see Figure 15). A similar decrease also occurred in Ontario. The 2015 incidence rate in Windsor-Essex County was slightly lower than the rate for Ontario (0.5 cases per 100,000 population).

Figure 15. Trends in confirmed Hepatitis A cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

From 2011 to 2015, confirmed cases ranged in age from 11 to 38 years. Males accounted for 66.7% of the confirmed cases reported during this period (4/6 cases).

Risk Factors

Behavioural Risk Factors

Of those risk factors asked of five or more cases, travel outside of the province in the 50 days prior to illness was the only risk factor reported by more than 50.0% of those asked (100.0%, 6/6 cases).

Medical Risk Factors

In regards to medical risk factors, all five cases who were asked about their immunization status reported being unimmunized for Hepatitis A (100.0%, 5/5 cases).

Hospitalization/Deaths

From 2011 to 2015, there were no hospitalizations or deaths reported in confirmed Hepatitis A cases from Windsor-Essex County.

Listeriosis

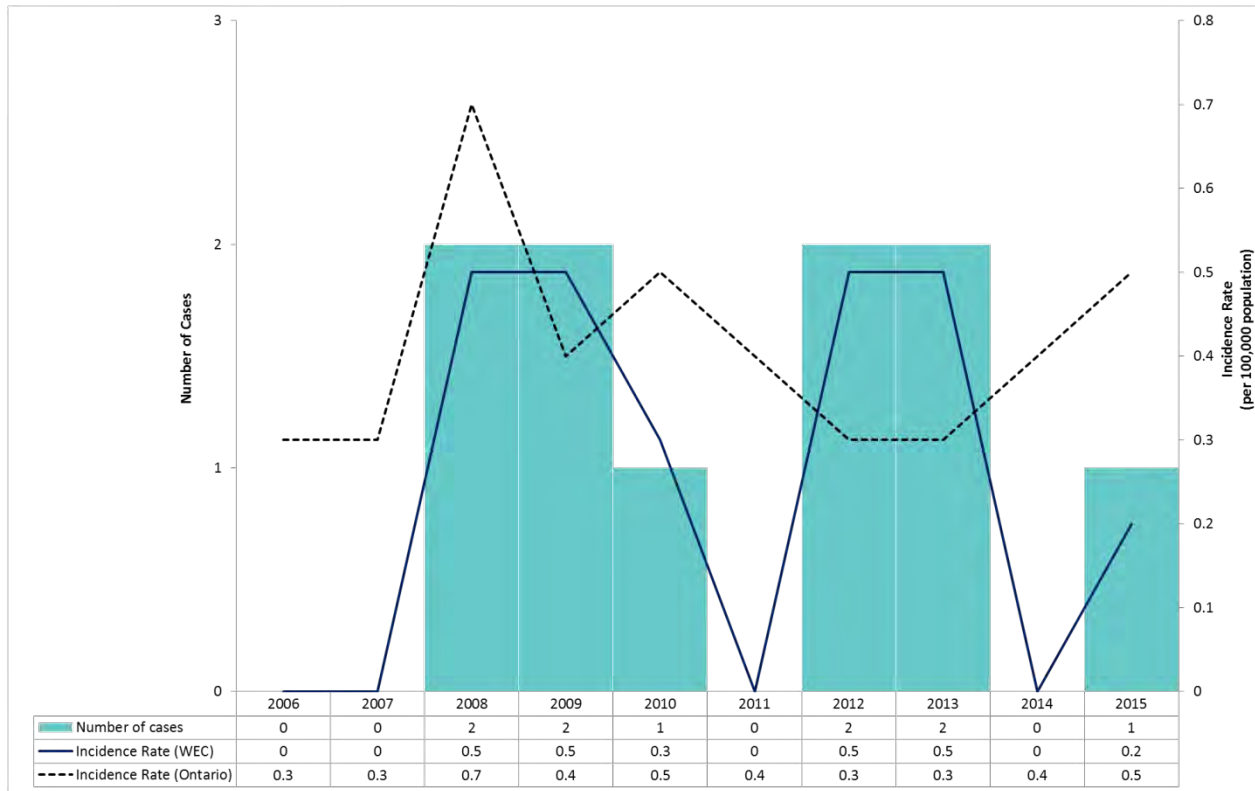
Background

Listeriosis is a serious and rare illness caused by the bacterium *Listeria monocytogenes*, a bacterium that is commonly found in the environment. The primary mode of transmission of the infection is through the consumption of foods contaminated with the bacteria. *Listeria* can be found in unpasteurized dairy products, soft cheese, raw vegetables, uncooked meat, hot dogs, cold cuts or deli meats. Transmission can also occur from mother to newborn during pregnancy or birth. Symptoms can occur from 3 to 75 days after infection, and include muscle aches, fever, diarrhea, nausea and vomiting. Some infected individuals do not display symptoms. In those who are at high-risk of infection (e.g. newborns, pregnant women, elderly, and the immunocompromised) complications such as brain infection or death may arise. In pregnant women infection can lead to premature delivery, fetal infection, stillbirth or spontaneous abortion. Prevention measures include avoiding high-risk foods, following proper food safety procedures (e.g. thorough washing of produce, cooking food to the right temperatures, avoiding cross-contamination between raw and ready-to-eat food during preparation and storage, proper sanitization of food preparation surfaces and following proper hand hygiene etiquette).²⁰⁻²²

Trends over time

In 2015, there was one case of listeriosis in Windsor-Essex County. In the period between 2006 and 2015, the number of cases has ranged from zero to two cases a year. The rate for Ontario has remained relatively steady over the same period. In 2015, there were 0.5 cases per 100,000 population in Ontario, compared to 0.2 cases per 100,000 population in Windsor-Essex County (see Figure 16).

Figure 16. Trends in confirmed listeriosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

All confirmed listeriosis cases from 2011 to 2015, were over 30 years of age at the time of illness. The oldest case was 77 years of age. There was no difference in the incidence by sex.

Hospitalization/Deaths

In 2015, the only case reported was hospitalized and died due to illness. This was the only death reported in a case between 2011 and 2015. Prior to 2015, there were two hospitalizations reported in cases between 2011 and 2015 (40%, 2/5 cases).

Salmonellosis

Background

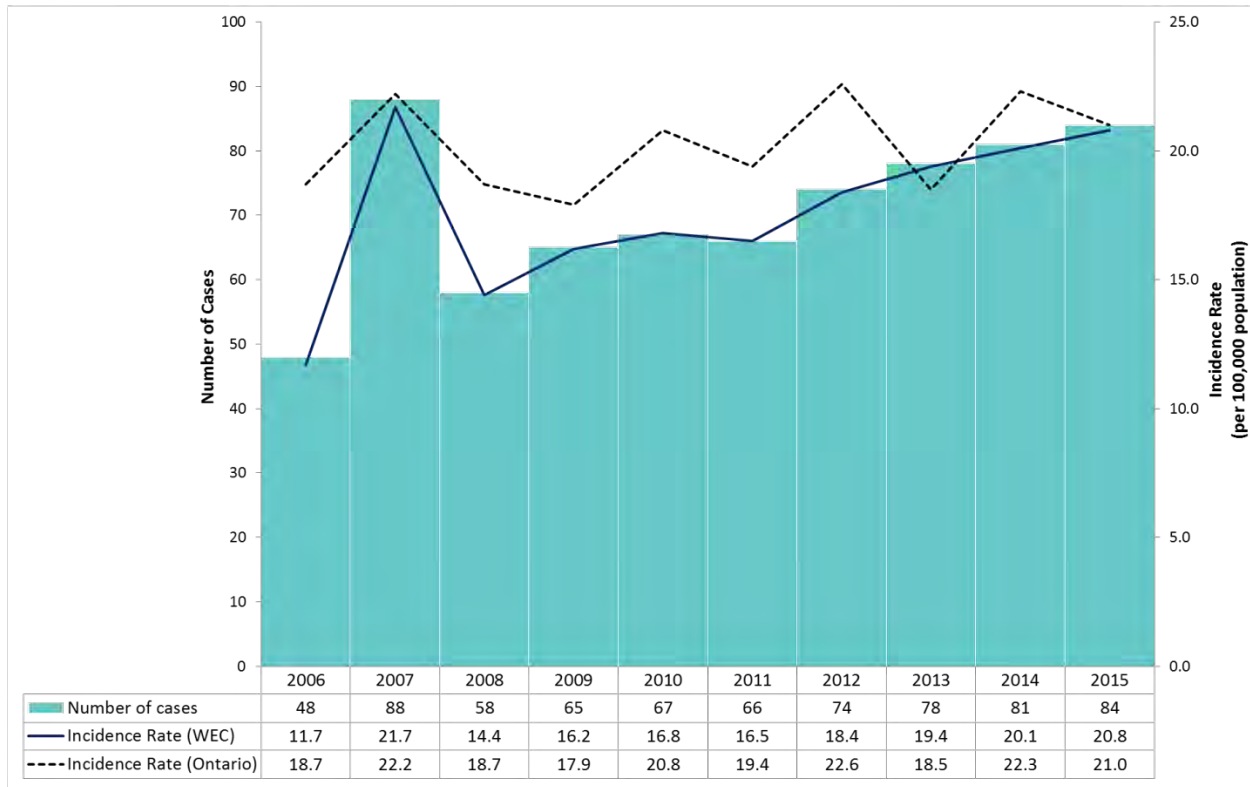
Salmonellosis is the leading foodborne illness in Windsor-Essex County (based on 2015 case counts). Salmonellosis is a foodborne infection caused by non-typhoidal *Salmonella* bacteria. Salmonellosis infections can result in fever, abdominal cramps, watery or bloody diarrhea, and vomiting. Symptoms can occur from 6 to 72 hours after infection. Hospitalization can result in cases with more severe illness (typically young children, elderly, and those with weakened immune systems). Deaths are uncommon.²³

General prevention measures include not consuming raw/undercooked eggs, meat, or poultry, and unpasteurized milk, avoidance of cross-contamination, and thorough hand-washing before and after food preparation.²⁴ Salmonellosis usually resolves within five to seven days, and treatment generally includes oral rehydration and electrolyte replacement for non-severe gastroenteritis. Severe cases may require intravenous rehydration and antibiotics may be indicated for patients at high risk (i.e. infants, elderly, those who are immunocompromised).^{23,25}

Trends over time

In 2015, there were 84 confirmed cases of salmonellosis in Windsor-Essex County. From 2006 to 2015, the incidence rate of salmonellosis in Windsor-Essex County increased by 77.8% (from 11.7 cases per 100,000 population in 2006 to 20.8 cases per 100,000 population in 2015; see Figure 17). This was significantly greater than the observed 12.3% increase in Ontario during the same period (from 18.7 cases per 100,000 population in 2006 to 21.0 cases per 100,000 population in 2015). In 2015, however, the incidence rate for Windsor-Essex County was comparable to Ontario (20.8 cases per 100,000 population in Windsor-Essex County compared to 21.0 cases per 100,000 population in Ontario).

Figure 17. Trends in confirmed salmonellosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Between 2011 and 2015, the highest rates of salmonellosis were observed in those younger than five years of age (see Table 12 and Figure 18). The overall incidence rate for those younger than five years was 49.4 cases per 100,000 population. Rates after five years remained relatively steady. There were no differences in rates by gender.

Table 12. Incidence of confirmed salmonellosis cases by age and sex, Windsor-Essex County (2011-2015)

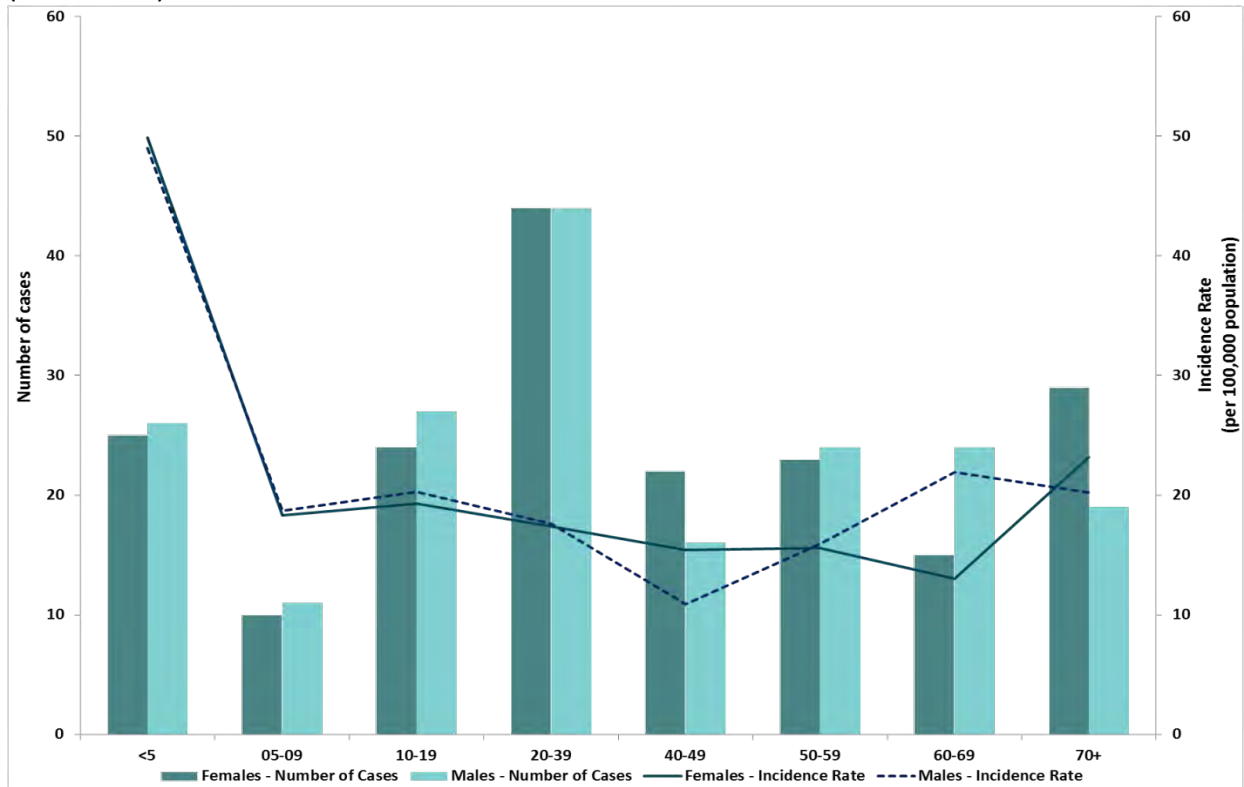
Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	25	49.9	26	49.0	51	49.4
05-09	10	18.3	11	18.7	21	18.5
10-19	24	19.3	27	20.3	51	19.8
20-39	44	17.4	44	17.6	88	17.5
40-49	22	15.4	16	10.9	38	13.1
50-59	23	15.6	24	15.9	47	15.7
60-69	15	13.0	24	21.9	39	17.4
70+	29	23.2	19	20.2	48	21.9

Note: The overall case count includes those of unknown sex.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 18. Incidence of confirmed salmonellosis cases by age and sex, Windsor-Essex County (2011-2015)



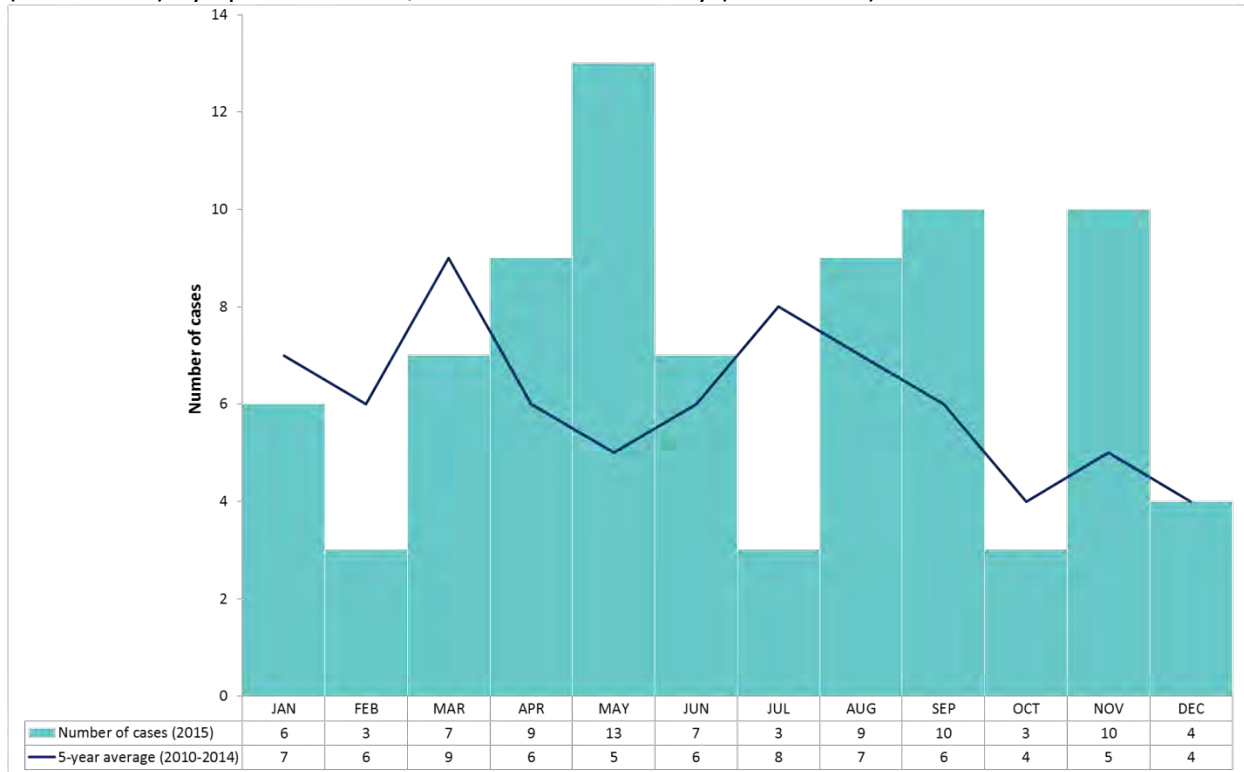
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Case counts of salmonellosis show a seasonal pattern, with peaks typically occurring in March, and July (based on the average of case counts from 2010 to 2014). In 2015, however, peaks were observed later than expected (in May and September; see Figure 19).

Figure 19. Confirmed salmonellosis case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Serotypes

The three most common serotypes identified in cases from Windsor-Essex County between 2011 and 2015 were: *S. Enteritidis* (33.7%), *S. Typhimurium* (14.1%), and *S. Heidelberg* (11.5%) (see Table 13). This is consistent with the most common serotypes reported in Ontario in previous years.²⁶ Other serotypes were reported by 39.2% of cases. Serotype was unspecified in 1.6% of cases.

Table 13. Confirmed salmonellosis cases by serotype, Windsor-Essex County (2006-2015)

Serotypes	Number of cases	Percentage of cases (%)
S. Enteritidis	129	33.7%
S. Typhimurium	54	14.1%
S. Heidelberg	44	11.5%
Unspecified Serotypes	6	1.6%
Other Serotypes	150	39.2%

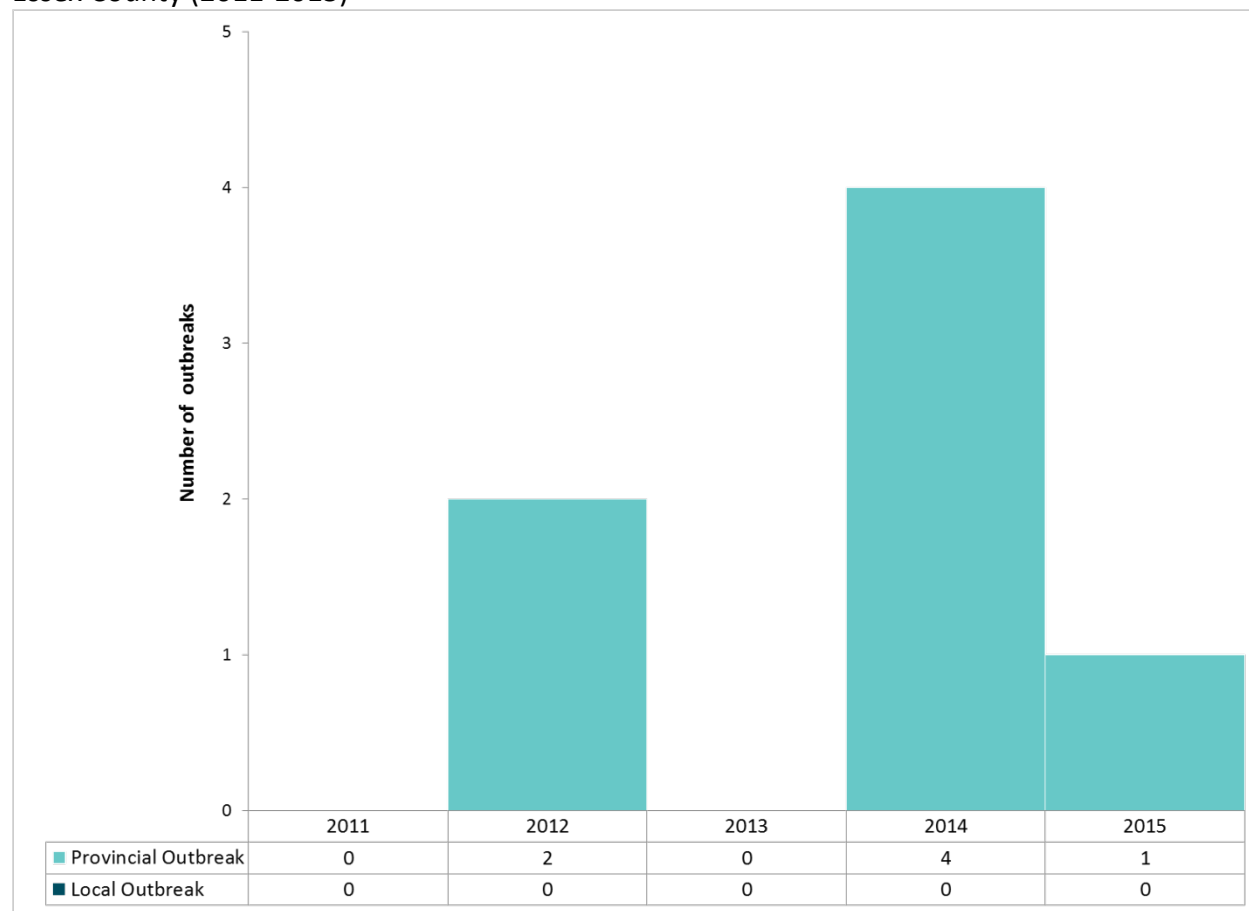
Note: Due to rounding, the sum of the percentages is equal to 100.1%.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Outbreaks

In 2015, there was one new outbreak of salmonellosis in Ontario with confirmed cases from Windsor-Essex County (see Figure 20). From 2011 to 2015, there were seven provincial outbreaks of salmonellosis with cases from Windsor-Essex County. There were no localized outbreaks of salmonellosis in Windsor-Essex County between 2011 and 2015.

Figure 20. Number of local and provincial salmonellosis outbreaks with cases from Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

The top risk factors reported by salmonellosis cases between 2011 and 2015 include consumption of raw fruits (80.0%), consumption of chicken/chicken products (67.6%), consumption of eggs or food containing eggs (53.3%), and contact with animals (51.2%). The 'other' risk factor was reported by 92.3% of cases (see Table 14).

Table 14. Behavioural risk factors reported by confirmed salmonellosis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Consumption of raw fruits	32	80.0
Consumption of chicken/chicken products	48	67.6
Consumption of eggs or food containing eggs	40	53.3
Contact with animals	150	51.2
Other	72	92.3

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' are included in this table. The 'unknown' risk factor was excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

Immunocompromisation was reported by 20.8% of cases (16/77 cases). Some 'other' medical risk factor was reported by 54.0% of cases (101/187 cases).

Hospitalization/Deaths

The proportion of cases hospitalized has increased from 8.1% (6/74 cases) in 2013 to 17.9% (15/84 cases) in 2015. Between 2011 and 2015, there were two deaths reported in cases (in 2014 and 2015), representing a case-fatality rate of 0.5% (2/383 cases).

Shigellosis

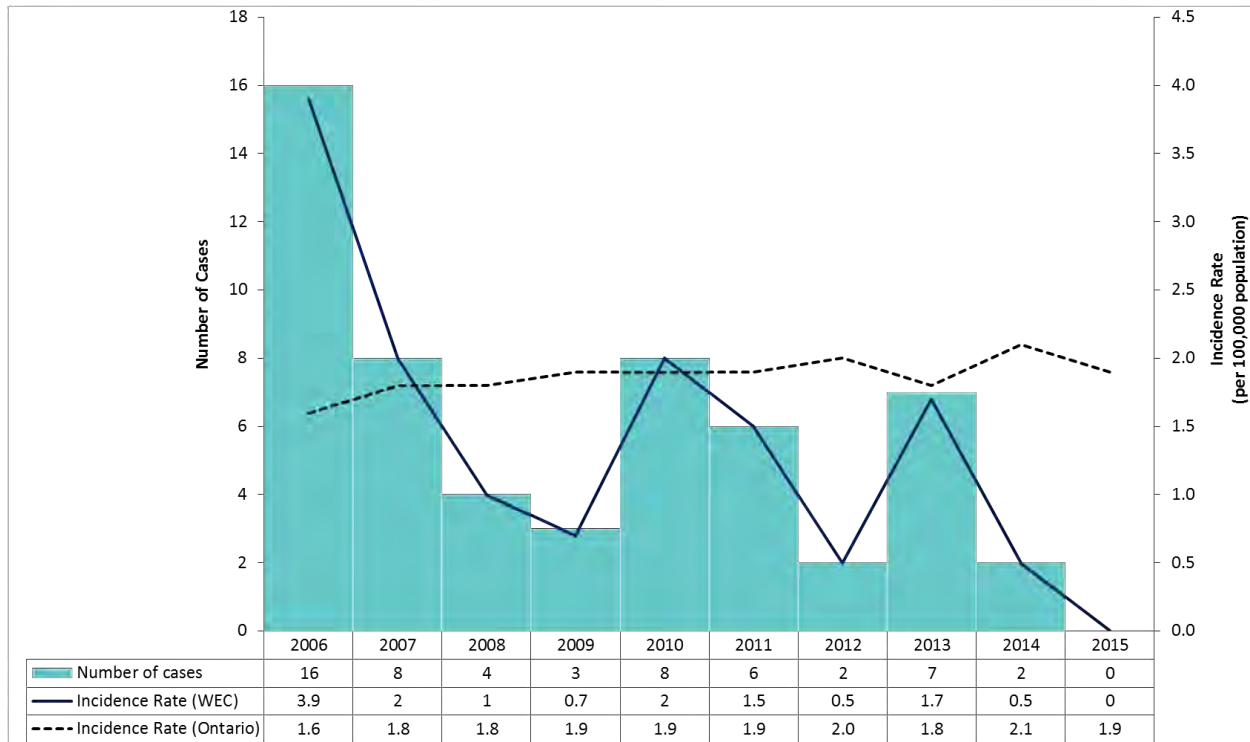
Background

Shigellosis is a bacterial disease caused by the bacteria *Shigella*. In mild cases, symptoms of shigellosis include watery/loose stools, fever, nausea, and vomiting. In more severe cases, infection can result in toxemia, abdominal cramps, and tenesmus with mucoid stools. The illness lasts about a week and resolves on its own. Severity of the illness varies with the age of the case and the species of *Shigella*. The primary mode of transmission is from fecal-oral contact through contact with contaminated objects, consumption of contaminated food or water, or through sexual contact. Treatment may involve rehydration and severe cases may require antibiotics. Proper hand hygiene, safe food handling, and avoiding anal-oral contact with sexual partners are some important measures in the prevention of shigellosis.^{27,28}

Trends over time

In Windsor-Essex County, rates of shigellosis have decreased steadily from 2006 to 2015. In 2015, there were no cases of shigellosis in the region. Rates of shigellosis in Ontario, however, have remained steady from 2006 to 2015 (see Figure 21). In 2015, there were 1.9 cases of shigellosis per 100,000 population in Ontario.

Figure 21. Trends in confirmed shigellosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Cases between 2011 and 2015 ranged in age from 5 to 75 years (median: 39 years) and women accounted for the majority of cases during this period (64.7% cases). In females, the highest rates were observed in the 30 to 39 and 60 to 69 year age groups (2.4 cases per 100,000 population and 1.7 cases per 100,000 population, respectively). In males, the highest rates were observed in the 70+ age group (1.1 cases per 100,000 population). See Table 15 and Figure 22.

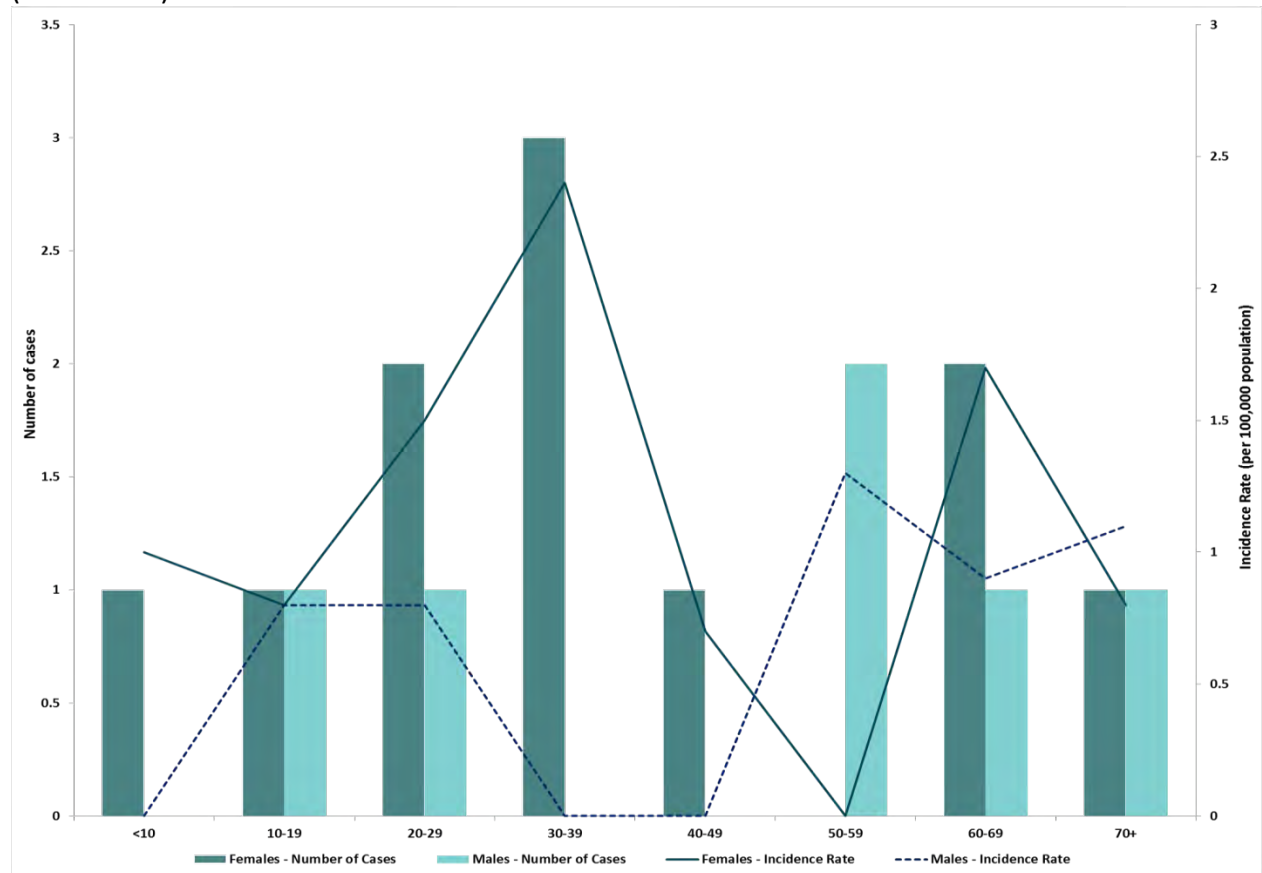
Table 15. Incidence of shigellosis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	1	1.0	0	0.0	1	0.5
10-19	1	0.8	1	0.8	2	0.8
20-29	2	1.5	1	0.8	3	1.1
30-39	3	2.4	0	0.0	3	1.2
40-49	1	0.7	0	0.0	1	0.3
50-59	0	0.0	2	1.3	2	0.7
60-69	2	1.7	1	0.9	3	1.3
70+	1	0.8	1	1.1	2	0.9

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 22. Incidence of confirmed shigellosis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Risk Factors

Travel outside of the province in the last seven days was the top risk factor reported by cases (56.3%, 9/16 cases). Only behavioural risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' were considered in the analysis. There were no medical risk factors reported by at least five cases between 2011 and 2015.

Hospitalization/Deaths

There were no hospitalizations reported in 2015. The last hospitalization of a case prior to 2015, was reported in 2013 (two cases). There have been no deaths reported in cases from 2011 to 2015.

Typhoid fever

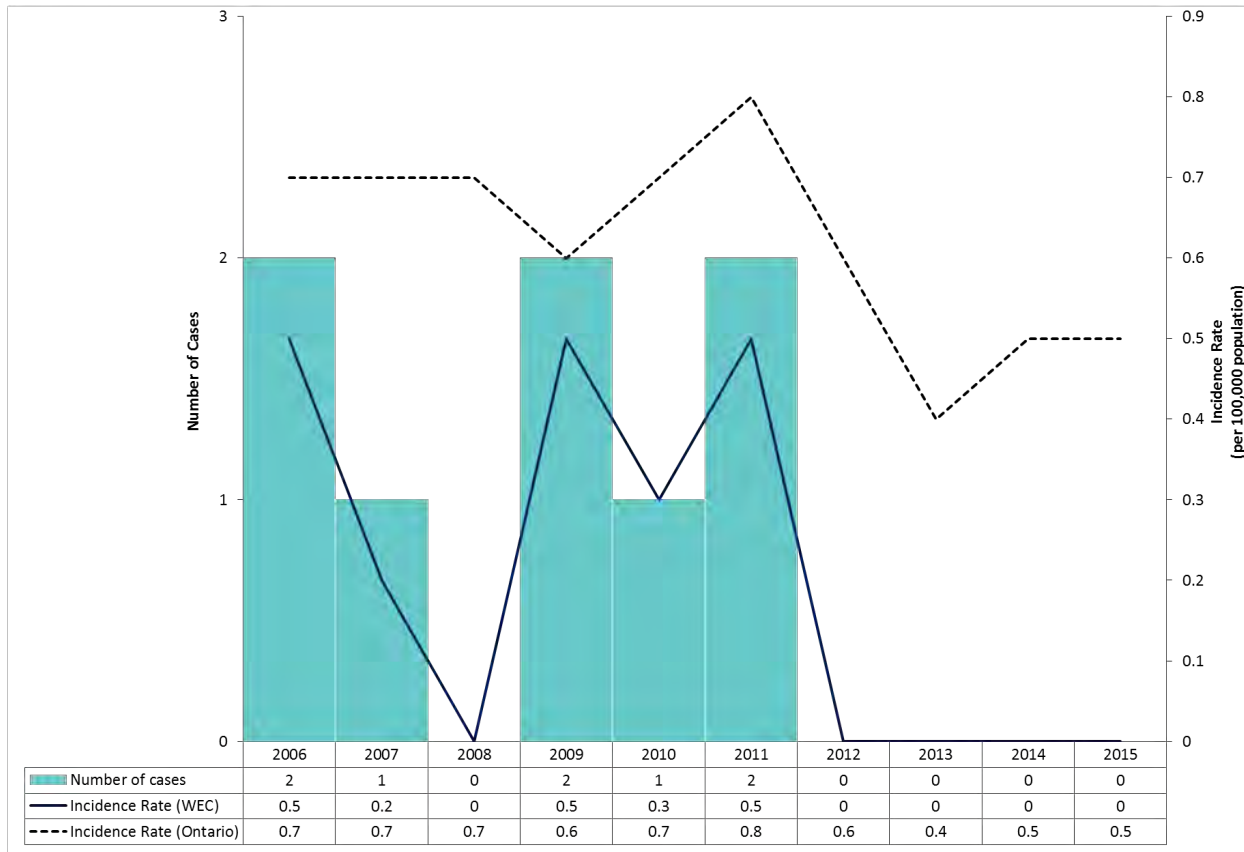
Background

Typhoid fever is a bacterial disease caused by *Salmonella* Typhi. Symptoms of this illness include fever, headache, constipation or diarrhea, fatigue, and loss of appetite. Severe cases may be characterized by worsening symptoms leading to complications such as intestinal bleeding, and enlarged liver or spleen. Transmission of infection may occur from ingestion of food and water contaminated by feces or urine of infected patients and from person-to-person. Antibiotic treatment is indicated in infected individuals, and recovery takes 10 to 14 days. Prevention measures include education on proper hand hygiene, practicing safe food and water precautions while travelling to endemic areas, boiling or steaming shellfish for at least ten minutes before consumption, and vaccination in individuals at high risk (travelers to endemic areas, household members of carriers, and laboratory workers).^{29,30}

Trends over time

No cases of typhoid fever have been reported in Windsor-Essex County in 2015 and the three years prior. Cases of typhoid fever in Ontario are associated with travel to endemic countries. In 2015, the rate in Ontario was 0.5 cases per 100,000 population (see Figure 23).

Figure 23. Trends in confirmed typhoid fever cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

No age- or sex- specific pattern can be identified due to low case counts.

Hospitalization/Deaths

No hospitalization or deaths have been reported in the cases from 2011.

Verotoxin-producing *Escherichia coli* (VTEC) infections

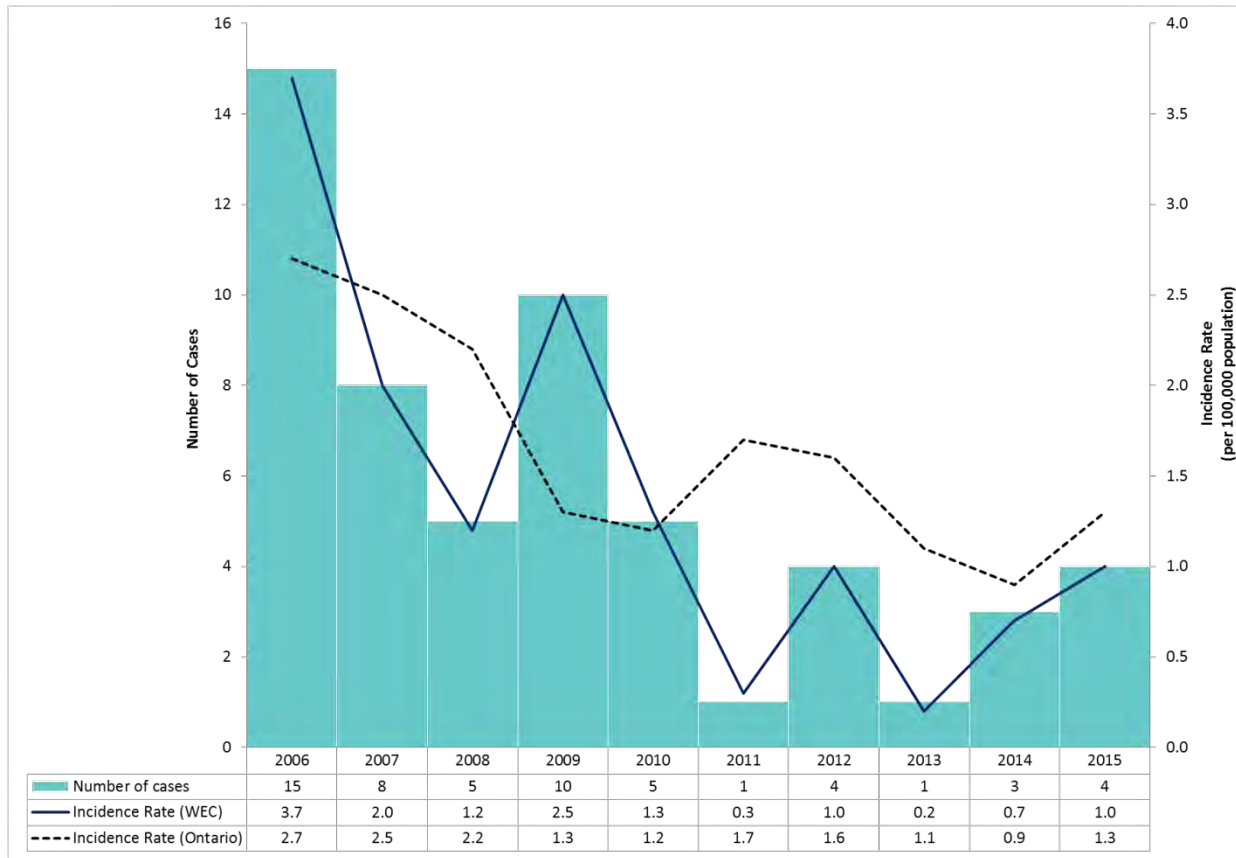
Background

Verotoxin-producing *Escherichia coli* (VTEC) are a subtype of *E. coli* that causes enteric disease. Symptoms of VTEC infection include bloody or non-bloody diarrhea, abdominal cramping, vomiting, acidosis, prostration, malaise and dehydration. Symptoms usually last less than five days. Complications such as hemorrhagic colitis and Hemolytic Uremic Syndrome (HUS) may also arise in some cases. Some individuals may not have any symptoms. Transmission of VTEC infection can occur through ingestion of food or water that has been contaminated by feces of animals or infected individuals. Person-to-person contact with an infected individual and contact with animals and their environment are also sources of VTEC transmission. Past outbreaks in North America have been associated with undercooked ground beef, lettuce, spinach, sprouts, unpasteurized milk and fruit juices, and inadequately treated drinking water. Treatment of VTEC is largely supportive and may require admission to hospital. Key prevention measures include practicing proper personal hygiene and safe food handling.^{31,32}

Trends over time

In 2015, there were four cases of verotoxin-producing *E. coli* infection (VTEC) in Windsor-Essex County. The incidence rate of VTEC in Windsor-Essex County has decreased considerably from 2006 to 2015 (from 3.7 cases per 100,000 population in 2006 to 1.0 case per 100,000 population in 2015; see Figure 24). However, in the three-year period from 2013 to 2015, rates have increased by 400% (from 0.2 cases per 100,000 population in 2013 to 1.0 cases per 100,000 population). The 2015 rate for Windsor-Essex County was slightly lower than the rate for Ontario (1.3 cases per 100,000 population).

Figure 24. Trends in confirmed VTEC cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Diseases Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The majority of VTEC cases from 2011 to 2015 were younger than 30 years (84.6%). In males, the highest rates were observed in the 10 to 19 and 20 to 29 year age-groups (2.3 cases per 100,000 population in each group). In females, the highest rate was observed in those younger than ten years (1.9 cases per 100,000 population). See Table 16 and Figure 25.

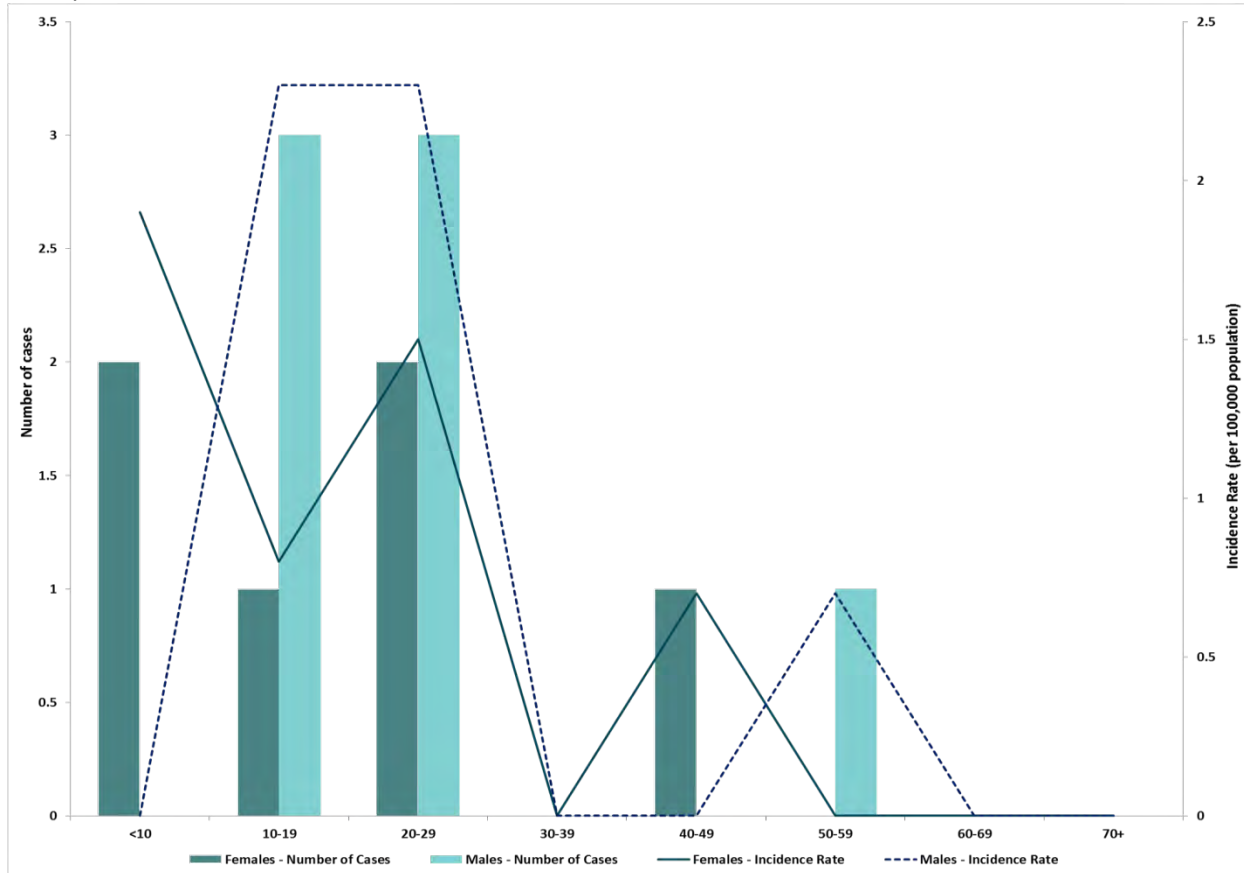
Table 16. Incidence of VTEC cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	2	1.9	0	0.0	2	0.9
10-19	1	0.8	3	2.3	4	1.6
20-29	2	1.5	3	2.3	5	1.9
30-39	0	0.0	0	0.0	0	0.0
40-49	1	0.7	0	0.0	1	0.3
50-59	0	0.0	1	0.7	1	0.3
60+	0	0.0	0	0.0	0	0.0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 25. Incidence of confirmed VTEC cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Cases counts of VTEC typically follow a seasonal pattern.³ In 2015, all four cases had episode dates between June and August.

Outbreaks

From 2011 to 2015, there were two outbreaks of VTEC in Ontario with cases from Windsor-Essex County. The outbreaks occurred in 2013 and 2014.

Risk Factors

Behavioural Risk Factors

Contact with animals was the top risk factor reported by VTEC cases (72.7%, 8/11 cases). There were no other risk factors with at least five respondents and reported by 50% of cases asked.

Medical Risk Factors

There were no medical risk factors reported by cases from 2011 to 2015, with at least five respondents.

Hospitalization/Deaths

In 2015, there were no hospitalizations reported in VTEC cases from Windsor-Essex County. From 2011 to 2015, there have been three hospitalizations and no deaths reported in 13 cases.

Yersiniosis

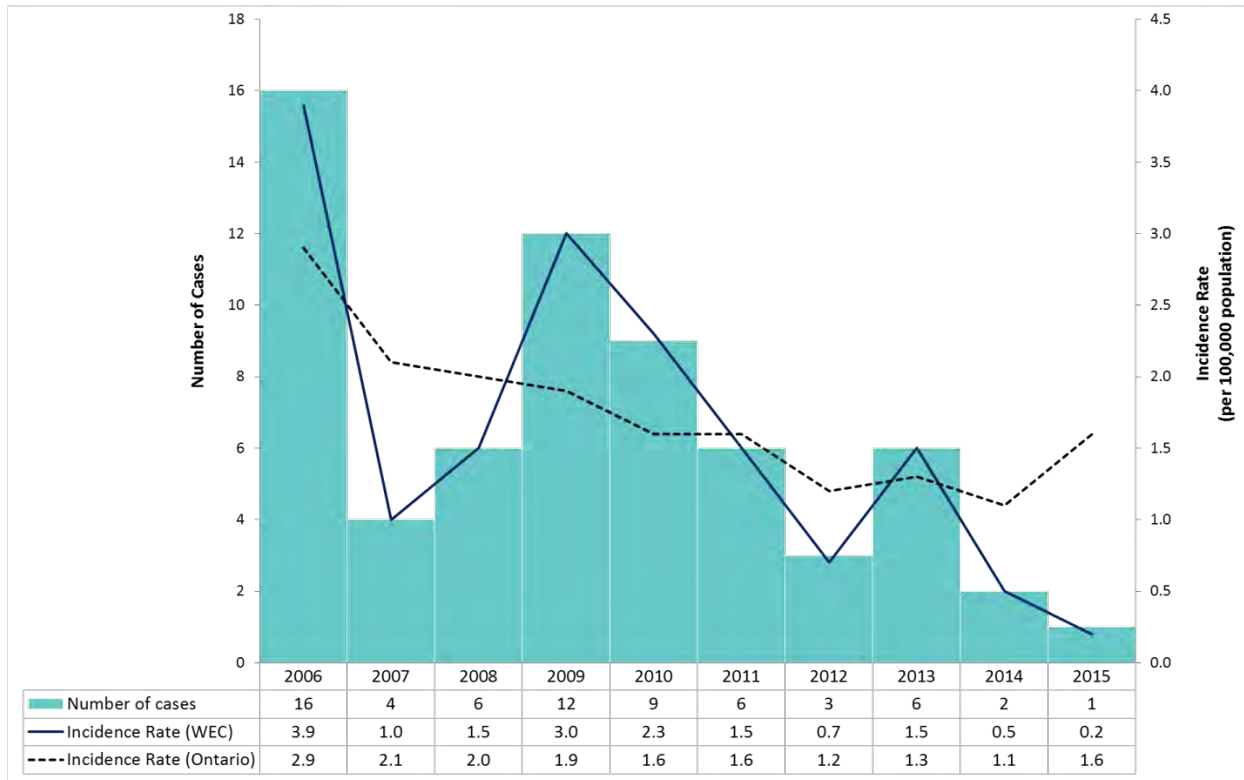
Background

Yersiniosis is a bacteria illness caused by bacteria from the genus *Yersinia*. In Canada, the most common species resulting in illness is *Yersinia enterocolitica*. In children with yersiniosis, the most common symptoms are fever, abdominal pain, and diarrhea (watery or bloody). In older children and adults, symptoms can include pseudo-appendicitis syndrome and fever. Infections resulting from *Yersinia pseudotuberculosis* can result in fever, skin rash, abdominal symptoms and acute pseudo-appendicitis. Symptoms usually begin three to seven days after infection and can last from one to three weeks. Infection is usually associated with the consumption of contaminated food or water, or by contact with the feces of a person or animal infected with the bacteria. The bacteria live in the intestines of infected persons/animals and are released with bowel movements. *Yersinia* infections have been linked to the consumption of unpasteurized milk, and raw/undercooked pork and pork products. Prevention measures for yersiniosis include practicing good hand hygiene, thorough cooking of meat, avoiding consumption of unpasteurized milk and milk products, following safe food handling practices, protecting water supplies from animal and human feces, and avoiding drinking water from open water sources such as shallow wells, rivers, lakes or streams.³³⁻³⁵

Trends over time

In 2015, there was one confirmed case of yersiniosis in Windsor-Essex County, representing a rate of 0.2 cases per 100,000 population. Rates of yersiniosis in Windsor-Essex County have declined by 94.9% since 2006 (3.9 cases per 100,000 population in 2006; see Figure 26). The rate in Windsor-Essex County for 2015 was 87.5% lower than the rate for Ontario (1.6 cases per 100,000 population).

Figure 26. Trends in confirmed yersiniosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Cases of yersiniosis between 2011 and 2015 ranged in age from <1 year to 79 years (median: 22 years). The highest rate was in those younger than five years (4.8 cases per 100,000 population). Rates of yersiniosis showed a decreasing trend with increasing age (see Table 17 and Figure 27). There were no differences in trends by sex.

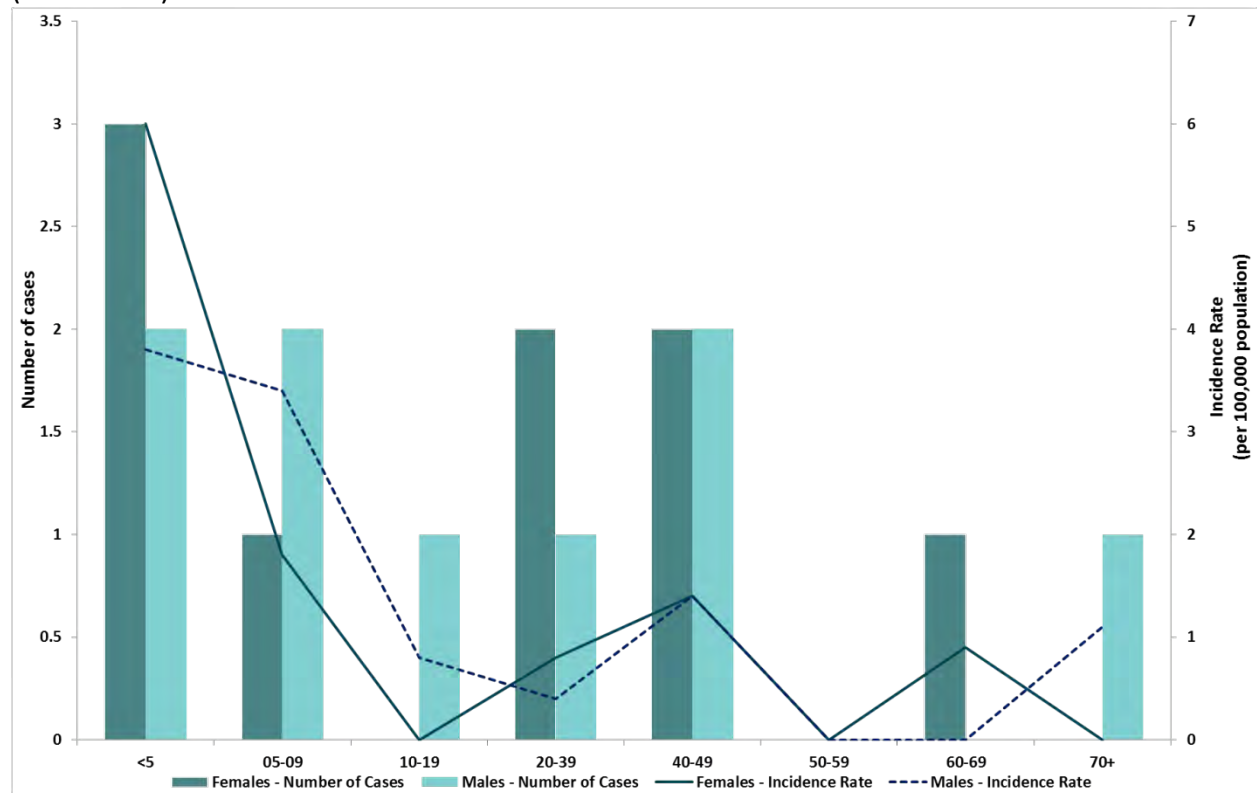
Table 17. Incidence of confirmed yersiniosis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	3	6.0	2	3.8	5	4.8
05-09	1	1.8	2	3.4	3	2.6
10-19	0	0.0	1	0.8	1	0.4
20-39	2	0.8	1	0.4	3	0.6
40-49	2	1.4	2	1.4	4	1.4
50-59	0	0.0	0	0.0	0	0.0
60-69	1	0.9	0	0.0	1	0.4
70+	0	0.0	1	1.1	1	0.5

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 27. Incidence of confirmed yersiniosis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Case counts of yersiniosis typically increase in the summer months in temperate climates.²³ In 2015, the only case reported had an episode date in August.

Risk Factors

Behavioural Risk Factors

The top risk factor reported by yersiniosis cases was contact with animals (57.1%, 8/14 cases).

Medical Risk Factors

There were no medical risk factors that were reported by at least five cases.

Hospitalization/Deaths

The last reported hospitalization of a yersiniosis case from Windsor-Essex County was in 2011 (one case). There have been no deaths reported in cases from 2011 to 2015.

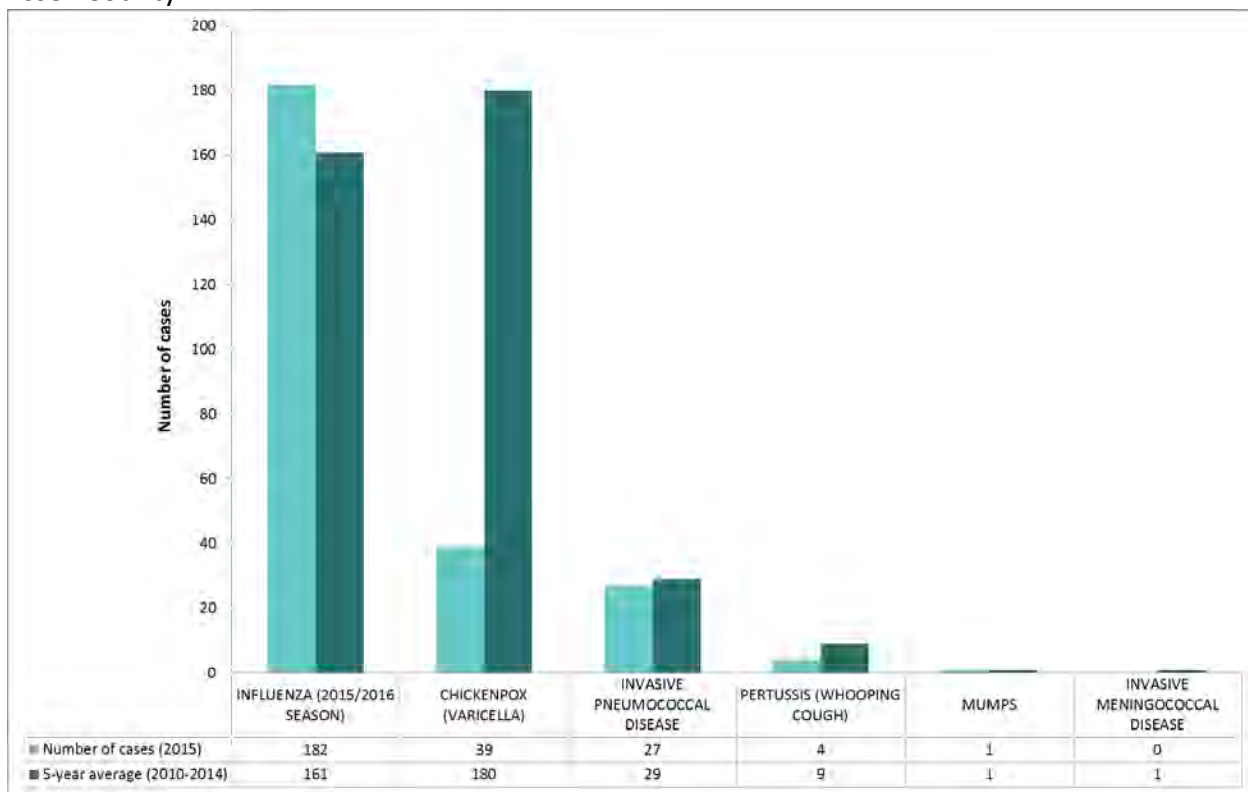
Vaccine-preventable diseases

Vaccine-preventable diseases are infectious diseases caused by viruses or bacteria for which effective preventive vaccines exist. Nearly all of the diseases are contagious and can be spread through the cough or sneeze of an infected person.

The top vaccine-preventable diseases in terms of incidence were influenza (182 cases for 2015/16 season), followed by chickenpox (39 aggregate-level cases), and invasive pneumococcal disease (27 cases). There were also four cases of pertussis, one case of mumps reported in 2015.

There were no cases of acute flaccid paralysis, invasive *haemophilus influenzae* type b (Hib) disease, invasive meningococcal disease (IMD), measles, acute poliomyelitis, rubella and rubella congenital syndrome, smallpox, and tetanus.

Figure 28. Number of cases and five-year average of vaccine preventable diseases, Windsor-Essex County



Influenza

Background

Influenza is an acute respiratory infection caused by influenza virus type A, B, or C. Types A and B are the most common types associated with illness. Symptoms of illness include cough, shortness of breath, fever, sore throat, headache, muscle pain, and fatigue. In children, illness may also be associated with nausea, vomiting, and diarrhea. In most people, the influenza illness resolves within five to seven days; however, the very young and elderly could develop complications such as pneumonia, or middle ear infections. Symptoms usually appear one to five days after infection, and most people recover within seven to ten days. It should be noted that many individuals infected with the virus do not display any symptoms.

The influenza virus spreads easily from person-to-person through release of respiratory droplets containing the virus (through sneezing, coughing, and talking), which may enter the eyes, nose or mouth of a host. Infection can also occur by touching contaminated objects and subsequently touching the face or eyes. The most important preventive measure for influenza illness is annual immunization. Other preventative measures include following proper hand hygiene and respiratory etiquette.^{36,37}

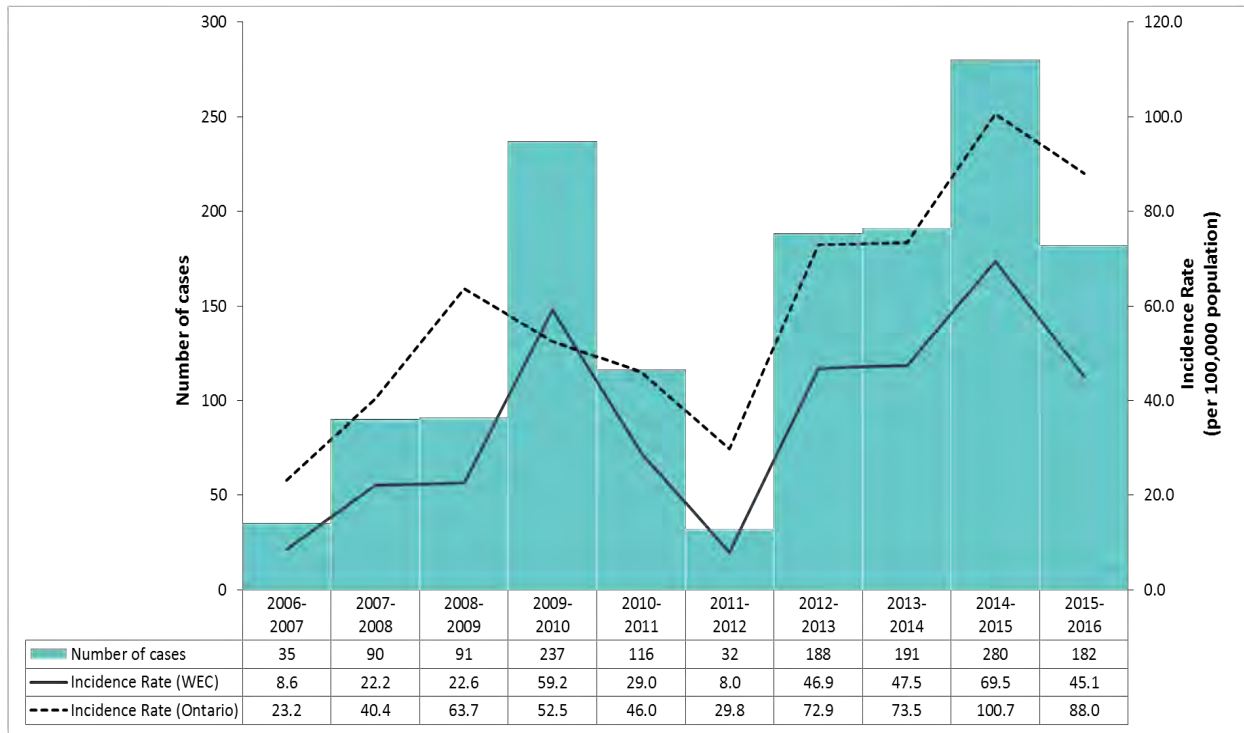
Trends over time

Case counts and rates of influenza are likely underestimates due to lack of reporting and diagnosis. Many individuals with influenza do not seek medical care, and health care providers do not order laboratory-testing for mild or uncomplicated cases.

In the 2015/2016 season (September 1st to August 31st), there were 182 confirmed cases of influenza reported in Windsor-Essex County, representing a rate of 45.1 cases per 100,000 population. From 2014/2015 to 2015/2016, rates have since decreased by 35.1% to the most recent rate (see Figure 29).

The rate in Ontario for the 2015/2016 season was 88.0 cases per 100,000 population. Rates in Windsor-Essex County have been lower than Ontario for most seasons from 2006/2007 to 2015/2016 except the 2009/2010 season (a pandemic season).

Figure 29. Trends in confirmed influenza cases by season, Windsor-Essex County and Ontario (2006/2007 to 2015/2016)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/13.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Of the cases reported between the 2011/2012 and 2015/2016 season, the highest incidence rate for influenza was observed in those younger than five years (see Table 18 and Figure 30). Males <1 year had the highest rate of any group (198.4 cases per 100,000 population), while females 1-4 years had the highest rate for females (106.6 cases per 100,000 population).

Though the incidence rates were highest in those younger than five years, the most number of cases were observed in those 60+ age group (33.4% of all cases reported in the above-mentioned period, 295/883 cases). In this age group, most cases were females (61.3%, 181/295 cases).

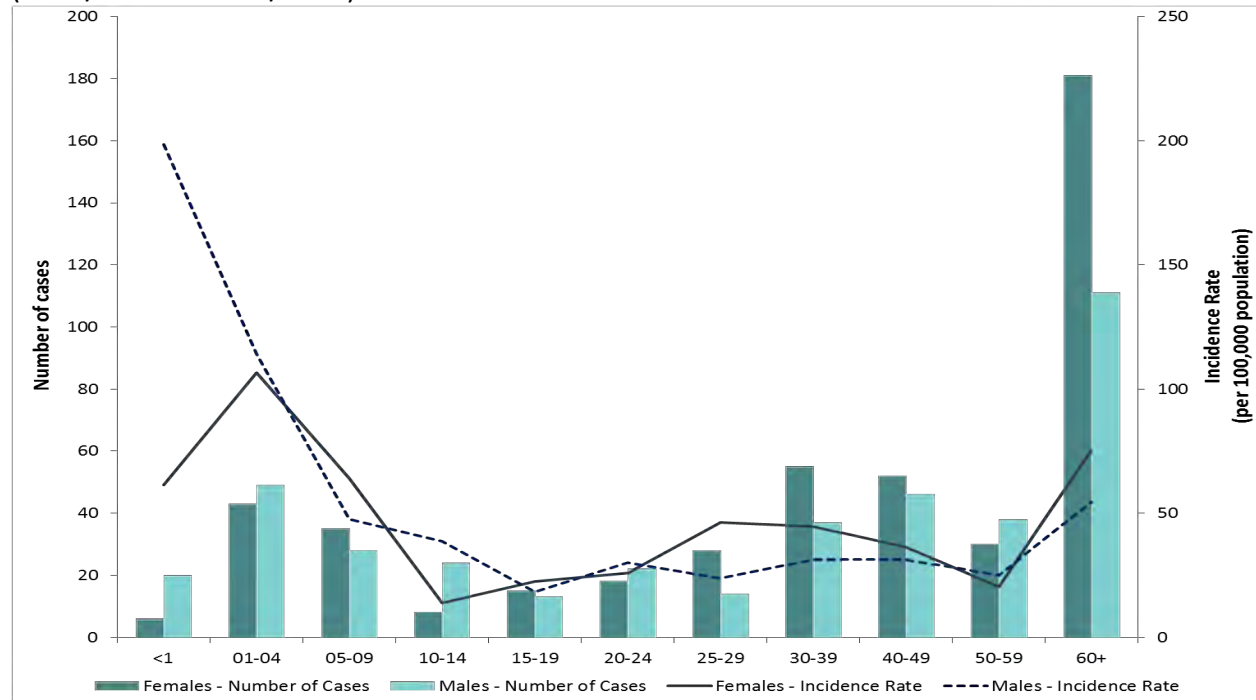
Table 18. Incidence of confirmed Influenza cases by age and sex, Windsor-Essex County (2011/2012 to 2015/2016)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<1	6	61.4	20	198.4	26	130.9
01-04	43	106.6	49	114.1	92	110.4
05-09	35	63.9	28	47.6	65	57.2
10-14	8	13.8	24	38.7	34	28.3
15-19	15	22.5	13	18.2	28	20.3
20-24	18	26.0	22	30.0	40	28.1
25-29	28	46.2	14	23.8	43	36.0
30-39	55	44.8	37	31.3	93	38.6
40-49	52	36.3	46	31.4	98	33.8
50-59	30	20.3	38	25.2	69	23.1
60+	181	75.4	111	54.6	295	66.5

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/13.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 30. Incidence of confirmed Influenza cases by age and sex, Windsor-Essex County (2011/2012 to 2015/2016)



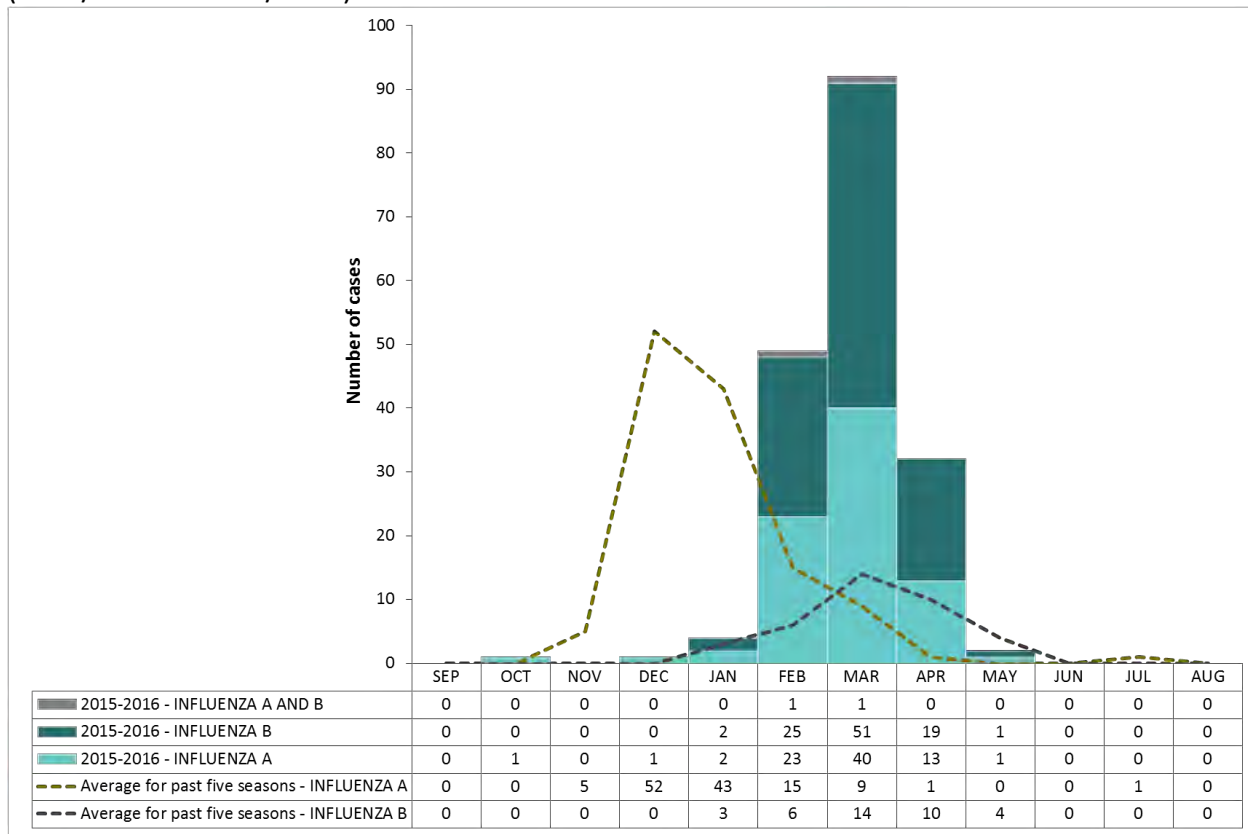
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/13.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Influenza activity follows a seasonal pattern, and case counts typically peak in the colder months. For the 2015/2016 season, case counts peaked in March (see Figure 31). There were 92 cases with episode dates (symptom onset dates) in March, when only 23 were expected (based on five-year seasonal average). This peak was later than expected based on the seasonal average. Typically, peaks are observed in December and January.

Figure 31. Confirmed influenza case counts (2015/2016) and average of case counts for past five seasons (2010/2011 to 2014/2015) by type and episode month, Windsor Essex County (2010/2011 to 2015/2016)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/13.

Risk Factors

Behavioural Risk Factors

The top behavioural risk factor reported by influenza cases between 2011/2012 and 2015/2016 was being a resident of a nursing home or other long term care facility (56.6%, 125/221 cases). The 'other' risk factor was reported by 80.6% of cases interviewed (79/98 cases).

Medical Risk Factors

The top medical risk factor reported by confirmed cases was not being immunized (62.4%, 496/795 cases). Some 'other' medical risk factor was reported by 77.8% of cases (98/126).

Hospitalization/Deaths

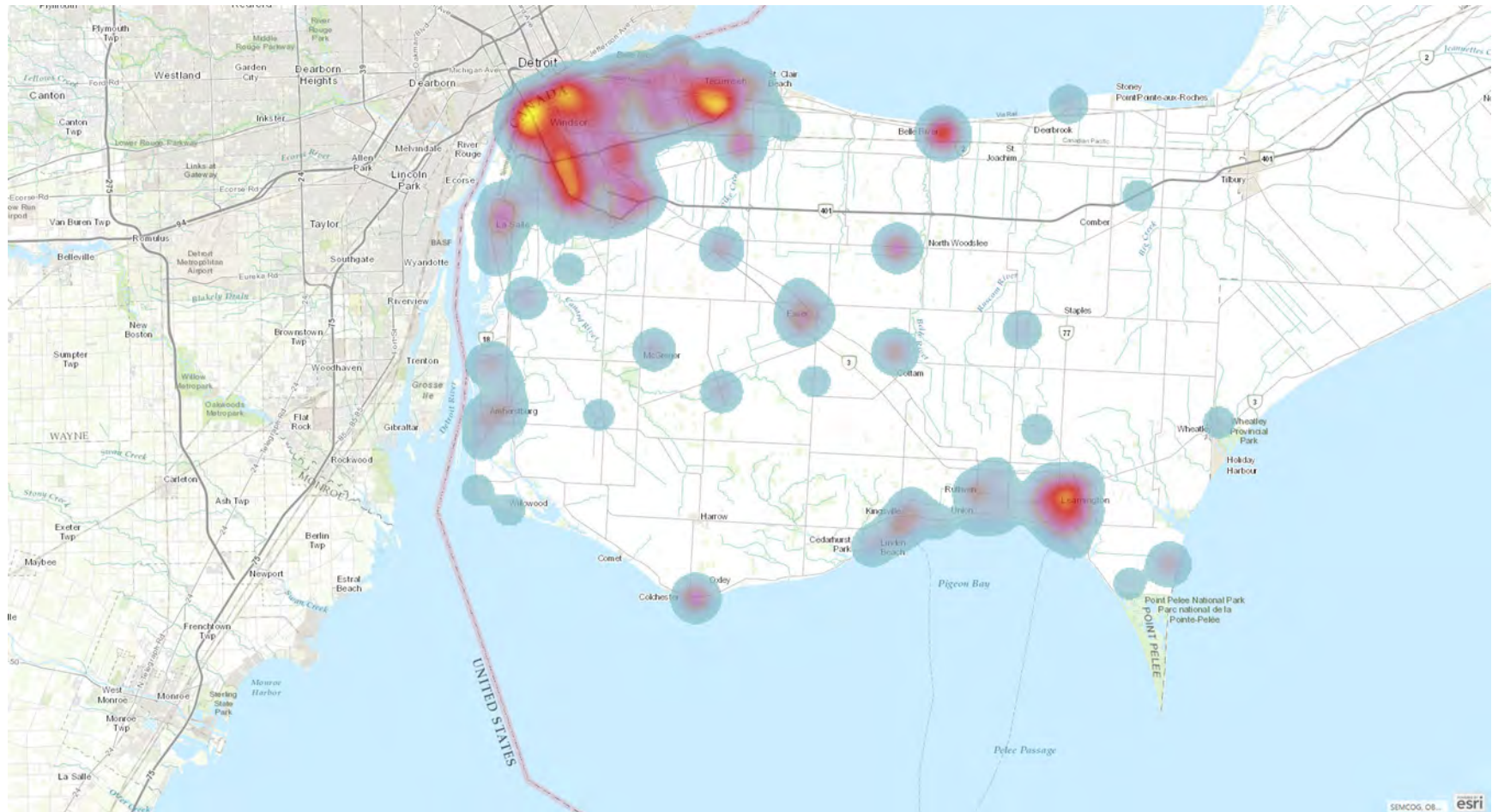
In the 2015/2016 influenza season, hospitalization was reported in 11.5% of confirmed cases (21/182 cases), and death was reported in 2.2% of cases (4/182 cases).

In the last five seasons (2011/2012 to 2015/2016), the highest case hospitalization rate was reported in 2011/2012 (46.9%, 15/32 cases), and the highest case fatality rate was reported in the 2013/2014 season (4.7%, 9/191 cases).

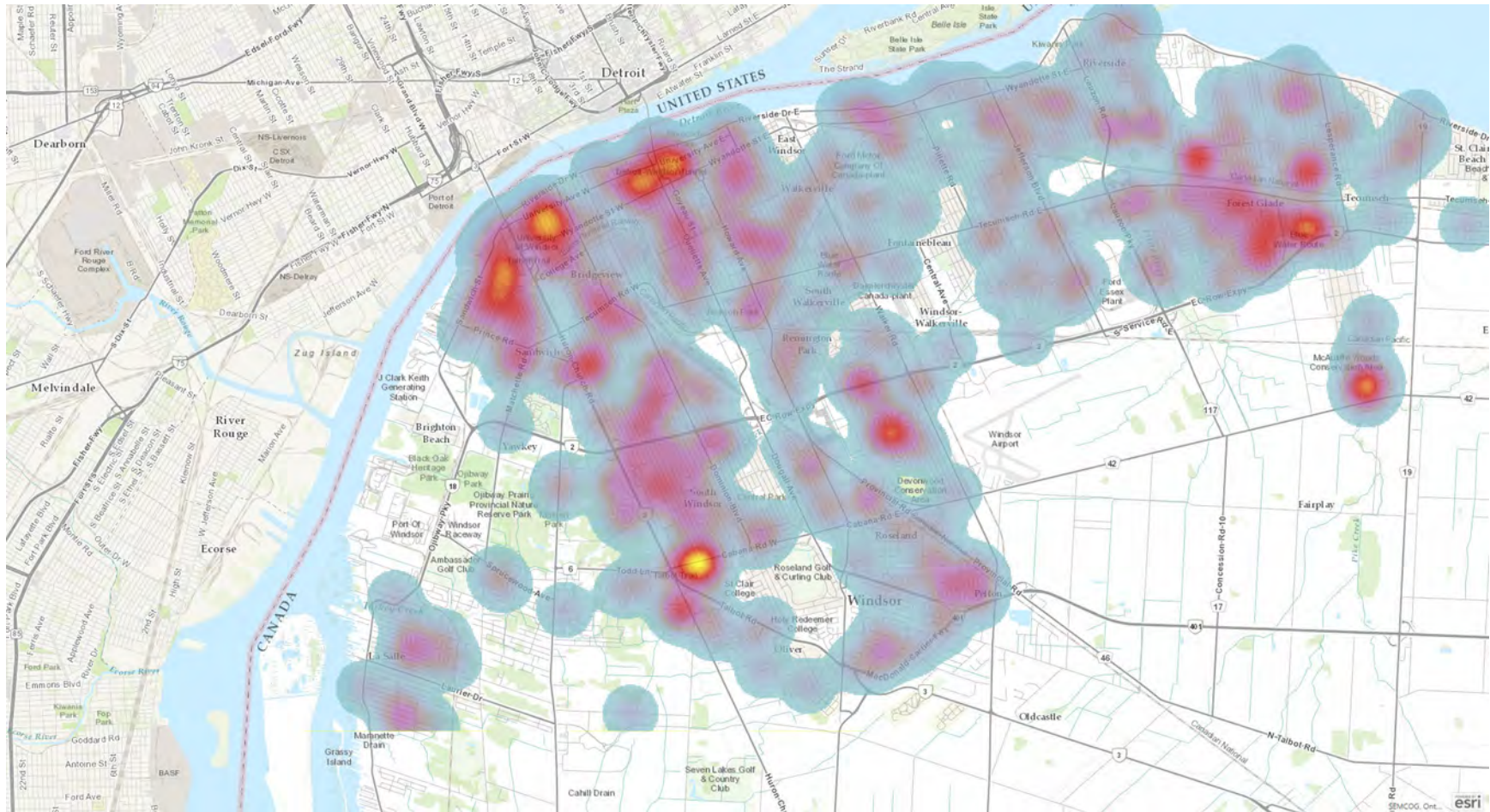
Based on case counts from 2011/2012 to 2015/2016, the age group with highest case hospitalization rate was the <1 years age group (42.3% of all cases in this age-group were hospitalized, 11/26 cases). The majority of reported hospitalizations took place in those 60+ years (45.9% of all influenza-related hospitalizations were from this age-group, 78/170 hospitalizations). The age group with the highest mortality rate for influenza was the 60+ age group (6.8% of all cases in this age group, 20/295 cases). This age group also had the majority of deaths (83.3% of all influenza-related deaths, 20/24 deaths).

Geographic Distribution

Map 3. Heat map (WEC) - Influenza cases diagnosed in WEC (based on address at time of illness) between 2012/13 and 2015/16 influenza seasons



Map 4. Heat map (Windsor) - Influenza cases (based on address at time of illness) diagnosed in WEC between 2012/13 and 2015/16 influenza seasons



Invasive Meningococcal Disease (IMD)

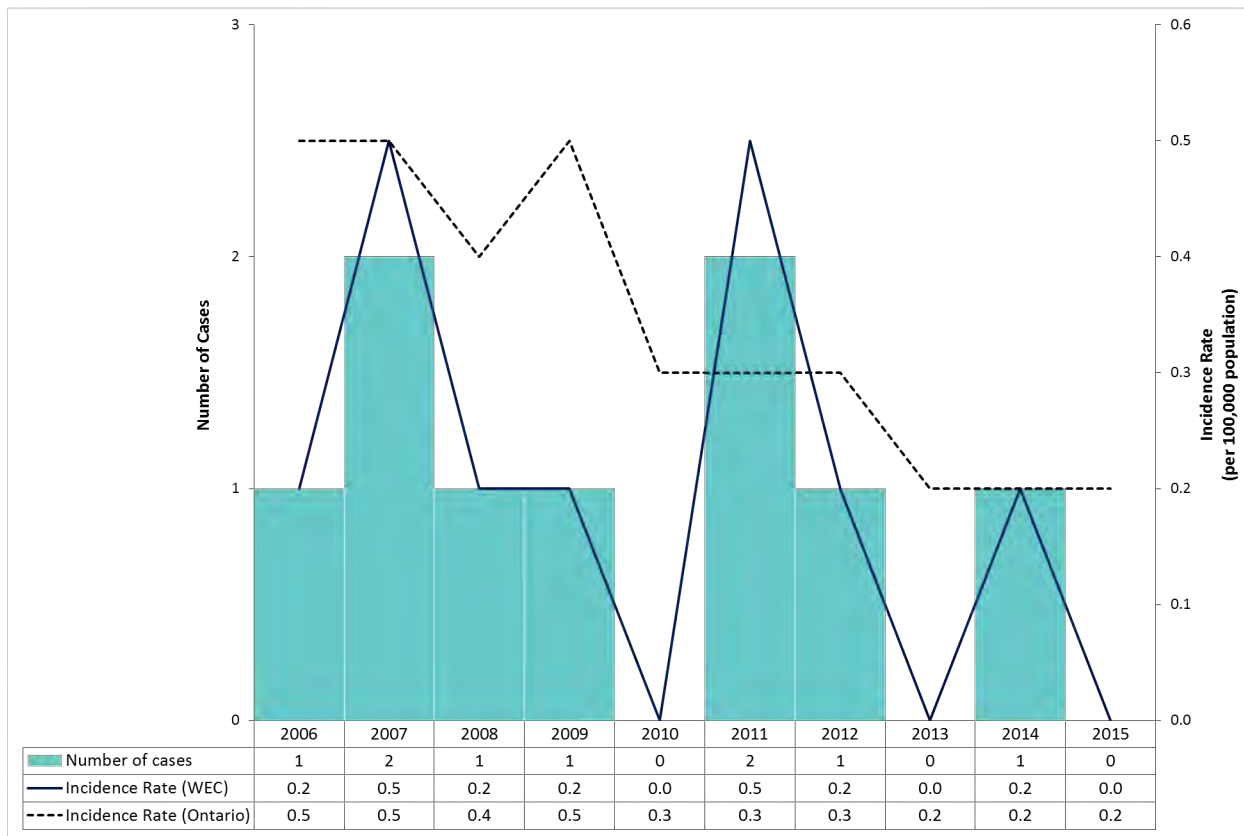
Background

Invasive meningococcal disease (IMD) is a bacterial infection caused by the bacterium *Neisseria meningitidis*. Infection can cause meningitis and septicemia. Symptoms typically occur 2 to 10 days after exposure and severe cases may result in death. In 10-20% of survivors, complications such as hearing impairment, limb amputation, skin scarring, skin scarring and intellectual disability can also result.³⁸ The disease is spread through close direct contact (e.g. living in close living quarters, kissing, coughing, sneezing, and sharing food or drinks). Antibiotics treatment can help to stop the spread of bacteria within 24 hours of treatment. High risk groups for IMD include children under five years, people living in crowded quarters, adolescents 15 to 18 years, travelers to endemic areas, those with respiratory tract infection, smokers, those with HIV, and individuals with genetic risk factors. The most important prevention measure for IMD is vaccination. In those who are not immunized, there is risk of the disease becoming invasive or passed on to others.³⁹

Trends over time

In 2015, there were no cases of IMD reported in Windsor-Essex County. Between 2006 and 2015, the number of new cases has ranged from zero to two per year (see Figure 32). There were nine cases reported during this period. In Ontario, the rate for 2015 was 0.2 cases per 100,000 population.

Figure 32. Trends in IMD cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Cases of IMD between 2011 and 2015 ranged in age from 10 to 80 years. The majority of cases were over 50 years (75%, 3/4 cases). There were no differences in case counts by gender.

Seasonality

In Ontario, the incidence of IMD is typically higher in the colder months.³ However, in Windsor-Essex County, such a trend was not observed in the cases reported between 2011 and 2014.

Serogroup

From 2011 to 2014 (the most recent year prior to 2015 with a case), serogroup B was reported in two cases, followed by serogroup Y (one case) and serogroup W-135 (one case). See Table 19.

Table 19. Confirmed IMD cases by serogroup, Windsor-Essex County (2011-2014)

Serogroup	Number of cases	Percentage of cases (%)
Serogroup B	2	50
Serogroup Y	1	25
Serogroup W-135	1	25

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Hospitalization/Deaths

From 2011 to 2014 (the most recent year prior to 2015 with a case), there were three hospitalizations reported out of four cases. There have been no deaths reported during this period. Typically, between 8% and 15% of those who get ill with IMD die as a result of the disease.³⁸

Invasive Pneumococcal Disease (IPD)

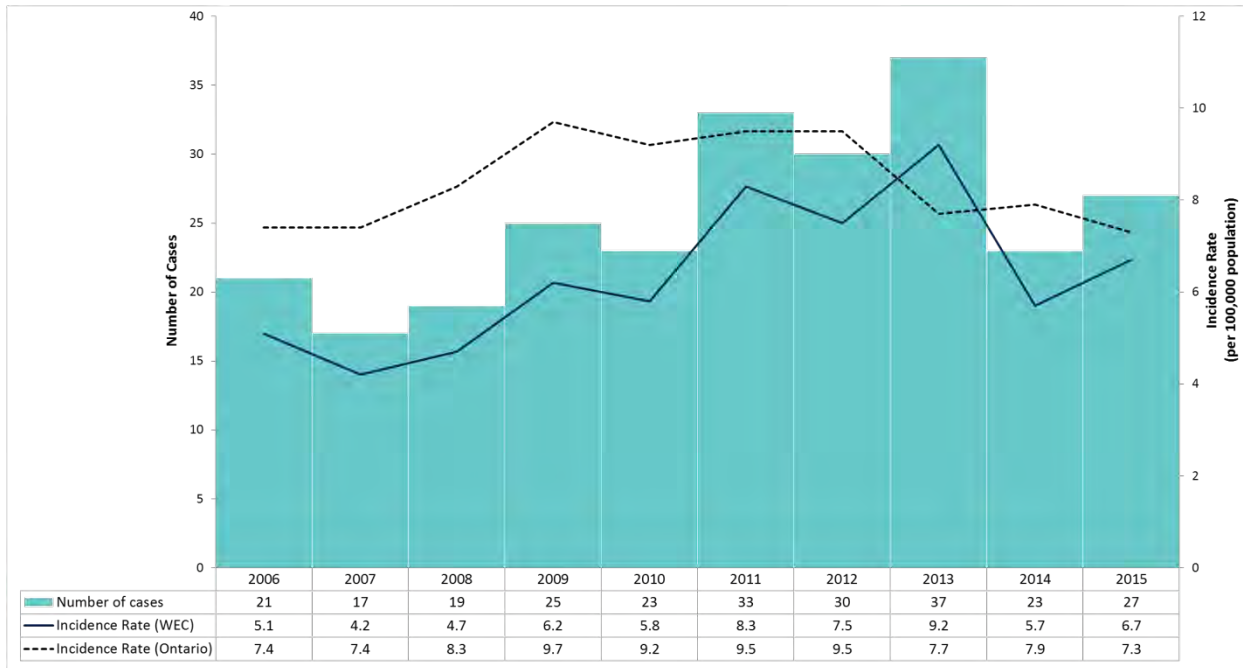
Background

Invasive pneumococcal disease (IPD) is an acute communicable disease caused by the bacterium *Streptococcus pneumoniae*. The disease can present as bacteremic pneumonia, bacteremia, and meningitis.²³ Transmission of the bacteria occurs through contact with infected mucus or saliva droplets. This usually happens from close contact with an infected person, coughs and sneezes from an infected person, or contact with objects exposed to an infected person's respiratory secretions and consequent touching of the eyes, nose or mouth.⁴⁰ IPD is an endemic disease among the elderly and those with underlying medical conditions. Infants are also susceptible to the disease.²³ Those with IPD require antibiotic treatment, and the disease typically resolves within 24 hours of start of treatment. The primary preventative measure for IPD remains immunization with pneumococcal vaccines.^{23,40}

Trends over time

In 2015, there were 27 confirmed cases of IPD in Windsor-Essex County, representing a rate of 6.7 cases per 100,000 population. After a peak year in 2013 (9.2 cases per 100,000 population), rates decreased by 38% to 5.7 cases per 100,000 in 2014. However, rates have since increased by 17.5% to the rate observed in 2015. The incidence rate for Ontario has remained stable and higher than the rate in Windsor-Essex County for every year 2006 to 2015, except 2013 (see Figure 33).

Figure 33. Trends in confirmed IPD cases by year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The incidence of IPD increased with age starting from 40 years, with the highest incidence rate in adults >70 years (22.9 cases per 100,000 population). More than half the cases reported were above 60 years (58.0%). From 40 years onwards, the incidence of IPD was higher in males than females.

Children under five years had a higher incidence of IPD (5.1 cases per 100,000 population) compared to those in the 5-9 and 10-19 year age groups (3.0 and 0.8 cases per 100,000 population, respectively). In children younger than five years, females had a higher incidence than males (females: 6.7 cases per 100,000 population; males: 3.6 cases per 100,000 population). See Table 20 and Figure 34.

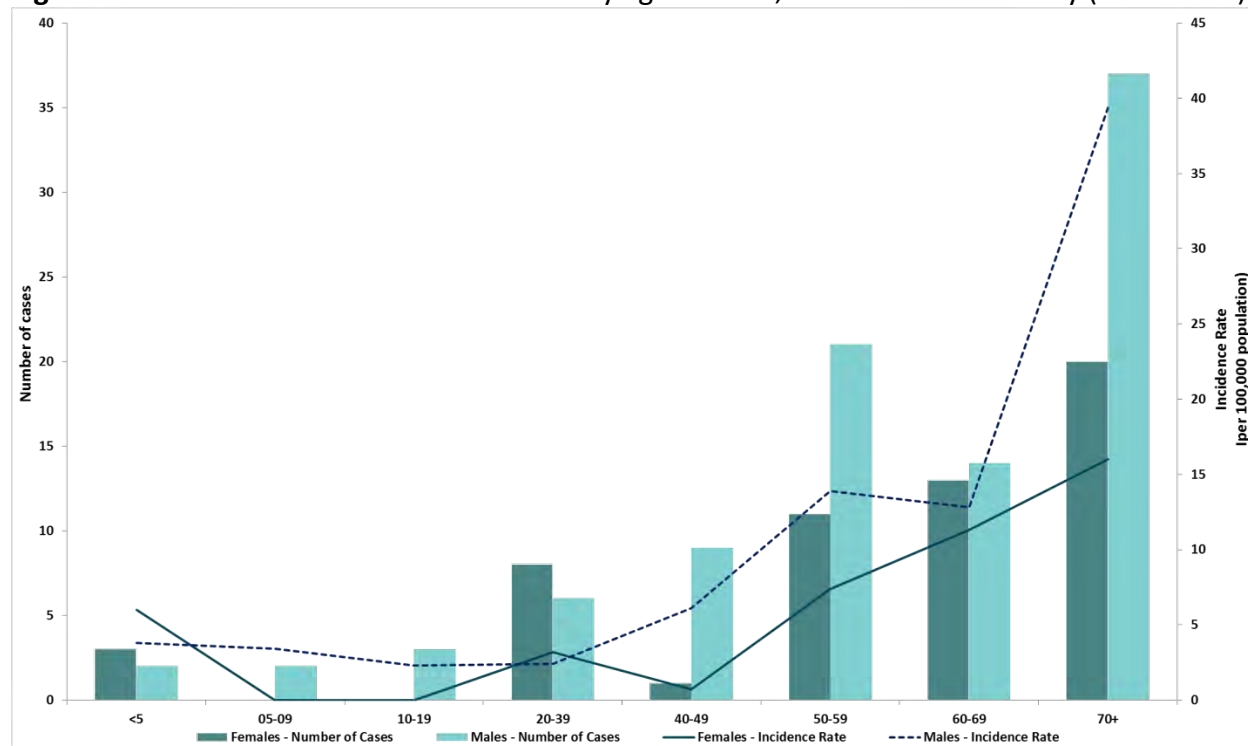
Table 20. Incidence of confirmed IPD cases by age and sex, Windsor-Essex County (2006-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	7	6.7	4	3.6	11	5.1
05-09	3	2.7	4	3.3	7	3.0
10-19	1	0.4	3	1.1	4	0.8
20-39	11	2.1	9	1.7	20	1.9
40-49	6	2.0	10	3.2	16	2.6
50-59	17	6.0	32	11.2	49	8.6
60-69	23	11.0	30	15.1	53	13.0
70+	45	18.8	50	28.6	95	22.9

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 34. Incidence of confirmed IPD cases by age and sex, Windsor-Essex County (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

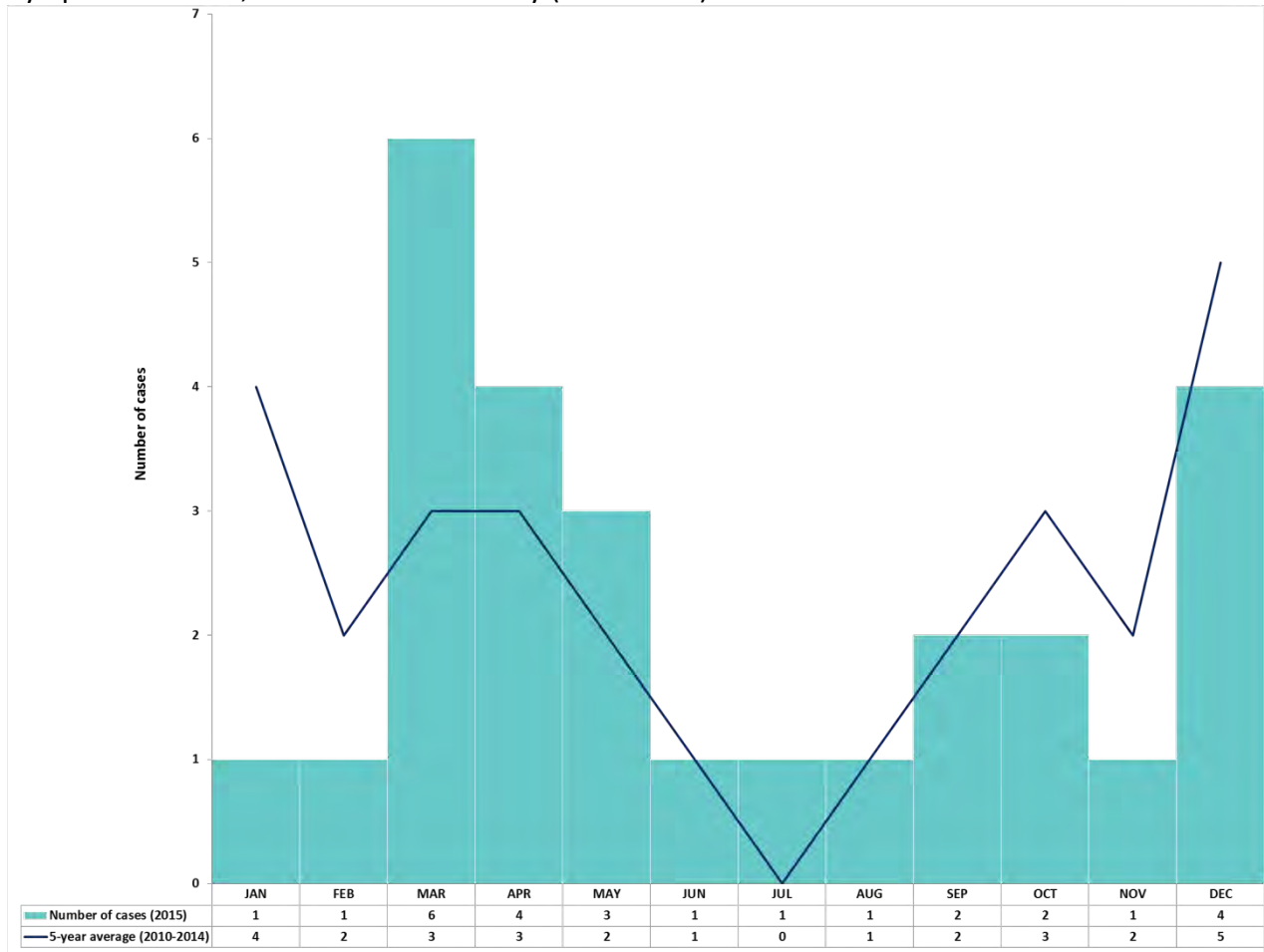
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In 2015, most confirmed cases of IPD were observed in March (six cases), followed by April (four cases), and December (four cases). Based on the five-year average of case counts, case

counts of IPD typically increases between the fall and spring months, and decline in the summer months (see Figure 35). Increased incidence of IPD is also typically accompanied by influenza epidemics.²³

Figure 35. Confirmed IPD case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2014)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

Besides the risk factor of 'unknown' and 'other', the top risk factors reported by cases include inhalation drug use (36.1%) and alcohol abuse (29.8%). Only one case reported injection drug use (4.2%). The 'other' risk factor was reported by 96.0% of cases. See Table 21.

Table 21. Behavioural risk factors reported by confirmed IPD cases, Windsor-Essex County (2011-2015)

Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Inhalation drug use	13	36.1
Alcohol abuse	14	29.8
Injection Drug use	1	4.2
Under-housed/homeless	0	0.0
Other	48	96.0

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Risk factors with less than ten respondents in total were not included in this table. The 'unknown' risk factor was also excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

When asked about chronic illness/underlying medical conditions, 90.7% of confirmed IPD cases between 2011 and 2015 reported having such a condition at the time of illness. Other top risk factors include immunocompromisation (69.8%), and not being immunized (50.0%). Six cases reported being partially/incompletely immunized (18.8%). Some 'other' medical risk factor was reported by 90.0% of cases. See Table 22.

Table 22. Medical risk factors reported by confirmed IPD cases, Windsor-Essex County (2011-2015)

Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Chronic illness/underlying medical condition	107	90.7
Immunocompromised	30	69.8
Unimmunized	59	50.0
Partially/incompletely immunized	6	18.8
Other	27	90.0

Note 1: Multiple medical risk factors can be reported for a single case.

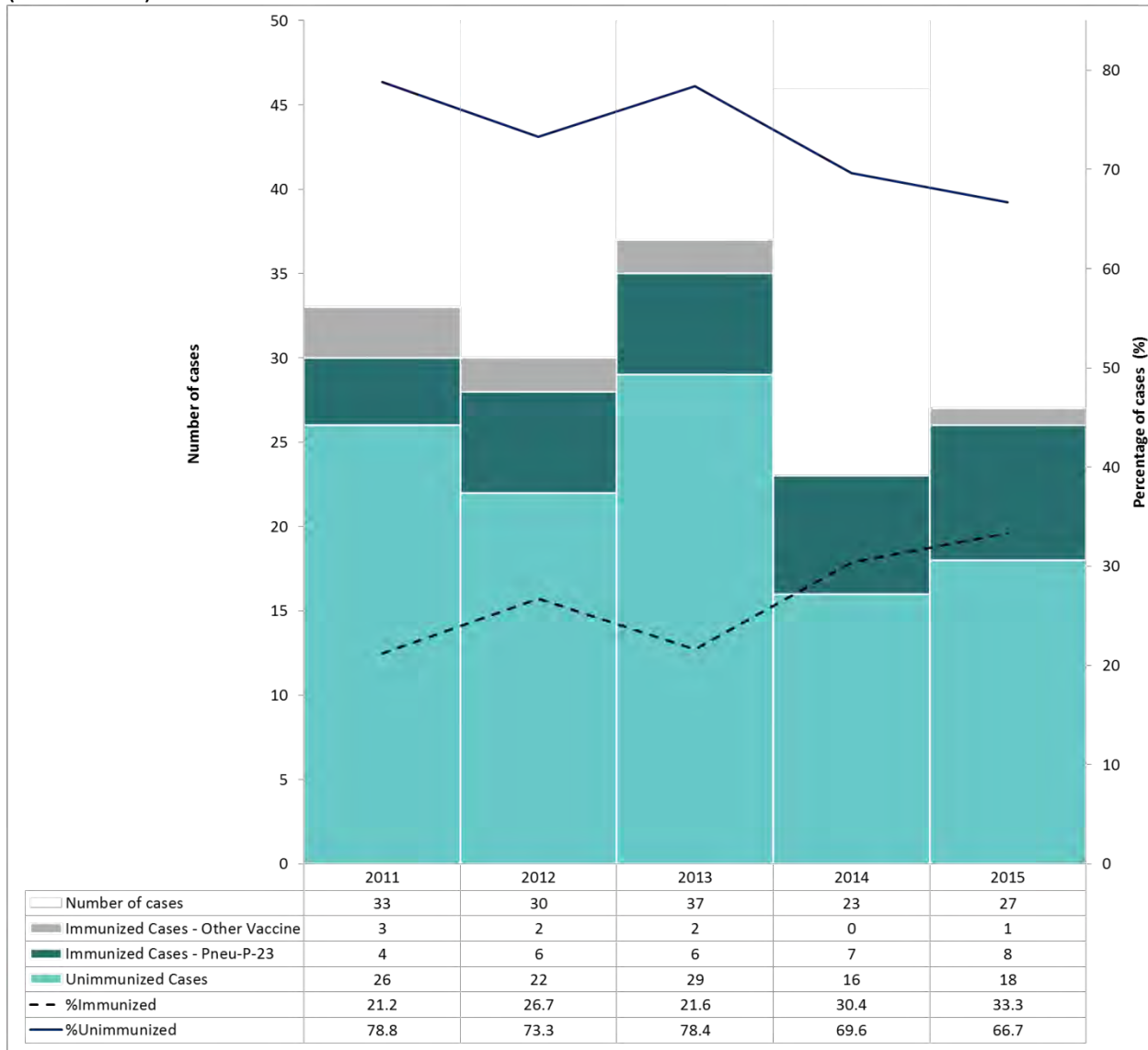
Note 2: Only risk factors with at least five respondents that stated 'Yes' are included in this table. The 'unknown' risk factor was excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Immunization

The percentage of cases who have received a single dose of pneumococcal vaccine (either before or after illness onset) has increased from 21.2% (7/33 cases) in 2011 to 33.3% (9/27 cases) in 2015. In 2015, 29.6% of cases (8/27 cases) received vaccination for the 23-valent pneumococcal polysaccharide vaccine (Pneu-P-23). See Figure 36 for trends.

Figure 36. Immunization status of confirmed IPD cases by episode year, Windsor-Essex County (2011-2015).



WEC Case and Immunization Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Case data extracted: 2016/09/19. Immunization data extracted: 2016/10/07.

Serotypes

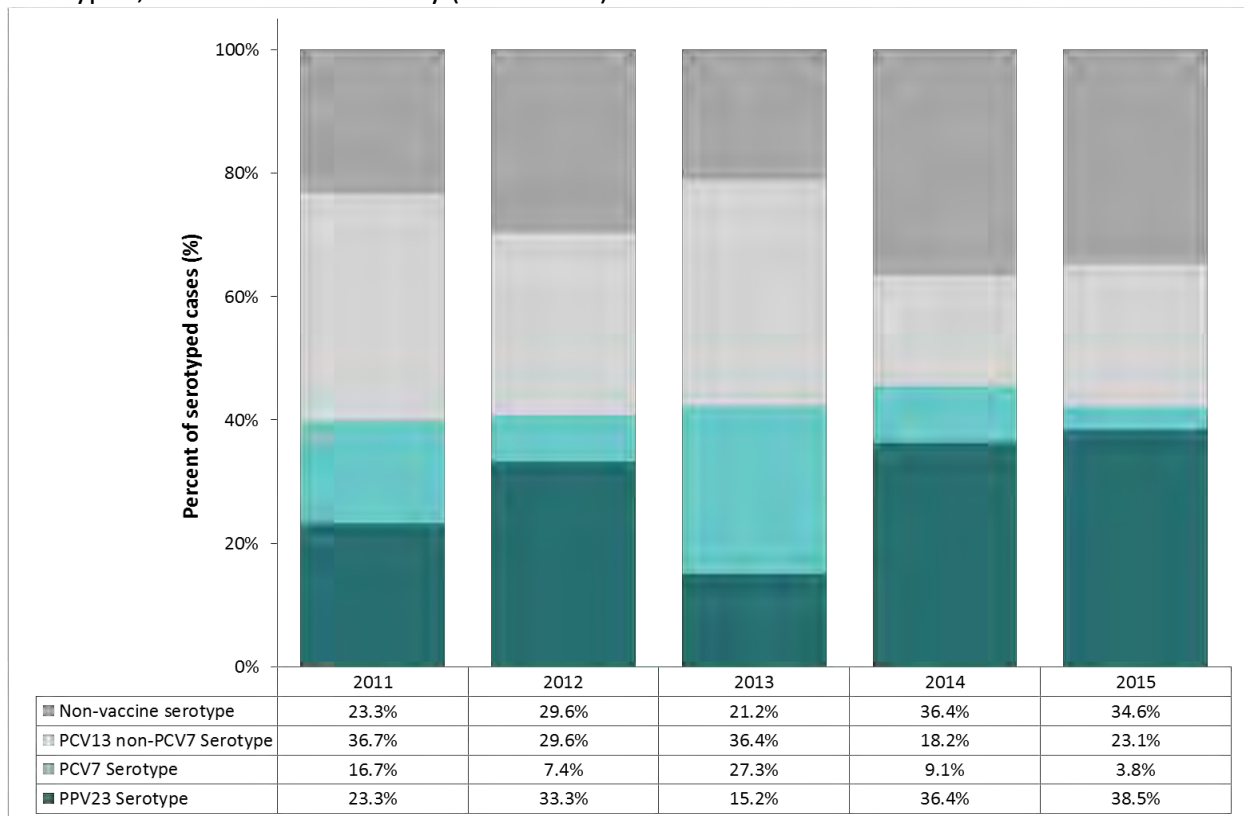
Serotype information was available for 92% of cases from 2011 to 2015 (138 cases). Sixteen of the thirty serotypes identified in cases from this period are covered by the two publicly funded pneumococcal vaccines currently available in Ontario.

The five most-common serotypes identified in confirmed IPD cases from 2011 to 2015 were: Type 22F (21 cases), Type 19A (17 cases), Type 3 (12 cases), Type 7F (12 cases) and Type 4 (ten cases).

The proportion of serotyped IPD cases with a PCV7 serotype has decreased from 16.7% in 2011 to 3.8% in 2015. Similarly, the proportion of PCV13 non-PCV7 serotype cases has also decreased (36.7% in 2011 to 23.1% in 2015).

In the same period, however, the proportion of PPV23 serotype IPD cases has increased from 23.8% in 2011 to 38.5% in 2015. Non-vaccine serotypes have also increased from 23.3% in 2011 to 34.6% in 2016. See Figure 37 for a depiction.

Figure 37. Percentage of serotyped cases of IPD by episode year and associated vaccine serotype*, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

*PCV-7 serotypes: 4, 6B, 9V, 14, 18C, 19F and 23F; PCV13 serotypes: 1, 3, 5, 6A, 7F, and 19A; PPV-23: 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F and 33F.

Hospitalization/Deaths

In 2015, 92.6% of cases were hospitalized (25 cases). Deaths were reported in 14.8% of cases (four cases). Trends in hospitalization and deaths of confirmed IPD cases have remained stable from 2011 to 2015.

As a result of a higher IPD incidence rate, from 2011 to 2015, most hospitalizations occurred in the 60+ year age group (55.3% of cases hospitalized, 73/132 cases). This age-group also had the highest case fatality rate of any age-group (death reported in 26.2% of cases in this age-group, 22/84 cases). As a result of the higher incidence and mortality rate, most IPD deaths were reported in this age-group (88% of all IPD deaths, 22/25 deaths).

Mumps

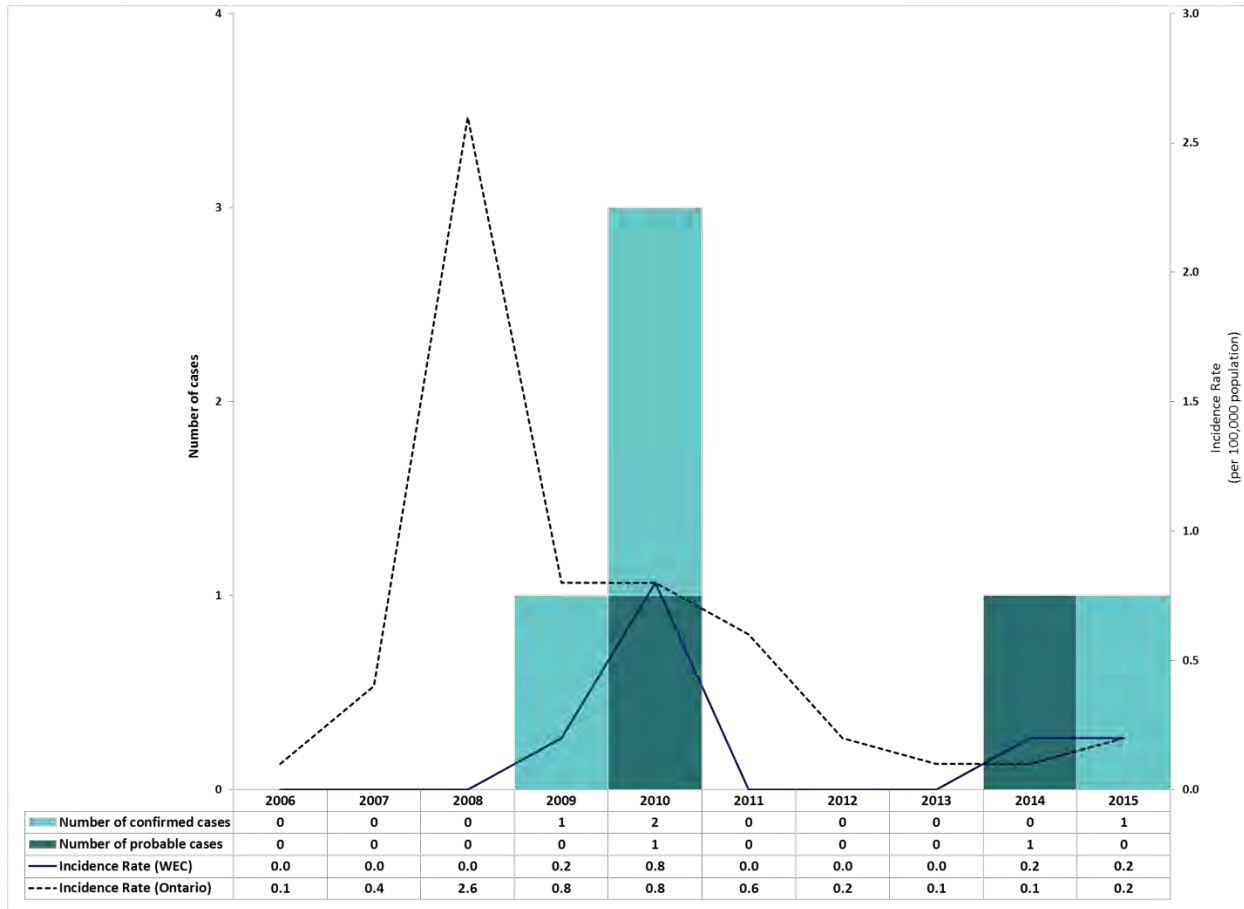
Background

Mumps is an infectious disease caused by the mumps virus, a member of *Paramyxoviridae* family. The disease is characterized by painful swelling of the cheeks and neck. Other symptoms include fever, headache or earache, fatigue, sore muscles, dry mouth, trouble talking, chewing or swallowing, and loss of appetite. Symptoms typically appear 16 to 18 days after exposure, and a person is most infectious from two days before to five days after symptoms appear.⁴¹ Most people recover within 7 to 10 days, however in rare cases complications such as deafness, meningitis, or infections of the testicles or ovaries may arise^{41,42} The virus can be transmitted by droplet spread during coughing and sneezing, as well as by direct contact with the saliva of an infected individual.^{41,42} Anyone who is not fully vaccinated or has not previously had mumps is at risk of infection. In Canada, those born before 1970 are presumed to have had mumps already, thereby having natural immunity. In those born on or after 1970, there is higher risk of exposure to mumps in travelers outside of North America, secondary and post-secondary students, health care professionals, and military personnel in close contact with an infected individual.⁴² Mumps can be prevented by immunization. Currently in Ontario, one dose of a combined measles, mumps, rubella (MMR) vaccine is given on or after the first birthday followed by a second dose at four to six years. Due to historical changes in vaccine programs in Ontario, there is a cohort of susceptible individuals born around 1991 or earlier who have likely only received one dose of MMR vaccine. These individuals would not have acquired natural immunity.⁴¹⁻⁴³

Trends over time

From 2006 to 2015, there were six cases of mumps (four confirmed and two probable) reported in Windsor-Essex County. Case counts have ranged from none (2006 to 2008 and 2011 to 2013) to three cases in a year (2010). In 2015, there was one case reported, representing a rate of 0.2 cases per 100,000 population (see Figure 38). This case reported travel outside of the province. The 2015 rate for Windsor-Essex County was the same as the rate for Ontario.

Figure 38. Trends in confirmed and probable mumps cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age/Sex

The two cases reported in 2014 and 2015, were males between 30 and 60 years.

Hospitalization/Deaths

No hospitalization or deaths have been reported in cases from 2011 to 2015.

Pertussis (whooping cough)

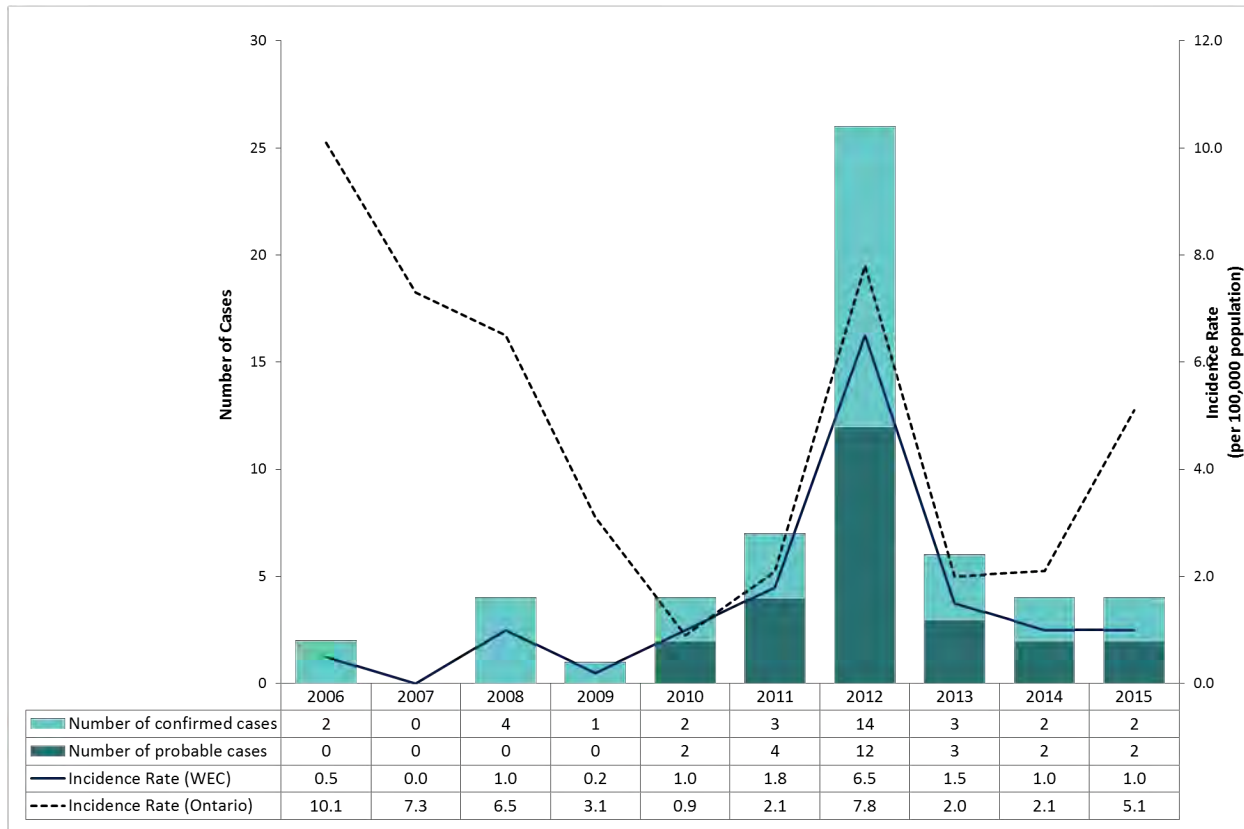
Background

Pertussis, also known as whooping cough, is a respiratory tract infection caused by the *Bordetella pertussis* bacteria. Pertussis is characterized by mild respiratory illness which may progress to prolonged cough episodes with a “whooping” sound which may lead to choking or vomiting. Without treatment, the infection can last weeks to months, and can cause brain damage or death. Pertussis is highly communicable, and transmission of the disease occurs through direct contact with the respiratory droplets of an infected person (spread through coughing or sneezing). Pertussis can last for weeks or months without any antibiotic treatment, and can be contagious for five days after treatment. Pertussis can be prevented with immunization. The disease is most severe in children under one year of age, especially if unvaccinated or under-vaccinated. Immunity gained from childhood vaccination and natural disease diminishes with time, and therefore adolescents and adults who have not received a booster vaccination are at risk of infection. In Ontario, a publicly funded pertussis vaccine is given in combination with vaccines against diphtheria, tetanus, polio and *Haemophilus influenzae* type b to infants at two, four and six months of age, with a booster given at 18 months. Additional booster doses of pertussis containing-vaccine are administered between four and six years and 14 to 16 years of age. As of December 2014, all adults over 19 years are eligible to receive a single dose of the vaccine, irrespective of vaccination in adolescence.^{3,44-46}

Trends over time

In 2015, there were four cases of pertussis (two confirmed and two probable) in Windsor-Essex County, representing a rate of 1.0 case per 100,000 population (see Figure 39). The rate in Windsor-Essex County for 2015 was five times lower than the rate for Ontario (5.1 cases per 100,000 population). Rates in Windsor-Essex County have shown a decline after 2012, a peak year due to an outbreak in Southwestern Ontario. Between 2014 and 2015, rates in Windsor-Essex County have remained stable, while rates in Ontario have more than doubled (from 2.1 cases per 100,000 in 2014 to 5.1 cases per 100,000 in 2015).

Figure 39. Trends in confirmed and probable pertussis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

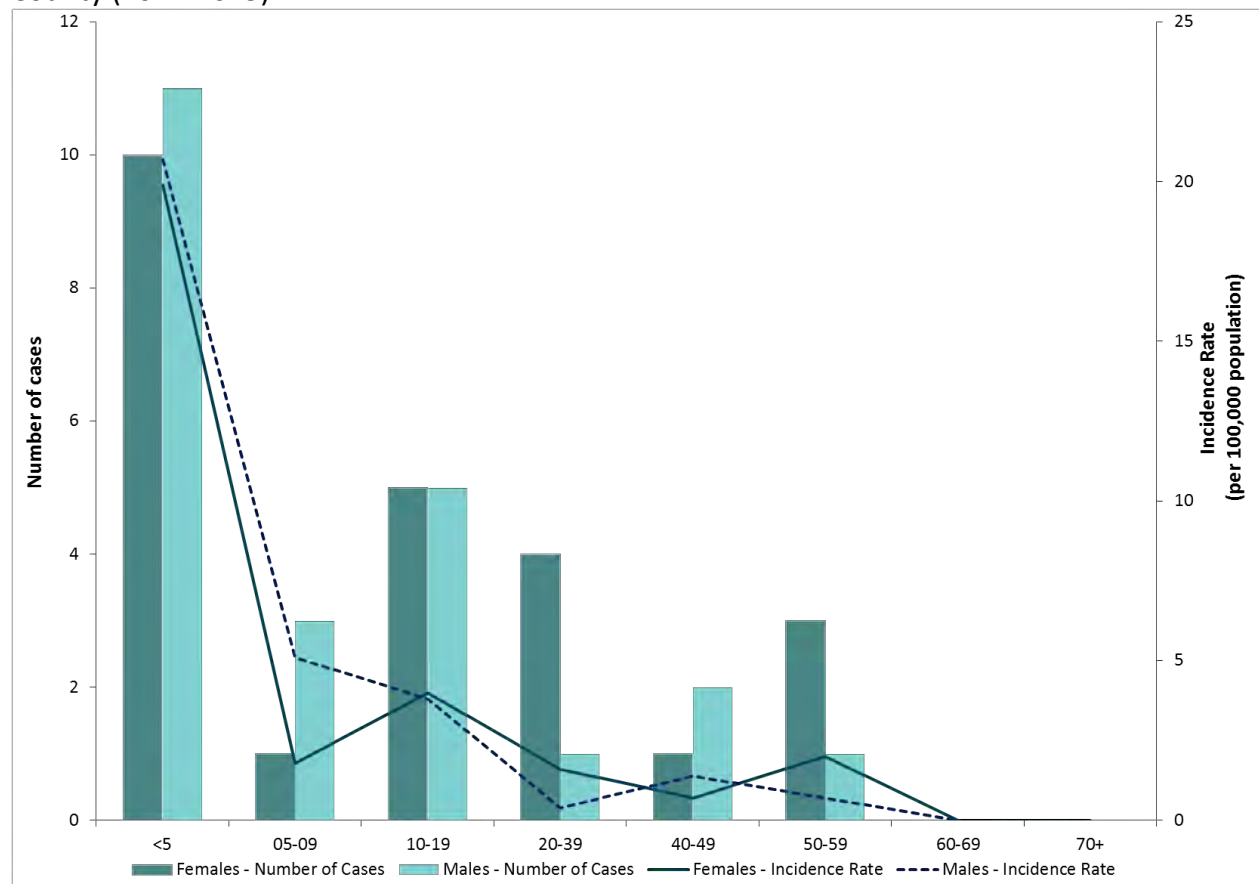
Between 2011 and 2015, the highest rates of pertussis were in those younger than five years of age (20.4 cases per 100,000 population). Rates of pertussis generally declined with increasing age (see Table 23 and Figure 40). There were no sex-specific trends in rates of pertussis.

Table 23. Incidence of confirmed and probable pertussis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	10	19.9	11	20.7	21	20.4
05-09	1	1.8	3	5.1	4	3.5
10-19	5	4.0	5	3.8	10	3.9
20-39	4	1.6	1	0.4	5	1.0
40-49	1	0.7	2	1.4	3	1.0
50-59	3	2.0	1	0.7	4	1.3
60+	0	0.0	0	0.0	0	0.0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 40. Incidence of confirmed and probable pertussis cases by age and sex, Windsor-Essex County (2011-2015)

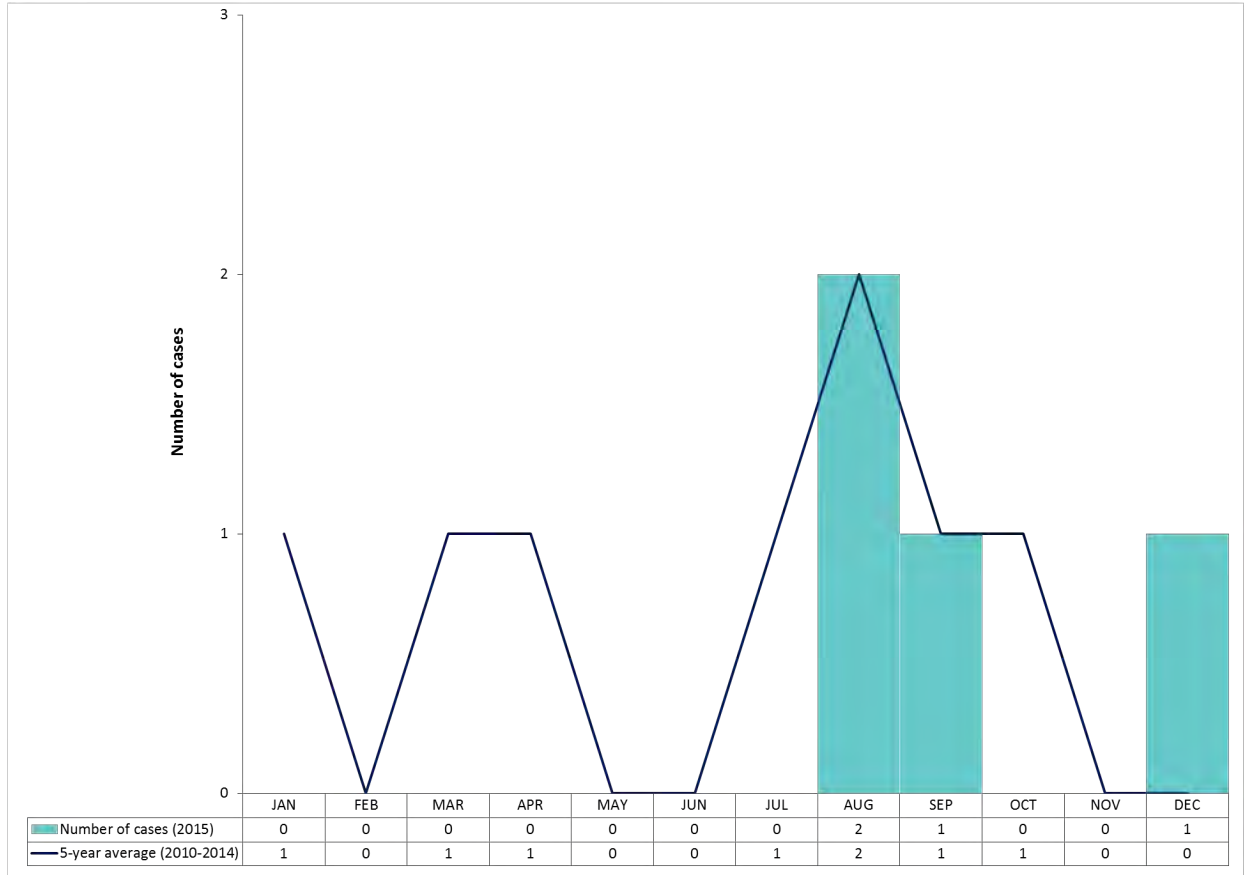


WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In 2015, three of the four cases were observed between August and September. Based on the five-year average of case counts (2010-2014), two cases are expected in August, and one in September (see Figure 41).

Figure 41. Confirmed and probable pertussis case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Outbreaks

The last outbreak of pertussis in Ontario with cases from Windsor-Essex County was in 2012. This was a provincial outbreak with 31 local cases that had episode dates ranging from late 2011 to early 2013.

Risk Factors

Behavioural Risk Factors

The top behavioural risk factor reported by cases was close contact with another case (61.8%, 21 cases). Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' were considered.

Medical Risk Factors

Not being immunized was the top medical risk factor reported by cases questioned about this risk factor (68.6%, 24 cases). Partial/incomplete immunization was reported by 53.3% of cases questioned (8 cases). No other medical risk factor was reported by five or more cases.

Hospitalization/Deaths

In 2015, one of the four cases was hospitalized. The last hospitalization of a case prior to 2015, was reported in 2011. There have been no deaths reported in pertussis cases from 2011 to 2015.

Varicella (chickenpox)

Background

Varicella (chickenpox) is an infectious disease caused by the varicella-zoster virus. Varicella can result in fever, blister-like rashes across the body and face, irritation and tiredness. The illness is most common in children, but also occurs in adults. Symptoms usually appear 10 to 21 days after infection and can last about two weeks. The virus can spread from person to person through the air (coughs or sneezes), through contact with a blister, and during or after pregnancy. A person can be contagious until the skin lesions crust over. Infected individuals are most contagious from a few days before to shortly after onset of rash. Isolation of cases can reduce the spread of illness.^{47,48}

Varicella can be prevented by immunization. In Ontario, two doses of the varicella vaccine are publicly funded. The first dose of varicella vaccine is recommended for children between 12 and 15 months. The second dose is offered to children from four to six years of age in the form of the MMRV (measles, mumps, rubella, varicella) vaccine.⁴⁹

Children who missed the first dose can receive it until they are 11 years old. As part of the catch-up program for the second dose of chickenpox vaccine, children who have already received two doses of the measles, mumps, and rubella (MMR) vaccine will be eligible to receive a second dose of the chickenpox vaccine separately. Children can receive the second dose three months after the first dose, until they are 11 years old (i.e., children born on or after January 1, 2000).⁴⁹

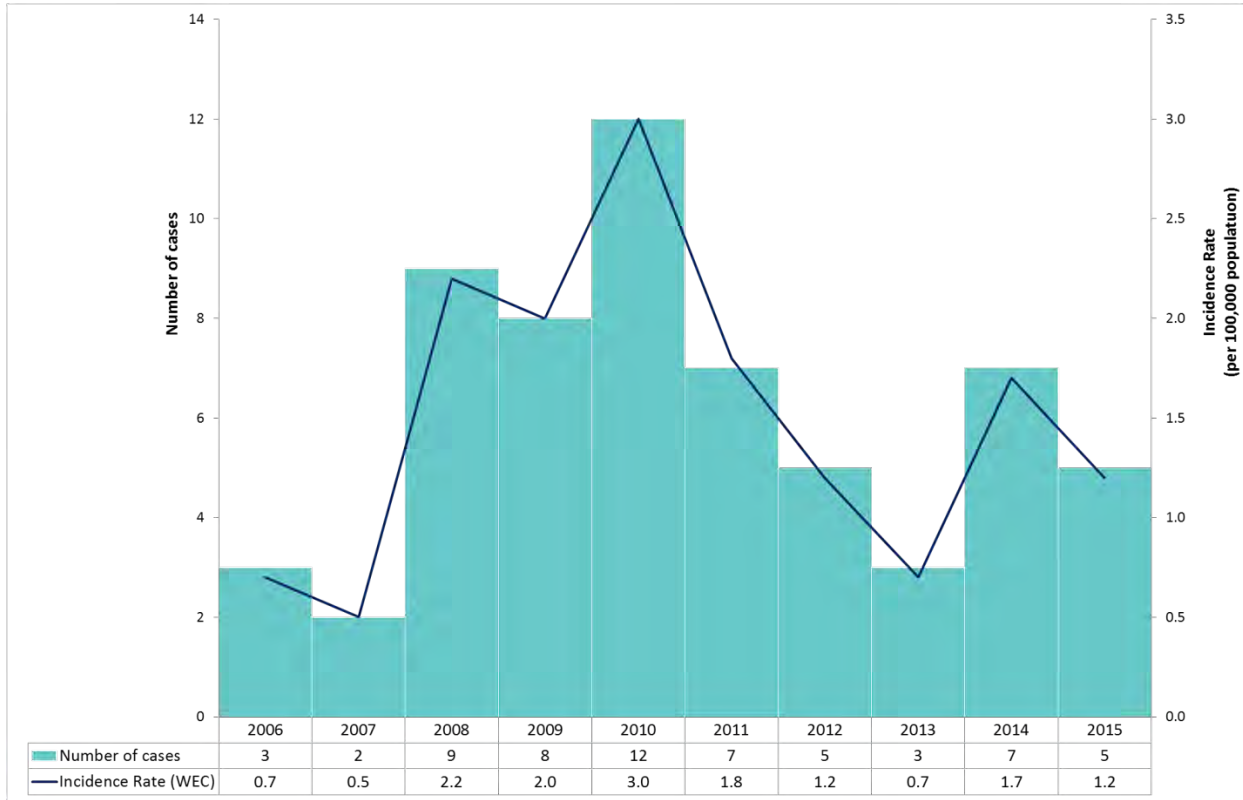
Trends over time

Cases of varicella are reported both individually and in aggregate. Since late 2006, aggregate cases counts broken down by age-group are reported by the public health unit every month. Only those cases with more severe illness are reported individually, in greater detail. Aggregate case counts may include duplicate cases reported from more than one data source, as well as misclassified cases.³ Aggregate case counts are useful in identifying trends in the incidence of the disease, however, it is susceptible to a great deal of under-reporting and precision.³

In 2015, there were five cases of varicella reported at the individual level, representing an incidence rate of 1.2 cases per 100,000 population (see Figure 42). Between 2006 and 2015, case counts of varicella at the individual level have ranged from 2 to 12 cases a year.

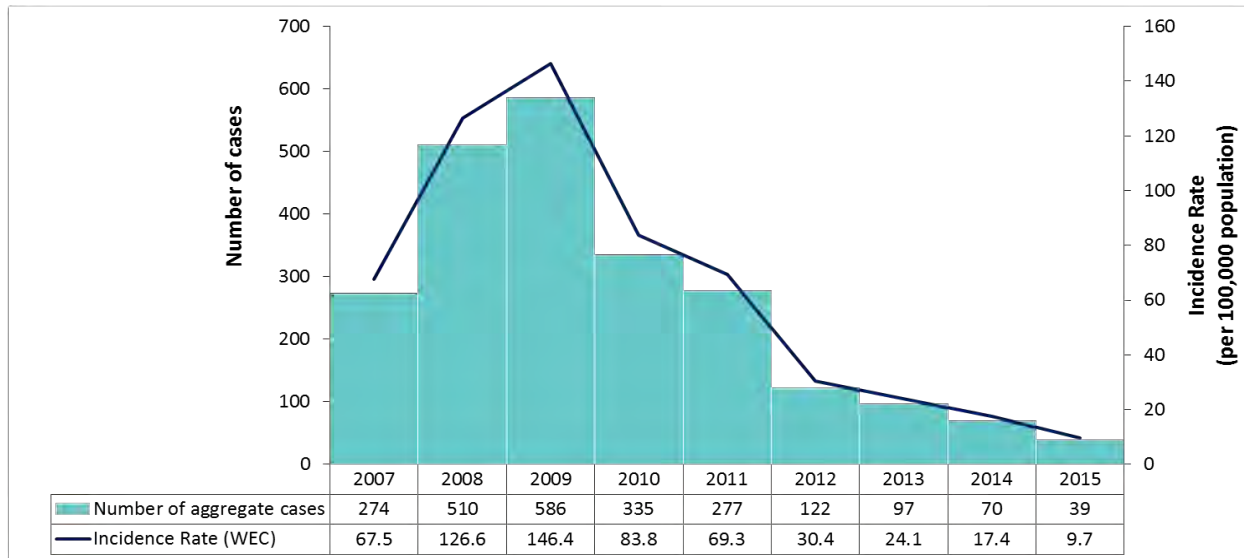
Since 2009 aggregate case counts have shown a sharp decline (93.4% decrease from 2009 to 2015). In 2015, the aggregate level incidence rate was 9.7 cases per 100,000 population (39 cases, see Figure 43).

Figure 42. Trends in individual-level varicella cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 43. Trends in aggregate-level varicella cases by episode year, Windsor-Essex County and Ontario (2007-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age

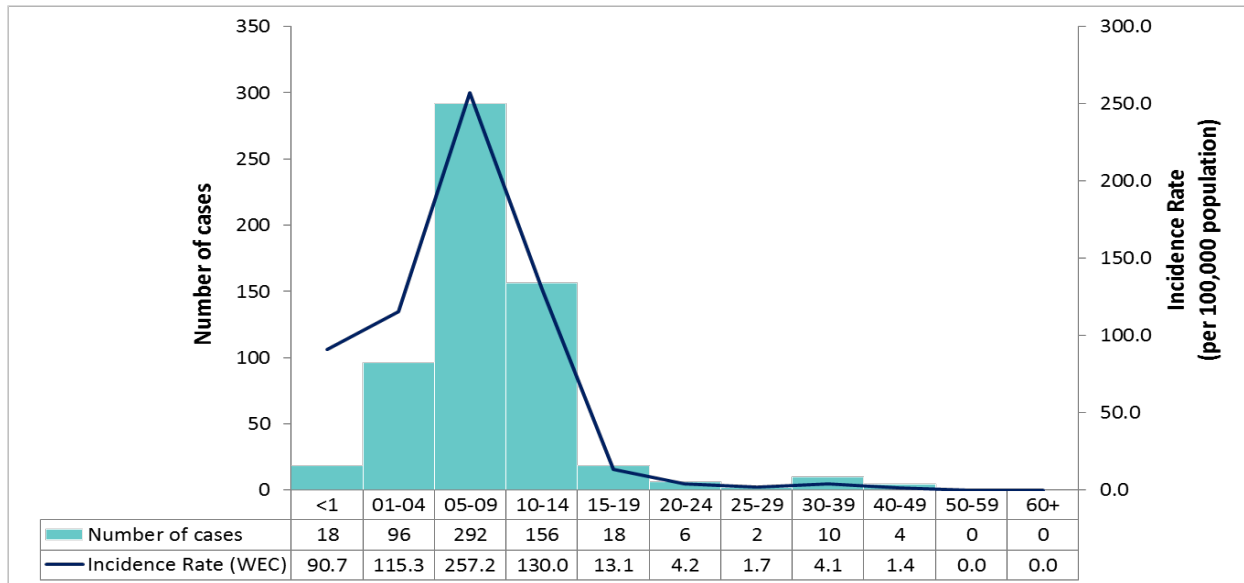
The incidence of varicella was highest in those between 1 and 14 years (see Table 24 and Figure 44). The highest incidence rate was observed in the 5 to 9 year age group (257.2 cases per 100,000 population), followed by the 10 to 14 year age group (130.0 cases per 100,000 population), and 1 to 4 year age group (90.7 cases per 100,000 population).

Table 24. Incidence of varicella cases reported at the aggregate-level by age, Windsor-Essex County (2011-2015)

Age group	Cases	Incidence Rate (per 100,000 population)
<1	18	90.7
01-04	96	115.3
05-09	292	257.2
10-14	156	130
15-19	18	13.1
20-24	6	4.2
25-29	2	1.7
30-39	10	4.1
40-49	4	1.4
50+	0	0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Figure 44. Incidence of varicella cases reported at the aggregate-level by age, Windsor-Essex County and Ontario (2007-2015)

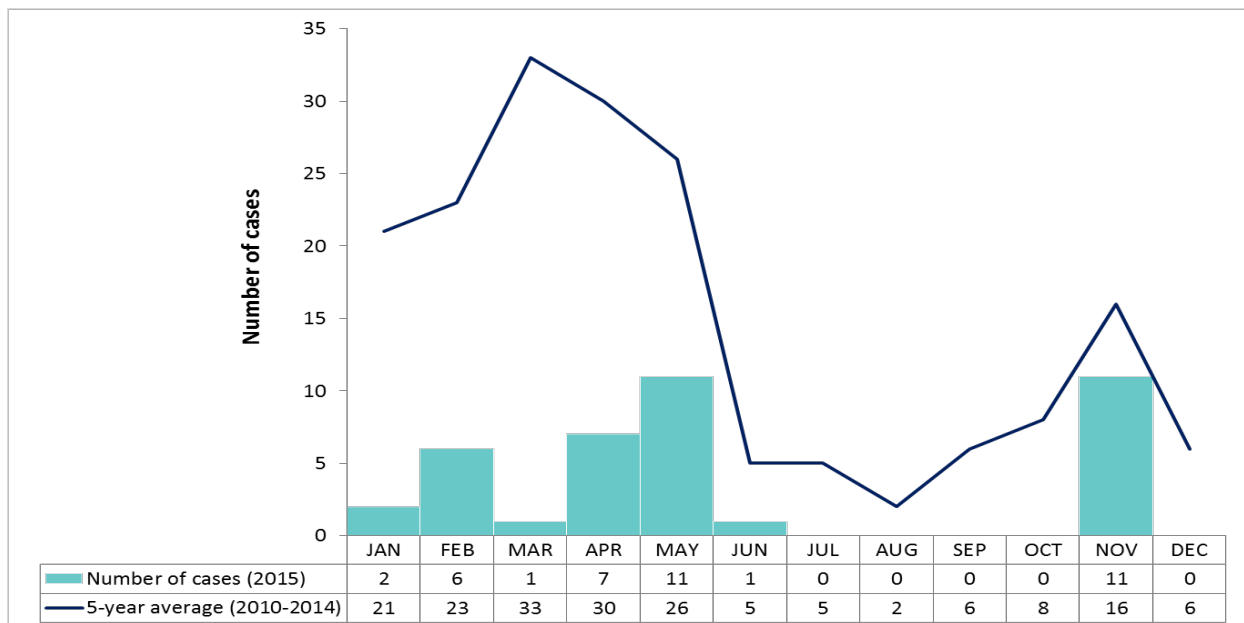


WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Seasonality

In 2015, peaks in case counts were observed in May (11 cases) and in November (11 cases). Based on the five-year average of counts (2010-2014), peaks are expected between March and May and in November (see Figure 45).

Figure 45. Aggregate-level varicella case counts by episode month, Windsor Essex County (2011-2014)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Hospitalization/Deaths

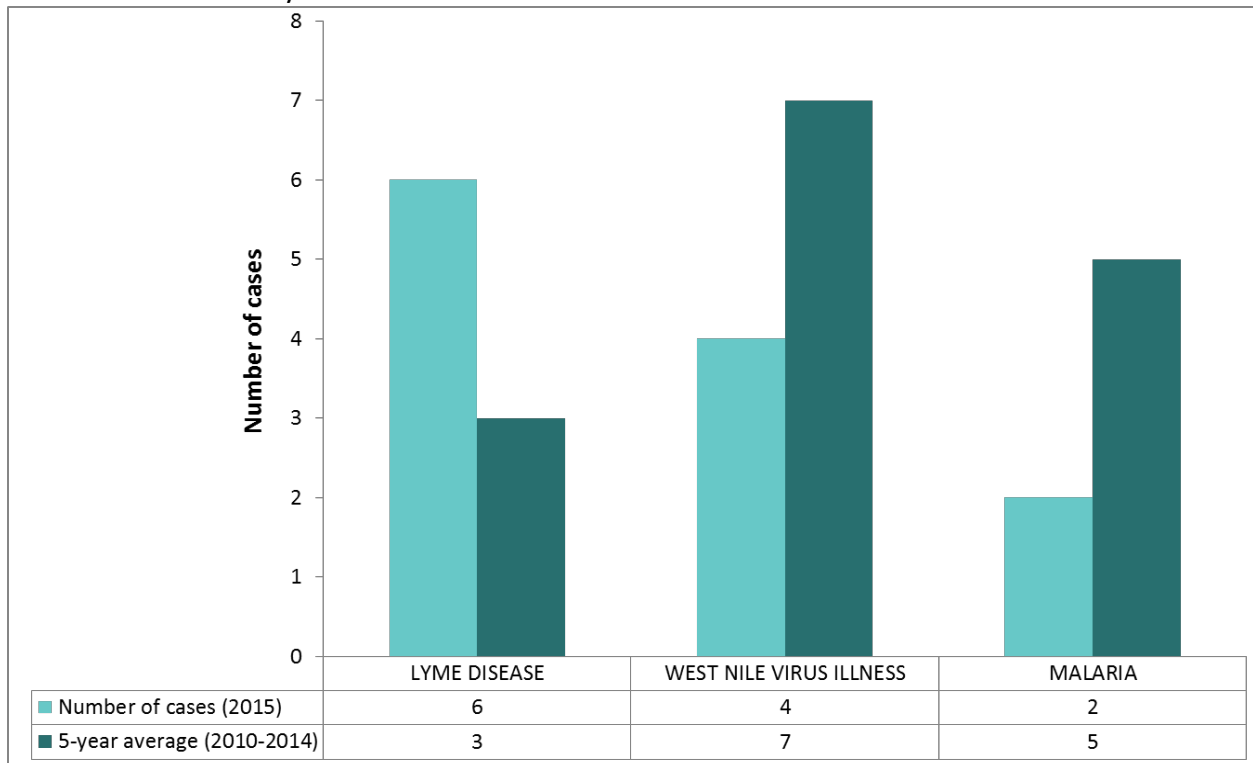
In 2015, there were no hospitalizations in cases reported at the individual-level. Between 2011 and 2014, the proportion of individual-level cases hospitalized has ranged from 14.3% (2011 and 2015: 1/7 cases) to 66.7% (2013: 2/3 cases). There have been no deaths reported in individual-level cases between 2011 and 2015.

Vector-borne and zoonotic diseases

Vector-borne diseases are illnesses that are transmitted to humans by an animal (vector). Vectors include any animal that can transmit a pathogen to a human (host) such as insects, ticks, and mites. Zoonotic diseases are diseases that are spread from animals to humans through contact (direct or indirect) or through vectors capable of carrying zoonotic pathogens.

In 2015, there were 12 cases of vector-borne disease and no cases of zoonotic disease (rabies) reported in Windsor-Essex County. Lyme disease case counts for 2015 were twice the five-year average, while WNV and malarial case counts were below the historical average (see Figure 46).

Figure 46. Number of cases and five-year average of vector-borne and zoonotic diseases, Windsor-Essex County



Lyme Disease

Background

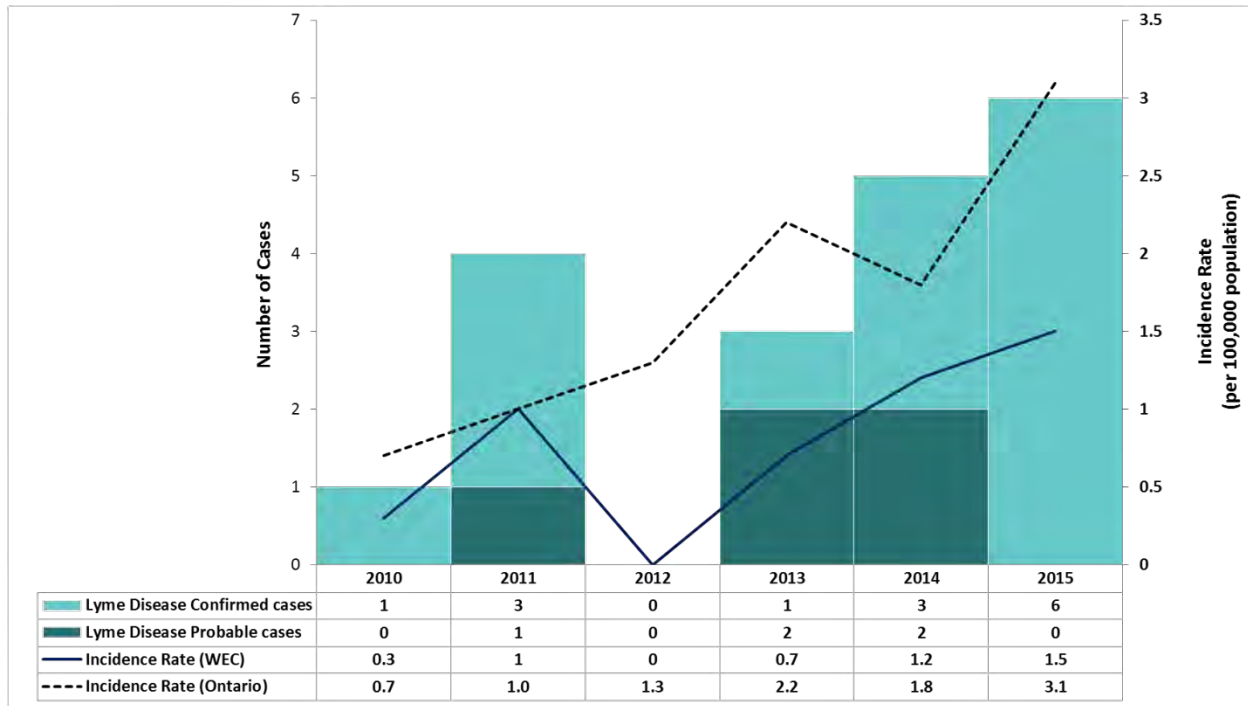
Lyme disease is a bacterial disease caused by *Borrelia burgdorferi*. The disease is spread to humans from the bite of an infected tick. In Ontario, the disease is only transmitted through the blacklegged tick. Ticks become infected by feeding on infected wild animals such as deer, birds, and rodents. Symptoms of Lyme disease vary from person to person, and can include skin rash, headache, fever or chills, fatigue, spasms or weakness, muscle and joint pain, numbness or tingling, and swollen lymph nodes. Symptoms may appear three days to one month after being bitten by an infected tick. Early antibiotic treatment is usually effective. If untreated, the disease can progress to heart palpitations, abnormal heart beat, extreme fatigue and weakness, paralysis, mental confusion, and nervous system disorders. Preventive measures for Lyme disease include using insect repellent when outdoors, wearing proper clothing, removing ticks from the body immediately after bites, and preventing ticks from living near the home by doing things such as keeping the grass mowed and removing leaf litter.⁵⁰⁻⁵² In Windsor-Essex County, Point Pelee National Park is an estimated risk area, where black-legged ticks have been found through tick dragging.⁵³

Trends over time

The provincial case definition of Lyme disease was changed in early 2009 to include probable and confirmed cases. Prior to 2009, only confirmed cases were included in the definition. For comparability to Ontario, only trends after 2009 are analyzed in this report.

In 2015, there were six cases of Lyme disease in Windsor-Essex County (all confirmed cases). Rates of Lyme disease have increased steadily from 0.3 cases per 100,000 population in 2010 to 1.5 cases per 100,000 population in 2015 (see Figure 47). Rates in Ontario have also increased during the same period. However, the rates in Windsor-Essex County have been lower than the rates for Ontario for most years. The 2015 rate for Windsor-Essex County was 52% lower than that of Ontario (3.1 cases per 100,000 population in Ontario). The increase in incidence may be a result of increasing black-legged tick populations, increased public health and clinician awareness of the disease, and improved surveillance.⁵⁴

Figure 47. Trends in confirmed and probable Lyme disease cases by episode year, Windsor-Essex County and Ontario (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

Females accounted for most cases of Lyme disease in Windsor-Essex County between 2011 and 2011 (72.2%). In females, high rates were observed in the 20-29 year age-group (3.1 cases per 100,000 population) and the 60-69 year age group (2.6 cases per 100,000 population). In males, the highest rate was observed in children less than 10 years (1.8 cases per 100,000 population). See Table 25 and Figure 48 for a break down by age-group and gender.

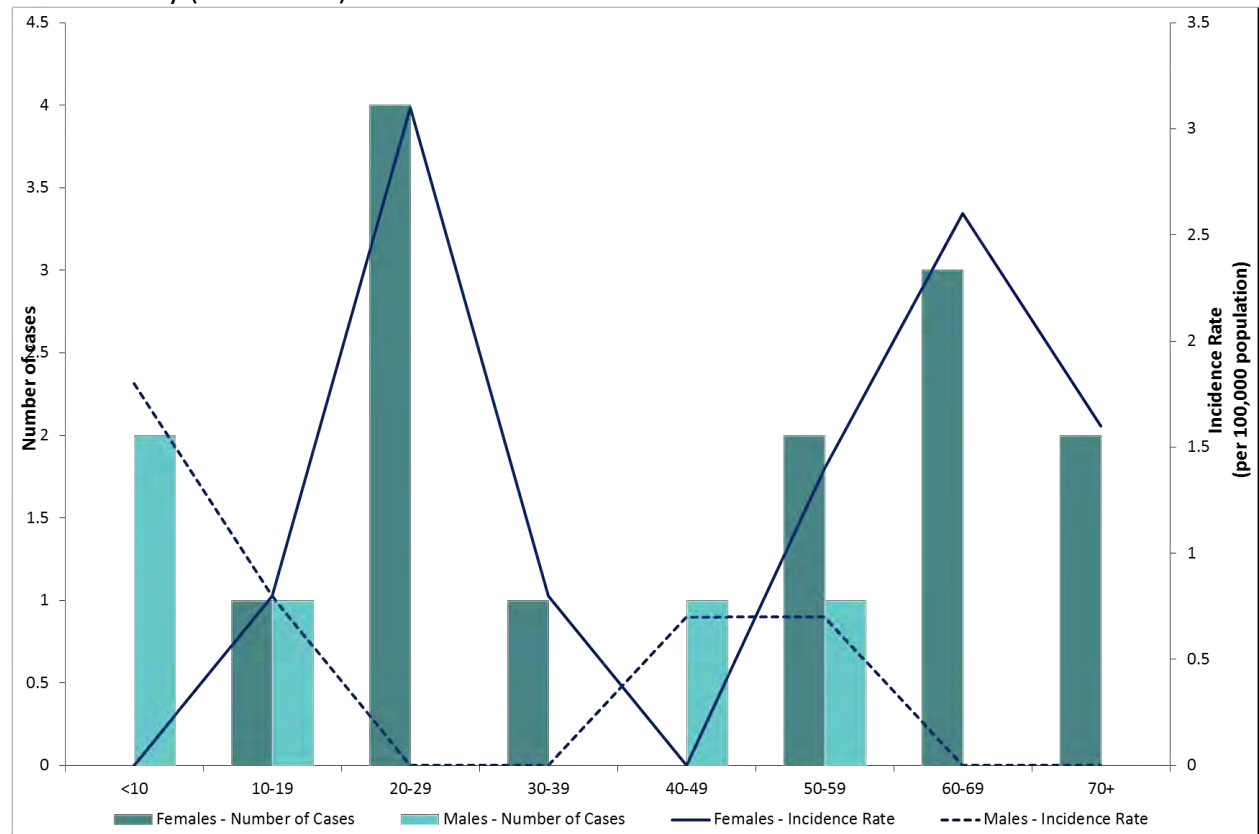
Table 25. Incidence of confirmed and probable Lyme disease cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	0	0.0	2	1.8	2	0.9
10-19	1	0.8	1	0.8	2	0.8
20-29	4	3.1	0	0.0	4	1.5
30-39	1	0.8	0	0.0	1	0.4
40-49	0	0.0	1	0.7	1	0.3
50-59	2	1.4	1	0.7	3	1.0
60-69	3	2.6	0	0.0	3	1.3
70+	2	1.6	0	0.0	2	0.9

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 48. Incidence of confirmed and probable Lyme disease cases by age and sex, Windsor-Essex County (2011-2015)



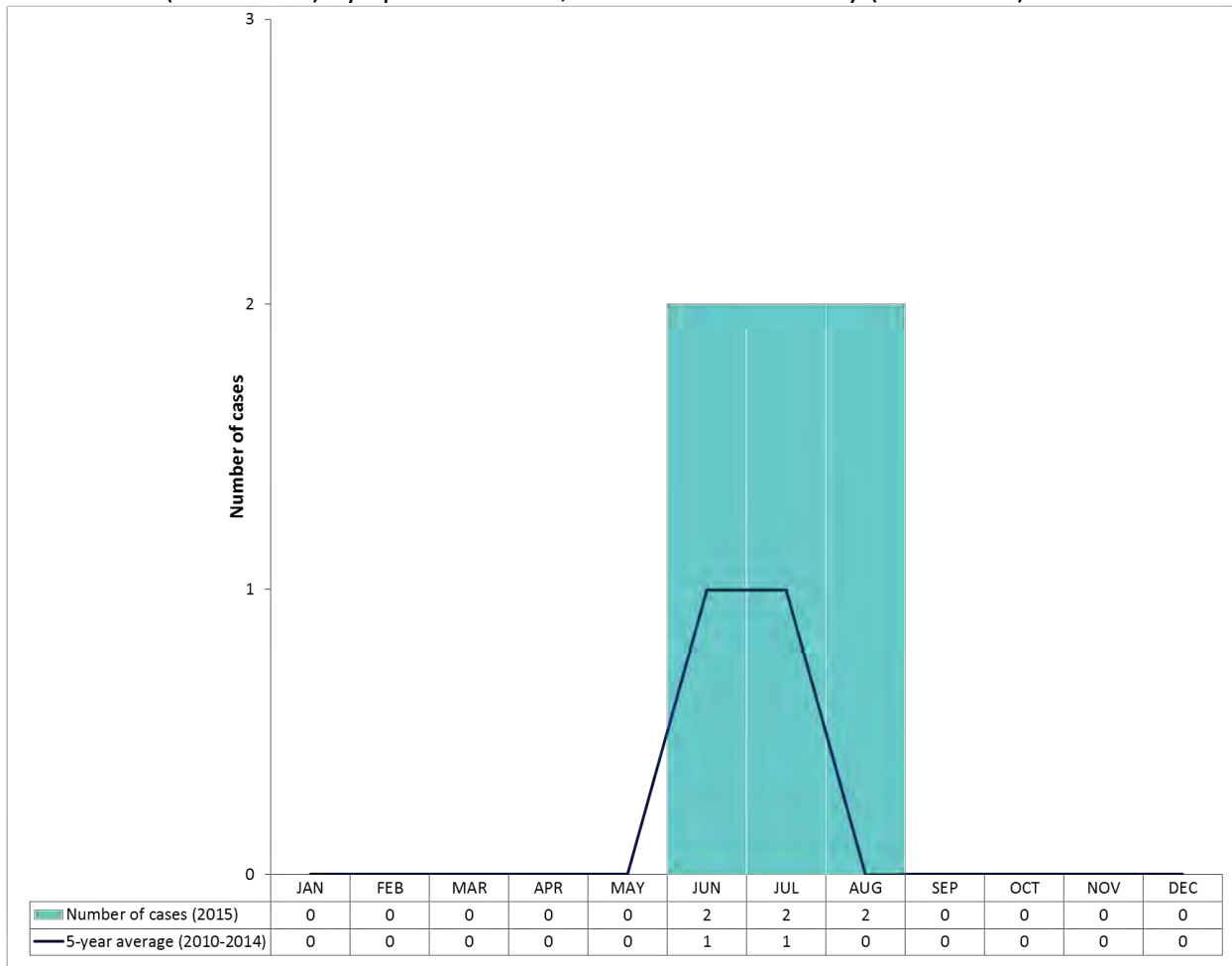
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In 2015, all six cases occurred in the summer months (two cases per month from June to August; see Figure 49). This is expected as black-legged ticks are in the nymphal stage of their life cycle in the summer (a period of peak activity for nymphal stage ticks), and also due to increased outdoor activity.

Figure 49. Confirmed and probable Lyme disease case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural risk factors

The top risk factor reported by Lyme disease cases from 2011 to 2015 was performing activities in wooded or tall grass areas (91.7%). Other reported risk factors include failure to check for ticks after being outdoors in wooded or tall grass areas (80.0%), travel to an endemic area in the last 32 days (71.4%), tick bite or exposure to ticks (66.7%), failure to use insect repellent

when outdoors in wooded or tall grass areas (62.5%), and failure to use adequate clothing protection in wooded or tall grass areas (54.5%).

Table 26. Behavioural risk factors reported by confirmed and probable Lyme disease cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'	Percentage of cases that reported 'Yes'
Activities in wooded or tall grass areas	11	91.7
Does not always check themselves for ticks after being outdoors in wooded or tall grass areas	4	80.0
Travel to endemic area in the last 32 days	5	71.4
Tick bite or exposure to ticks	10	66.7
Does not always use insect repellent when outdoors in wooded or tall grass areas	5	62.5
Does not always use adequate clothing protection in wooded or tall grass areas	6	54.5

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in 2011 and 2015. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and ≥50% of the respondents stating 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical risk factors

There were no medical risk factors besides 'unknown', reported by at least five cases.

Hospitalization/Deaths

From 2011 to 2015, there were two hospitalizations reported in Lyme disease cases (11.1%, 2 cases). The hospitalized cases had episode dates in 2013 and 2014 respectively. There have been no deaths reported in cases of Lyme disease from 2011 to 2015.

Malaria

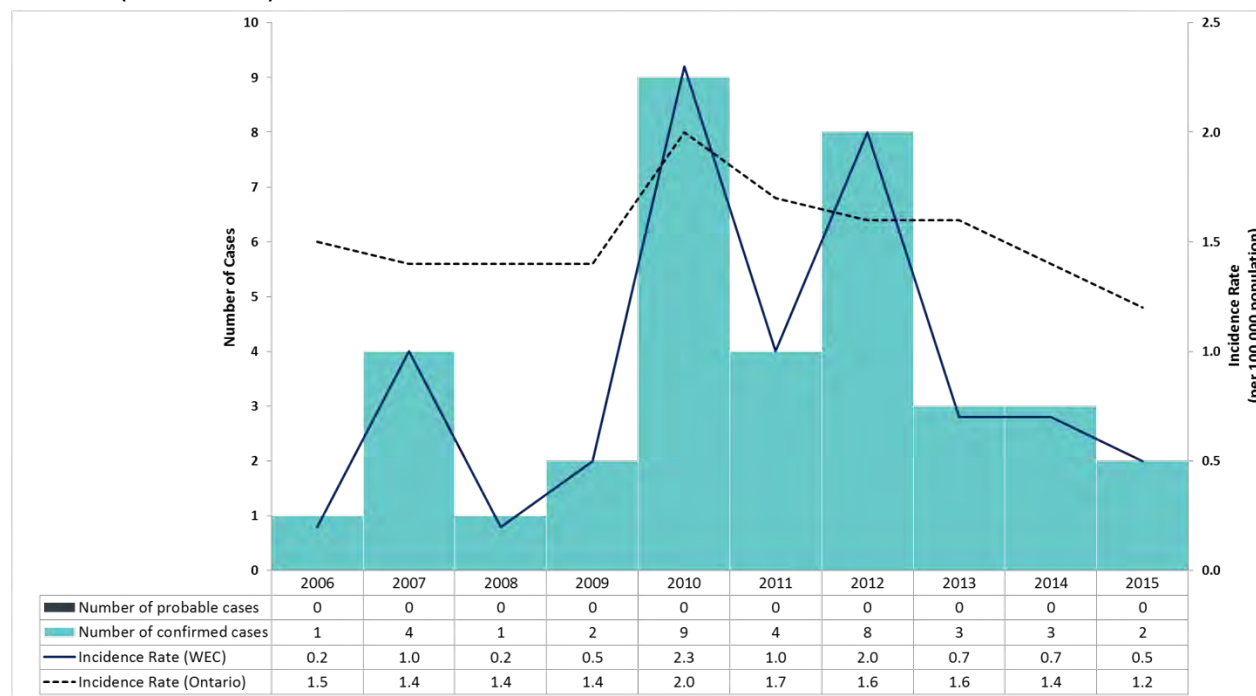
Background

Malaria is an infection caused by a parasite from the genus *Plasmodium*. There are five different parasites from this genus that can cause infection in humans. These species are *P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale*, and *P. knowlesi*. The infection is spread to humans by the bite of an infected female mosquito of the genus *Anopheles*. Transmission of the infection can also occur through blood transfusion, needle sharing, and from mother to fetus during pregnancy; although, transmission through these modes are rare. Symptoms of malaria typically appear one to four weeks after infection and include fever, diarrhea, headache, sweats or chills, nausea, vomiting, and muscle and stomach pain. In some cases, complications such as coma, seizures, respiratory failure, and renal failure may also arise. Lack of immediate treatment may also result in death. Preventive measures for malaria include the use of anti-malarial drugs, use of protective clothing, bed nets and repellents with DEET in high risk areas, and seeking early treatment for fever during or following travel to endemic areas.^{55,56}

Trends over time

Malaria is not endemic in Canada, and cases reported locally are a result of travel to malaria-endemic countries. In 2015, there were two confirmed cases of malaria in Windsor-Essex County. Both cases reported in 2015 reported travel to malaria-endemic countries. Rates in Windsor-Essex County and Ontario have decreased from 2013 to 2015. Rates in Windsor-Essex County have been below that of Ontario during this period (see Figure 50). In 2015, there were 1.2 cases per 100,000 population in Ontario, compared to 0.5 cases per 100,000 population in Windsor-Essex County.

Figure 50. Trends in confirmed malaria cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The majority of cases from 2011 to 2015 were males (75%, 15/20 cases). Cases ranged in age from 3 to 66 years (median: 34 years; See Table 27 and Figure 51).

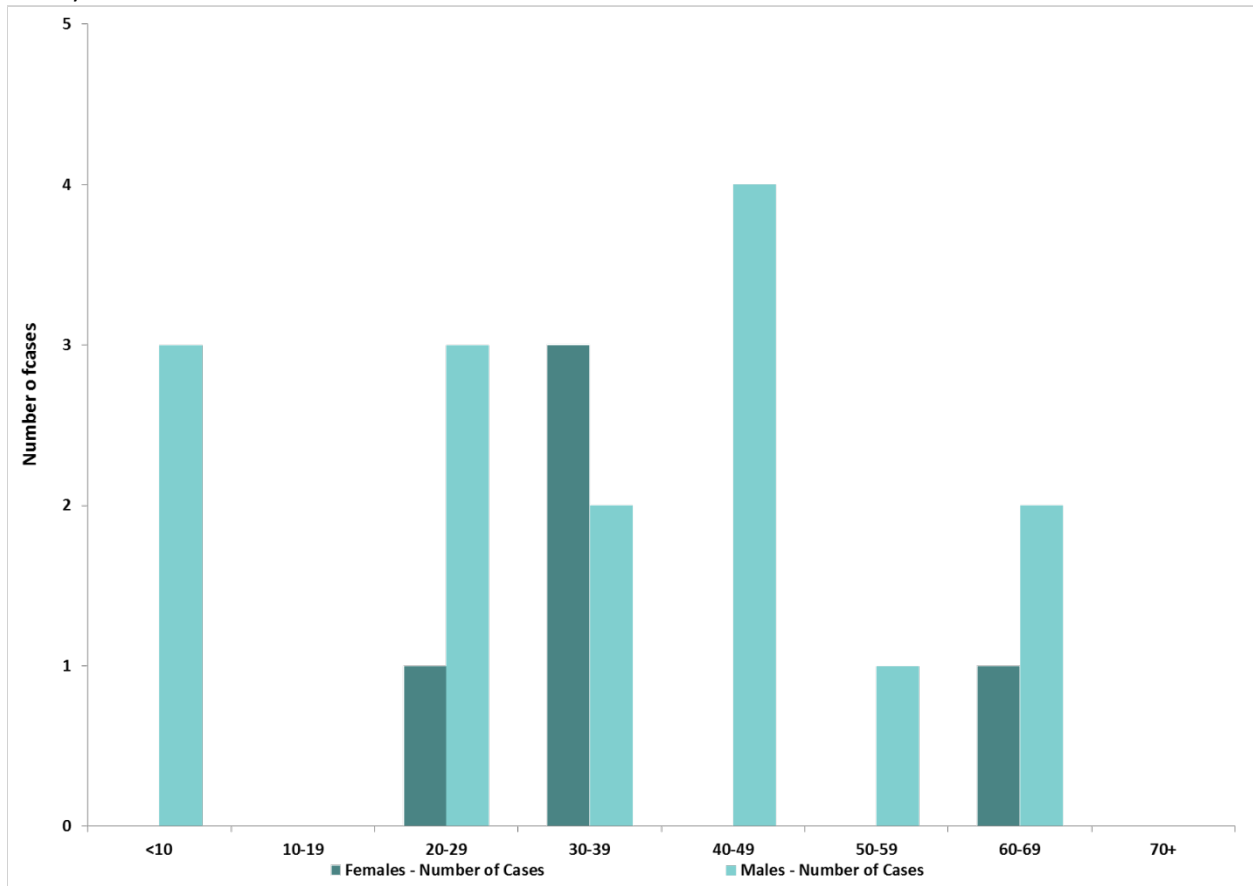
Table 27. Incidence of confirmed malaria cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Females	Males	Overall
<10	0	3	3
10-19	0	0	0
20-29	1	3	4
30-39	3	2	5
40-49	0	4	4
50-59	0	1	1
60-69	1	2	3
70+	0	0	0

Note: The overall case count includes those of unknown sex.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Figure 51. Incidence of confirmed malaria cases by age and sex, Windsor-Essex County (2011-2015)

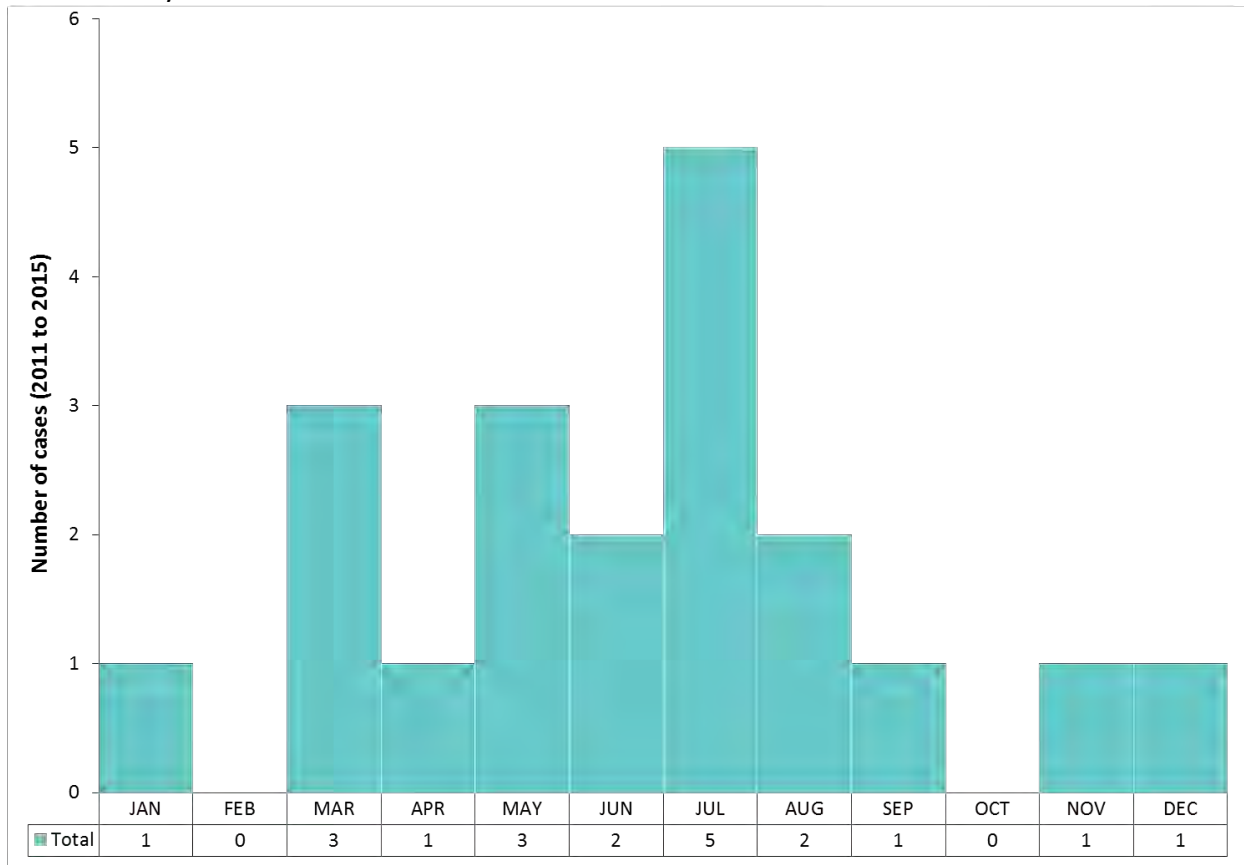


WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Seasonality

In 2015, the two cases reported had episode dates in June and July. This was expected as typically most cases are reported in the warmer months.⁵⁶ From 2011 to 2015, 60.0% of cases occurred between May and August (12/20 cases; see Figure 52).

Figure 52. Confirmed and probable case counts of Malaria (2011-2015) by month, Windsor-Essex County



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Species

Plasmodium falciparum was the most frequently identified malarial species in cases from Windsor-Essex County between 2011 and 2015 (60.0%; see Table 28). *Plasmodium vivax* was identified in 25.0% of cases during this period, and *plasmodium ovale* was identified in one case (5.0%).

Table 28. Confirmed malaria cases by malarial species, Windsor-Essex County (2011-2015)

Species	Number of cases	Percentage of cases (%)
<i>Plasmodium falciparum</i>	12	60.0
<i>Plasmodium vivax</i>	5	25.0
<i>Plasmodium ovale</i>	1	5.0
Unspecified	2	10.0

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

Travel to an endemic country in the 12 months prior to illness was the top risk factor reported by cases (100.0%; see Table 29). This was followed by mosquito bite or exposure to mosquitoes (87.5%), lived in an endemic area (80.0%), and failure to take anti-malarial drugs (58.8%).

Table 29. Behavioural risk factors reported by confirmed malaria cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Travel to endemic country in the last 12 months	16	100.0
Mosquito bite or exposure to mosquitoes	7	87.5
Lived in endemic area	8	80.0
Anti-malarial drugs not taken	10	58.8

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factors

History of malarial illness was the only medical risk factor reported by more than five cases (50.0%, 9/18 cases).

Hospitalization/Deaths

In 2015, there were no hospitalizations reported in cases from Windsor-Essex County. In the period between 2011 and 2014, the proportion of cases hospitalized ranged from 33.3% in 2013 (1/3 cases) to 75.0% in 2012 (6/8 cases). There have been no deaths reported in cases from 2015.

West Nile Virus

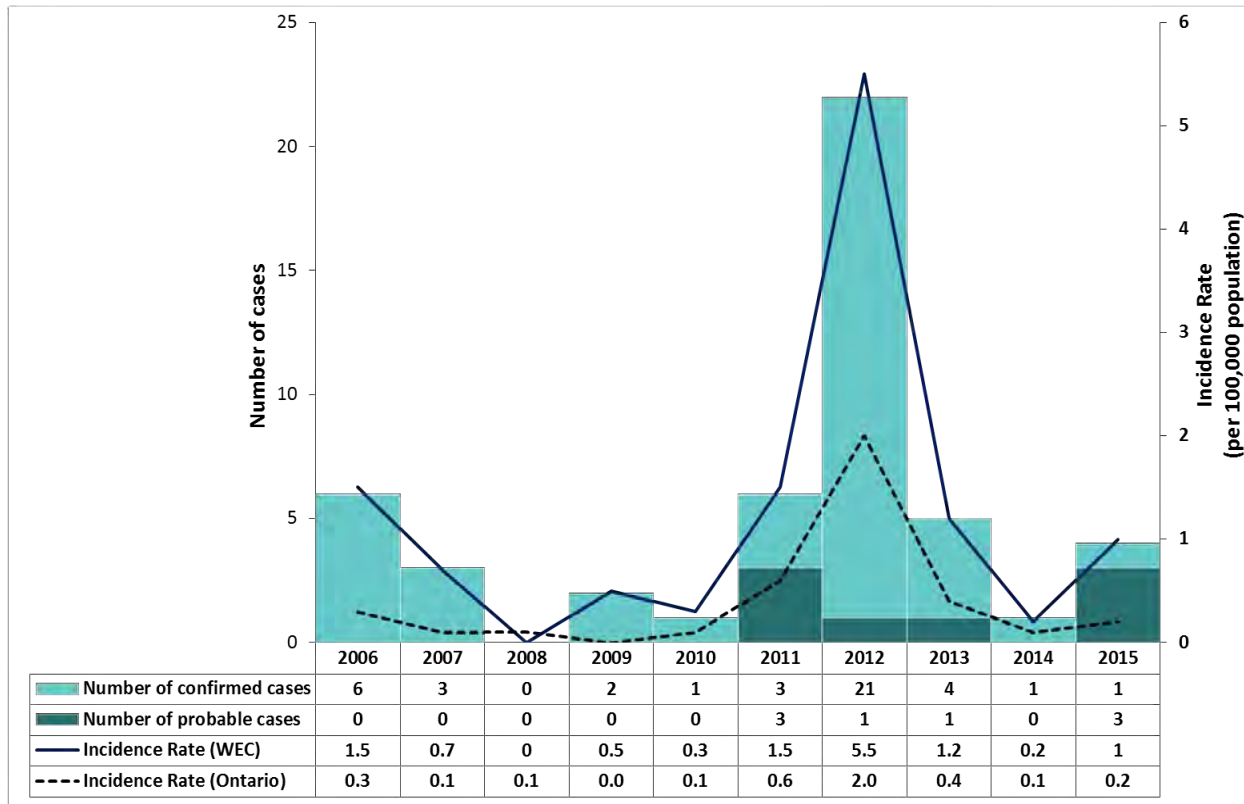
Background

West Nile virus (WNV) infection is most commonly transmitted to humans from the bite of an infected mosquito. The infection can also be transmitted through organ transplants, blood transfusions, from mother to the child during pregnancy, breast milk, and exposure to infected medical specimens. Risk of infection is greater in those over 50 years, those with chronic diseases, and those who are immunocompromised. Most infected individuals are asymptomatic. In those who experience symptoms, symptoms typically appear 2 to 14 days after being bit by an infected mosquito. Symptoms include fever, headache, body aches, fatigue, skin rash, vomiting and nausea. Less than 1% of infected individuals develop severe neurologic illness. There are no medications or vaccinations to treat or prevent WNV infection and cases are treated for their symptoms. Risk of WNV infection can be reduced by using insect repellent, wearing protective clothing, eliminating mosquito breeding sites, and preventing mosquito entry into the home.^{57,58}

Trends over time

In 2015, there was one confirmed case and three probable cases of WNV in Windsor-Essex County. This represented a rate of 1.0 case per 100,000 population. Rates in Windsor-Essex County have been higher than the rates for Ontario for most years from 2006 to 2015 (see Figure 53). In 2012, a peak year, rates locally were three times greater than the rate in Ontario (Windsor-Essex County: 5.5 cases per 100,000 population; Ontario: 1.2 cases per 100,000 population). In 2015, rates locally were five times greater than the rate in Ontario (0.2 cases per 100,000 in Ontario).

Figure 53. Trends in confirmed and probable West Nile virus cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The highest rate of West Nile virus was observed in the 50-59 year age-group (overall incidence: 6.0 cases per 100,000 population). From 50 years onwards, rates in males were higher than females (see Table 30 and Figure 54).

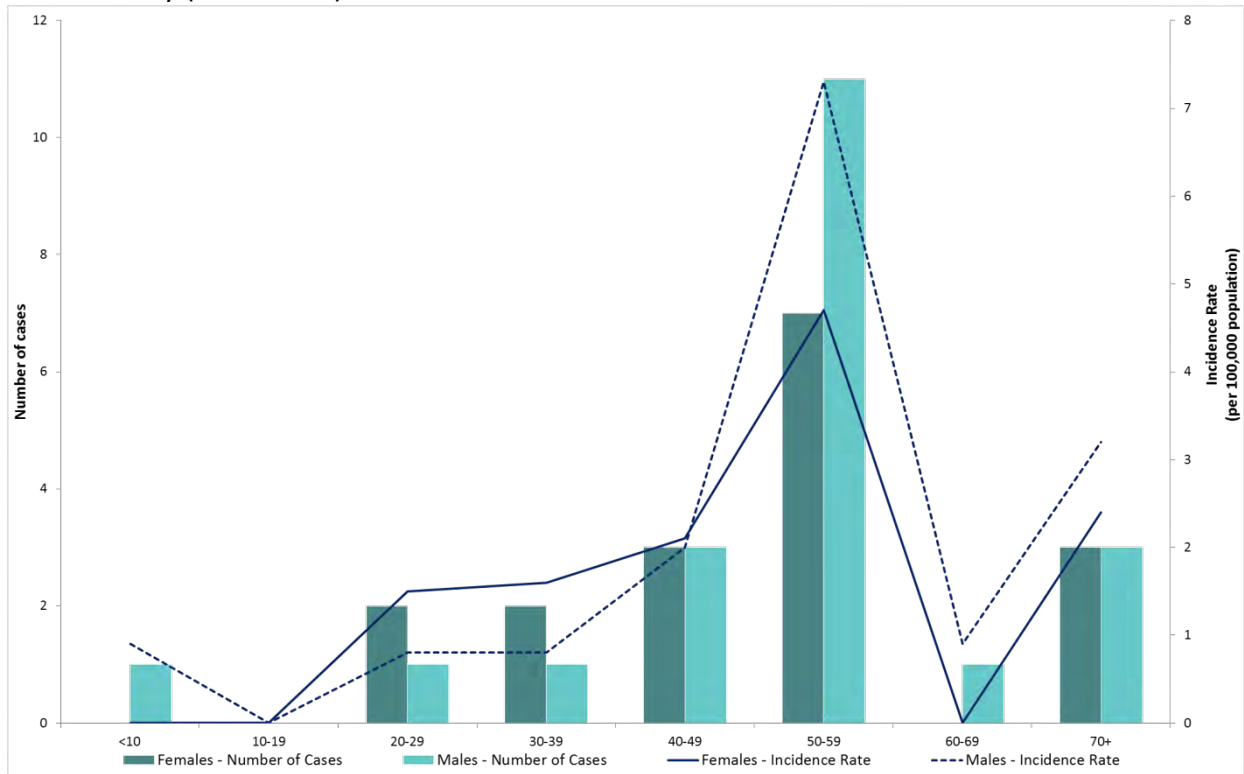
Table 30. Incidence of confirmed and probable West Nile virus cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	0	0.0	1	0.9	1	0.5
10-19	0	0.0	0	0.0	0	0.0
20-29	2	1.5	1	0.8	3	1.1
30-39	2	1.6	1	0.8	3	1.2
40-49	3	2.1	3	2.0	6	2.1
50-59	7	4.7	11	7.3	18	6.0
60-69	0	0.0	1	0.9	1	0.4
70+	3	2.4	3	3.2	6	2.7

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 54. Incidence of confirmed and probable West Nile virus cases by age and sex, Windsor-Essex County (2011-2015)

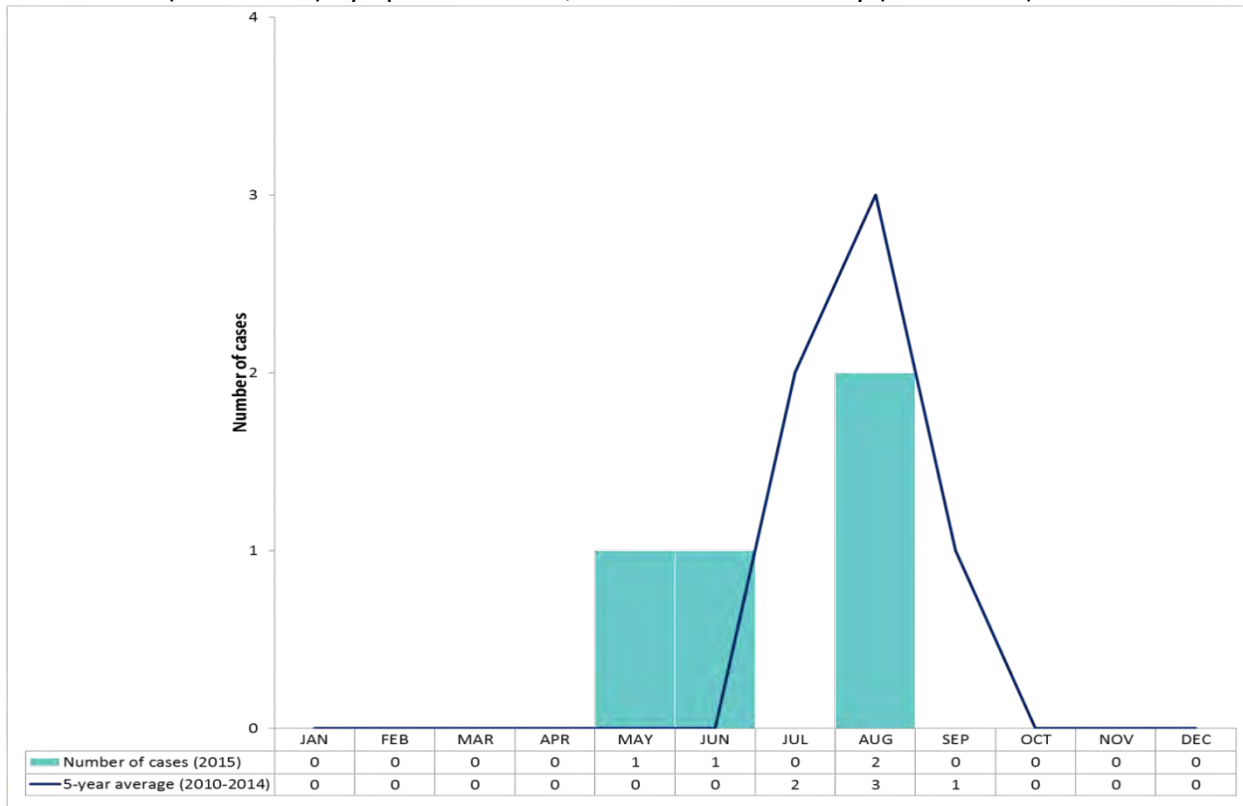


WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

The *Culex* mosquito (the primary vector for West Nile virus transmission), is most active in the warmer months. In 2015, all four cases had illness onset dates between May and August (see Figure 55).

Figure 55. Confirmed and probable West Nile virus case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

The top risk factors reported by West Nile Virus cases between 2011 and 2015 include outdoor activities (85.7%), not always using insect repellent when in wooded or tall grass areas (85.3%), not always using adequate clothing protection when exposed to mosquitoes (71.4%), and mosquito bite or exposure to mosquitoes (54.5%). See Table 31.

Table 31. Behavioural risk factors reported by confirmed and probable West Nile virus cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'	Percentage of cases that reported 'Yes'
Camping, hiking, working or other activities outdoors	18	85.7
Does not always use insect repellent when outdoors in wooded or tall grass areas	29	85.3
Does not always use adequate clothing protection when exposed to mosquitoes	15	71.4
Mosquito bite or exposure to mosquitoes	12	54.5

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in 2011 and 2015. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents and $\geq 50\%$ of the respondents stating 'Yes' are included in this table. The unknown 'and' municipal water system risk factors were excluded.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Medical Risk Factor

Of 21 respondents questioned about medical risk factors, 13 stated some 'other' medical risk factor (61.9%). This was the only risk factor besides 'unknown' that was reported by more than five respondents.

Hospitalization/Deaths

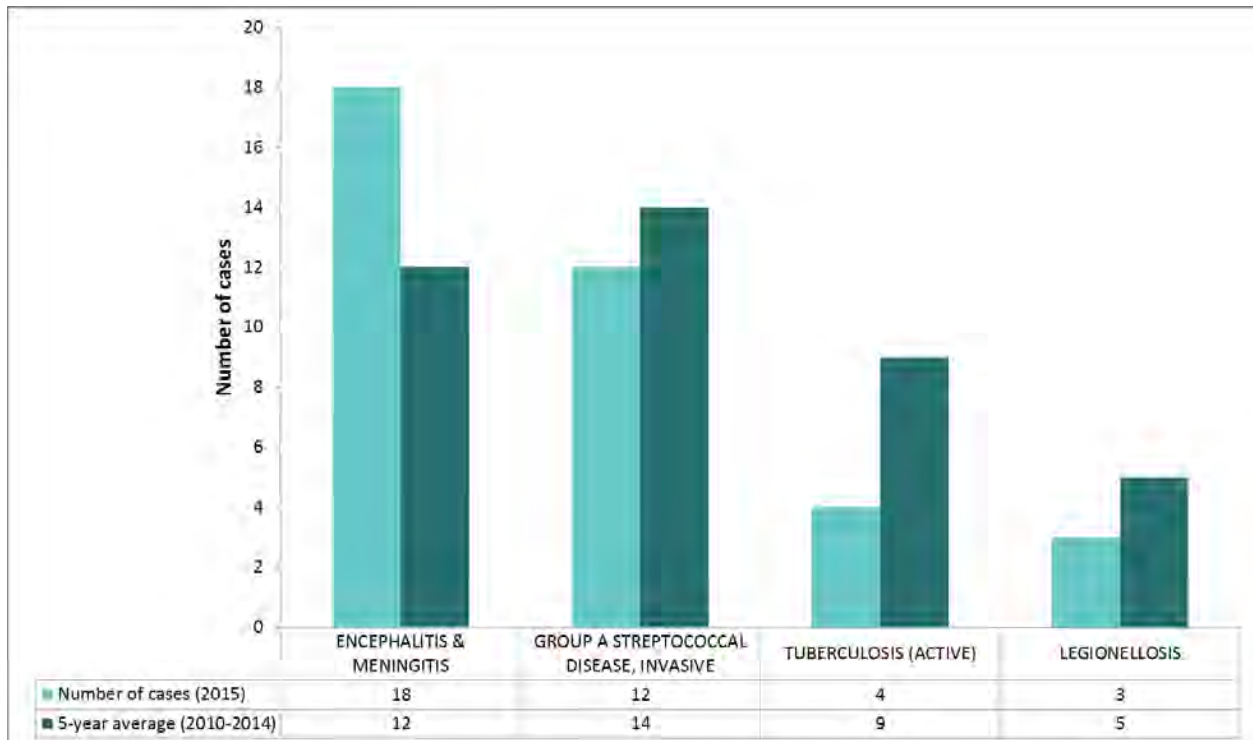
In 2015, one case of West Nile virus was hospitalized (25%). Between 2011 and 2015, the proportion of cases hospitalized has ranged from none (2014) to 50.0% (three cases in 2011). There were no deaths reported in 2015. During the period between 2011 and 2015, the only year with a reported death was 2012 (one case).

Other Diseases

Other reportable diseases (encephalitis and meningitis, invasive group a streptococcal disease, tuberculosis, and legionellosis) accounted for 37 cases in 2015. Encephalitis and meningitis and iGAS accounted for more than 80% of 'other' reportable disease cases. There were 18 cases of encephalitis and meningitis in 2015. This was the only disease grouping with case counts for 2015 higher than the historical average. See Figure 56.

There were no cases of Creutzfeldt-Jakob disease, hemorrhagic fevers, lassa fever, leprosy, severe acute respiratory syndrome (SARS) reported.

Figure 56. Number of cases and five-year average of other diseases, Windsor-Essex County in 2015.



Encephalitis and Meningitis

Background

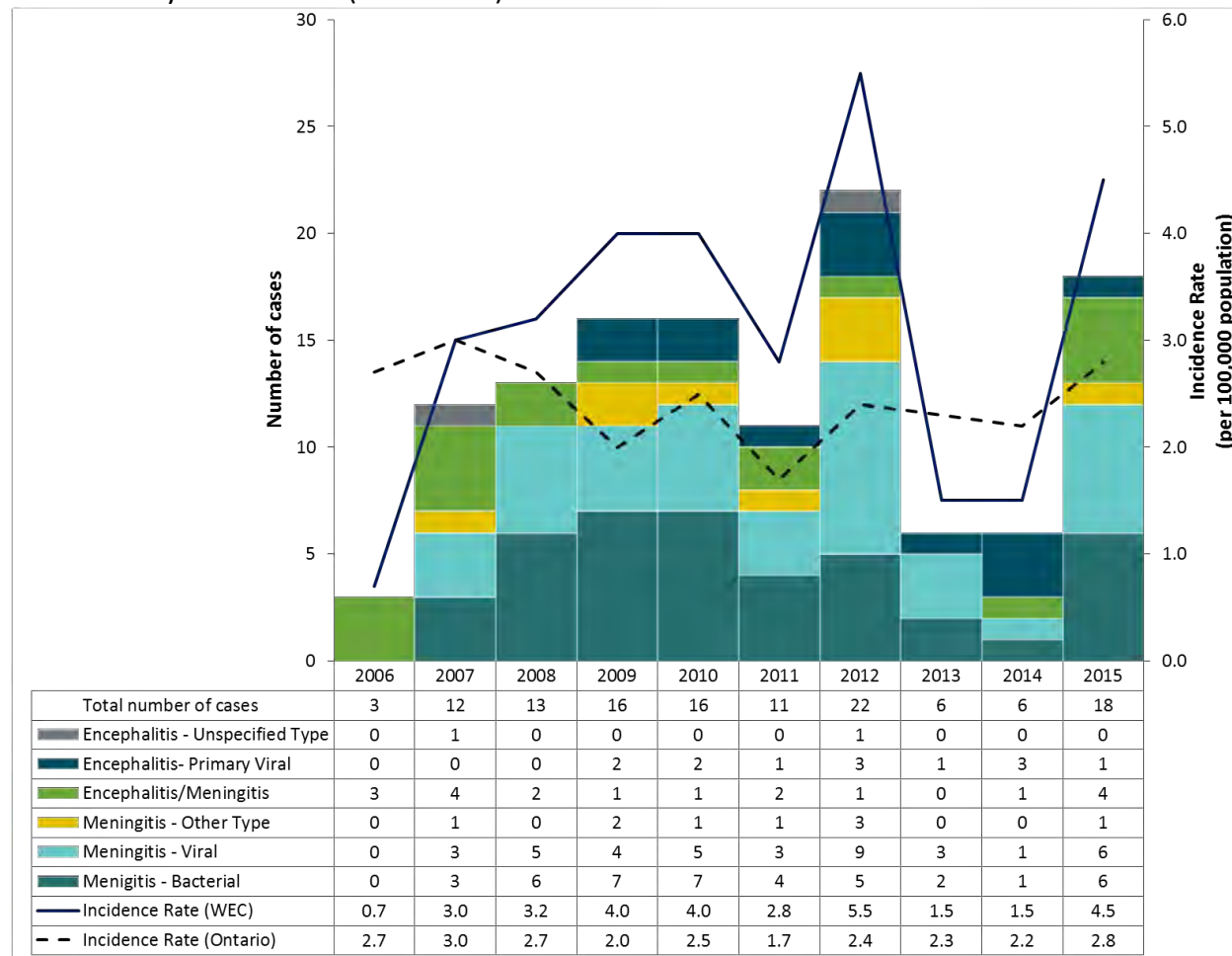
Encephalitis refers to inflammation of the brain tissue, caused by viral (most common), bacterial, or fungal infections. Symptoms of encephalitis include headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, convulsions, and spastic paralysis. In post-infectious encephalitis (spread of infection from another part of the body to the brain), cases may experience confusion, seizures, headaches, neck stiffness, fever, and loss of full control of bodily movements. Infection of the spinal cord may lead to paraplegia or quadriplegia. Treatment of encephalitis is mainly supportive, and personal prevention measures include proper hand hygiene, avoidance of sharing items such as cups and utensils, and taking precautions against arthropod bites.⁵⁹

Meningitis refers to inflammation of the membranous tissue surrounding the brain and spinal cord, caused by viral or bacterial infections. Meningitis has a very sudden onset and cases present with high fever, severe headache, vomiting, confusion, seizures, lethargy, drowsiness, stiff neck, and skin rash on the hands and feet. Personal prevention measures for bacterial meningitis include vaccination for the causative organism, avoidance of living in crowded quarters and sharing of items contaminated with saliva, and practicing proper cough etiquette and hand hygiene.⁶⁰

Trends over time

In 2015, there were 18 cases of encephalitis and meningitis in Windsor-Essex County, representing a rate of 4.5 cases per 100,000 population. This was the first increase in incidence rates since 2013 (200% increase). The rate in 2015 for Windsor-Essex County was also 60.7% higher than the rate in Ontario (see Figure 57). Meningitis accounted for 13 of the 18 cases (72.2% - bacterial meningitis: 6 cases; viral meningitis: 6 cases; other meningitis: one case). Primary encephalitis accounted for one case, and cases classified as “encephalitis/meningitis” accounted for four cases.

Figure 57. Trends in confirmed encephalitis and meningitis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/09.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The highest rates of encephalitis and meningitis were observed in children younger than five years of age (18.4 cases per 100,000 population; see Table 32 and Figure 58). In this age group, rates in males were more than twice that of females (males: 26.4 cases per 100,000 population; females: 10.0 cases per 100,000 population).

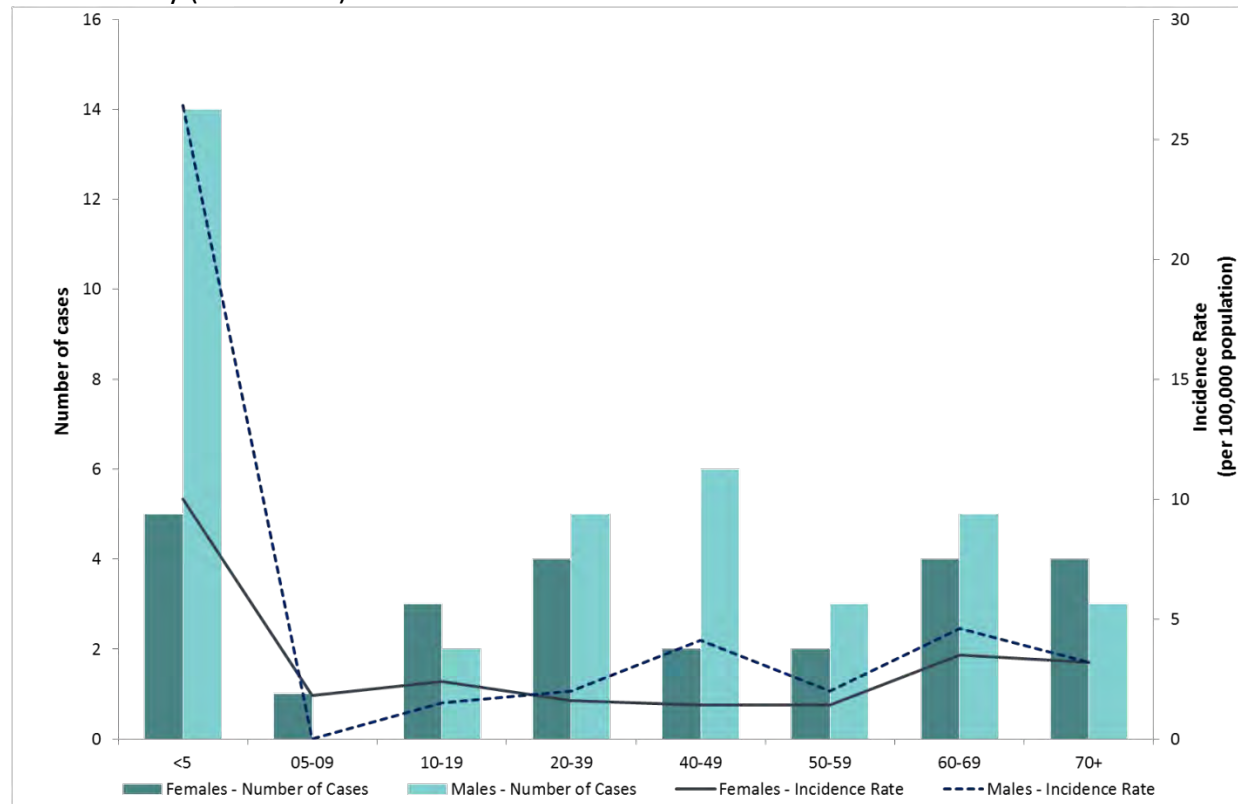
Table 32. Incidence of confirmed encephalitis and meningitis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	5	10.0	14	26.4	19	18.4
05-09	1	1.8	0	0.0	1	0.9
10-19	3	2.4	2	1.5	5	1.9
20-39	4	1.6	5	2.0	9	1.8
40-49	2	1.4	6	4.1	8	2.8
50-59	2	1.4	3	2.0	5	1.7
60-69	4	3.5	5	4.6	9	4.0
70+	4	3.2	3	3.2	7	3.2

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/09.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 58. Incidence of confirmed encephalitis and meningitis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/09.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Encephalitis and meningitis cases occur year round, without a seasonal trend.

Risk Factors

Medical Risk Factors

The top risk medical factors reported by encephalitis and meningitis cases were chronic illness/underlying medical condition (87.5%), and immunocompromisation (87.0%). The risk factor of 'other' was reported by 95.7% of cases.

Table 33. Medical risk factors reported by confirmed encephalitis and meningitis cases, Windsor-Essex County (2011-2015)

Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Chronic illness/underlying medical condition	28	87.5
Immunocompromised	20	87.0
Other	22	95.7

Note 1: Multiple medical risk factors can be reported for a single case.

Note 2: Only risk factors with at least five respondents that stated 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/09.

Hospitalization/Deaths

In 2015, hospitalization was reported for 88.9% of encephalitis and meningitis case (16/18 cases), and deaths were reported in 11.1% of cases (2/18 cases). The case hospitalization and mortality rates are on par with the rates for 2011 to 2014.

Invasive Group A Streptococcal Disease (iGAS)

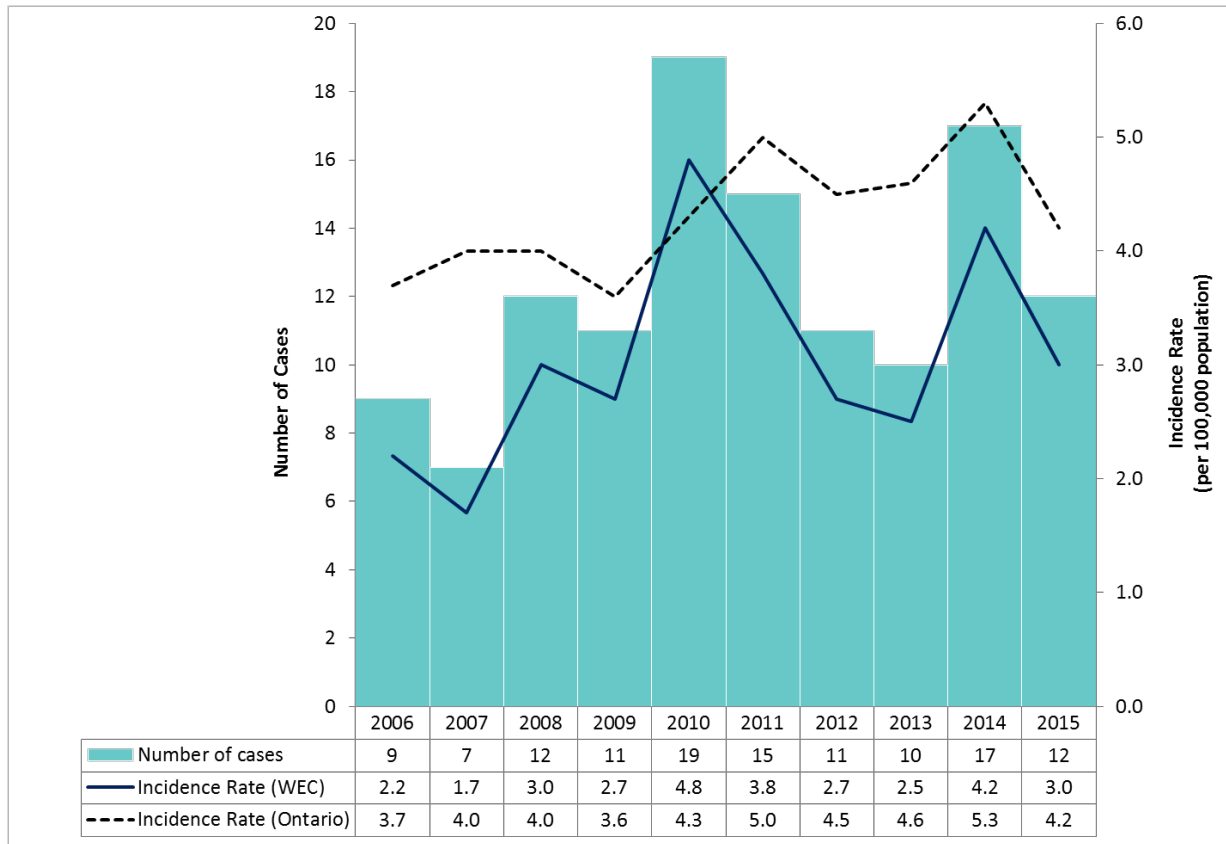
Background

Invasive Group A Streptococcal (iGAS) disease is caused by the bacteria *Streptococcus pyogenes*, and commonly presents as skin or soft tissue infections, bacteremia with no septic focus, pneumonia, streptococcal toxic shock syndrome, and necrotizing fasciitis. The disease is usually spread from person-to-person by droplet spread from coughs or sneezes by an infected individual, direct or indirect contact with oral or nasal mucus membranes with infectious secretions, contact with broken skin with infectious secretions or skin wound sections, and sharing of contaminated needles. Symptoms of the disease typically appear one to three days after infection, and untreated uncomplicated cases remain infectious for 10 to 21 days. Prevention measures include education about proper hand hygiene, proper respiratory etiquette, and varicella vaccination in persons with antecedent varicella infection.⁶¹

Trends over time

In 2015, there were 12 confirmed cases of iGAS in Windsor-Essex County. The incidence rate of iGAS in Windsor-Essex County has increased by 36.3% from 2006 to 2015 (from 2.2 cases per 100,000 population in 2006 to 3.0 cases per 100,000 population in 2015). However, rates in Windsor-Essex County have shown a decrease since 2014 (28.6% decrease). With the exception of 2010, rates in Windsor-Essex County have remained lower than that of Ontario from 2006 to 2015 (see Figure 59). The 2015 rate for Windsor-Essex County was 28.6% lower than the rate in Ontario (4.2 cases per 100,000 population in Ontario).

Figure 59. Trends in confirmed iGAS cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The highest rate of iGAS was found in those over 70 years (9.1 cases per 100,000 population). Rates differed greatly by sex, in those over 70 years. Females in this age group had a rate that was almost two times higher than males (females >70 years: 12.0 cases per 100,000 population; males >70 years: 5.3 cases per 100,000 population). Children under five years had the second highest rates (5.8 cases per 100,000 population). Rates in this age-group were comparable between males and females (see Table 34 and Figure 60).

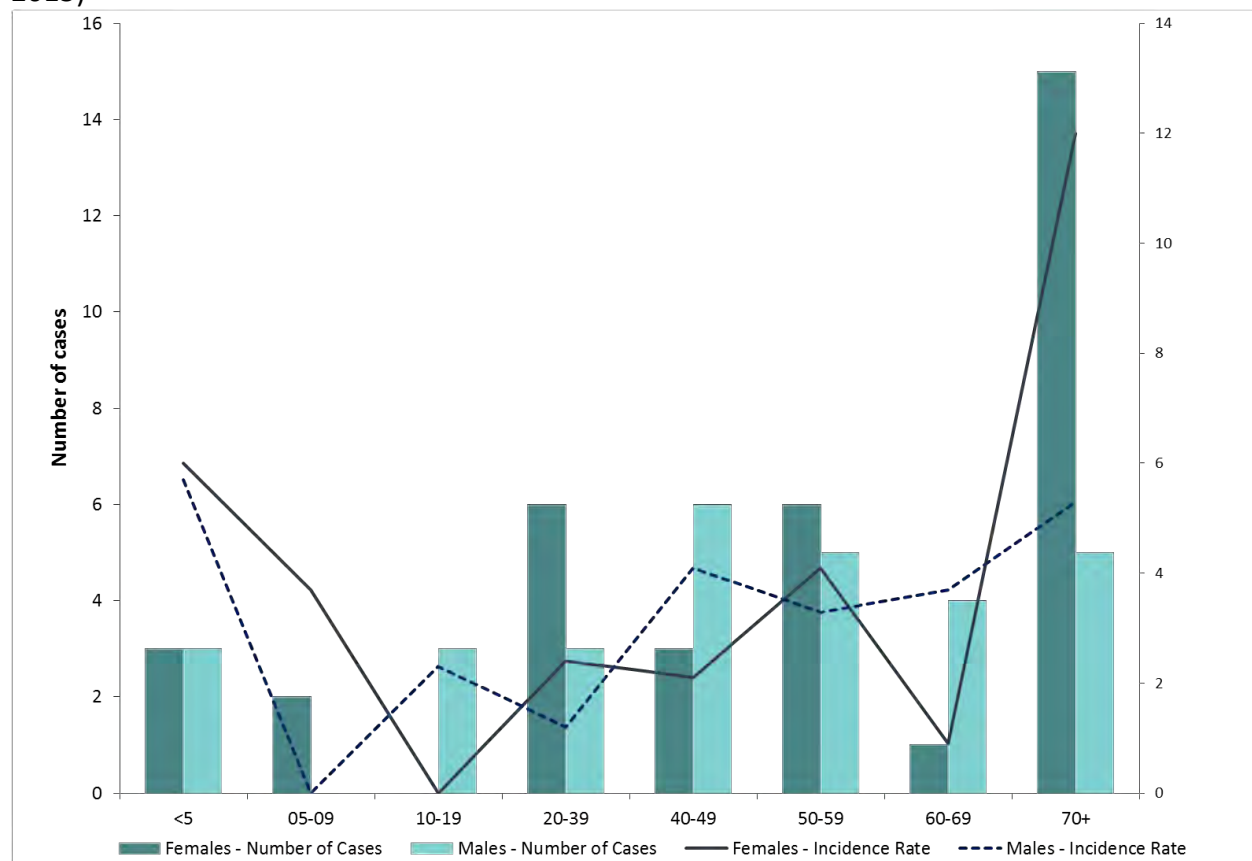
Table 34. Incidence of confirmed iGAS cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<5	3	6.0	3	5.7	6	5.8
05-09	2	3.7	0	0.0	2	1.8
10-19	0	0.0	3	2.3	3	1.2
20-39	6	2.4	3	1.2	9	1.8
40-49	3	2.1	6	4.1	9	3.1
50-59	6	4.1	5	3.3	11	3.7
60-69	1	0.9	4	3.7	5	2.2
70+	15	12.0	5	5.3	20	9.1

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 60. Incidence of confirmed iGAS cases by age and sex, Windsor-Essex County (2011-2015)



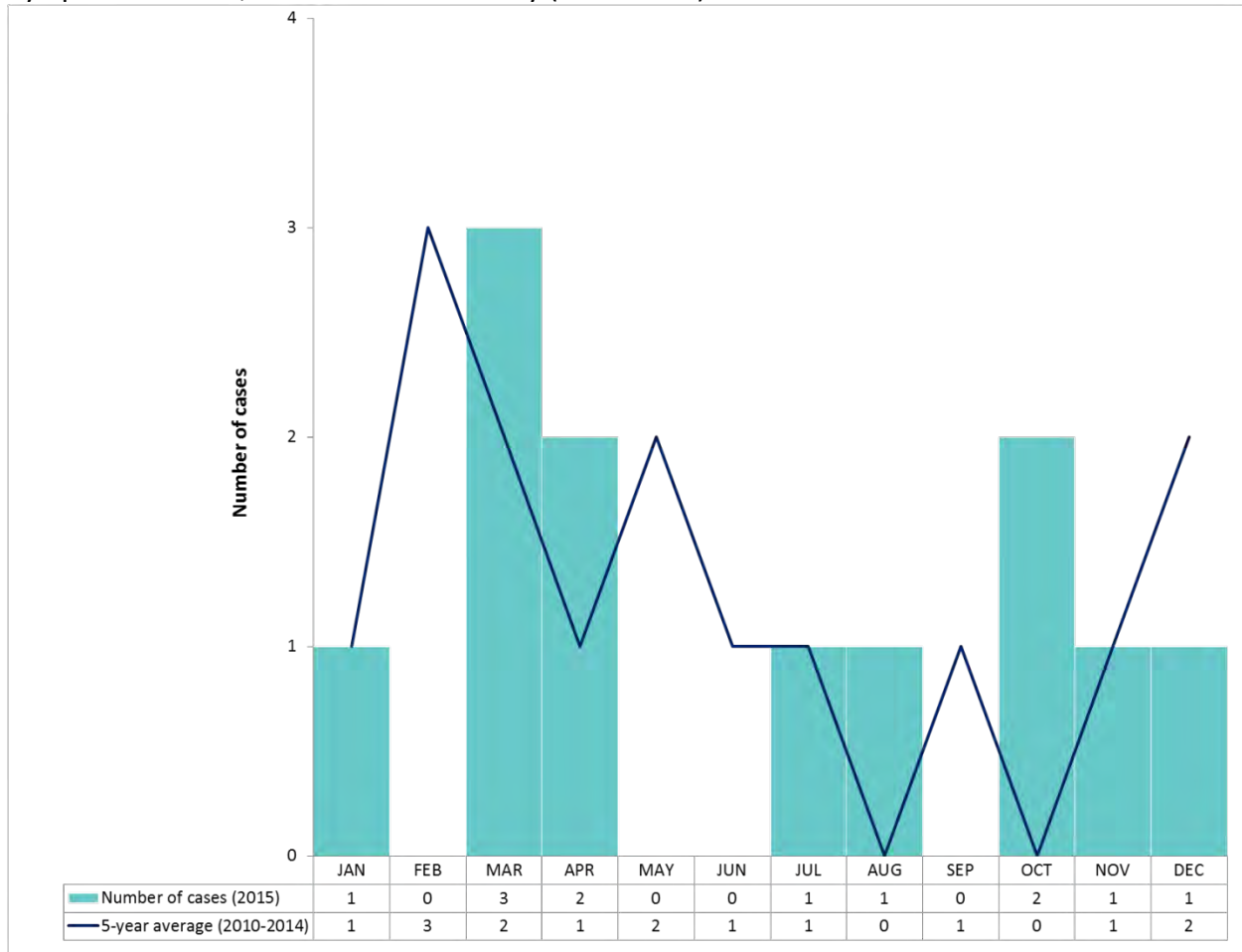
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

In Windsor-Essex County, most cases of iGAS are typically observed in the colder months. Based on the five-year average of case counts (2010-2014), peaks are expected in the fall and winter seasons (see Figure 61). In 2015, case counts peaked in March (three cases).

Figure 61. Confirmed iGAS case counts (2015) and five-year average of case counts (2010-2014) by episode month, Windsor Essex County (2010-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Risk Factors

Behavioural Risk Factors

Besides, the risk factor of 'unknown', the top risk factor reported by iGAS cases was injection drug use. Injection drug use was reported by 31.3% of cases (5/16 cases). The 'other' risk factor was reported by 91.7% of cases (11/12 cases).

Medical Risk Factors

The top risk medical factors for iGAS were chronic illness/underlying medical condition (81.0%), diabetes (73.3%), dermatological condition/chronic dermatitis/wound causing break in skin

integrity (68.4%), and immunocompromisation (66.7%). The risk factor of 'other' was reported by 95.2% of cases. See Table 35.

Table 35. Medical risk factors reported by confirmed iGAS cases, Windsor-Essex County (2011-2015)

Medical Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Chronic illness/underlying medical condition	34	81.0
Diabetes	11	73.3
Dermatological condition/chronic dermatitis/wound causing break in skin integrity	13	68.4
Immunocompromised	10	66.7
Other	20	95.2

Note 1: Multiple medical risk factors can be reported for a single case.

Note 2: Only risk factors with at least five respondents that stated 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Hospitalization/Deaths

In 2015, nine confirmed cases of iGAS were hospitalized (75.0%, 9/12 cases). Following a peak year in 2014, this marked a 12.8% decrease in the percent of cases hospitalized. Deaths were reported in five cases from 2015 (41.7%, 5/12 cases). This marked a significant increase from 2014 in the proportion of cases that died. In 2014, there were no deaths in confirmed iGAS cases.

Legionellosis

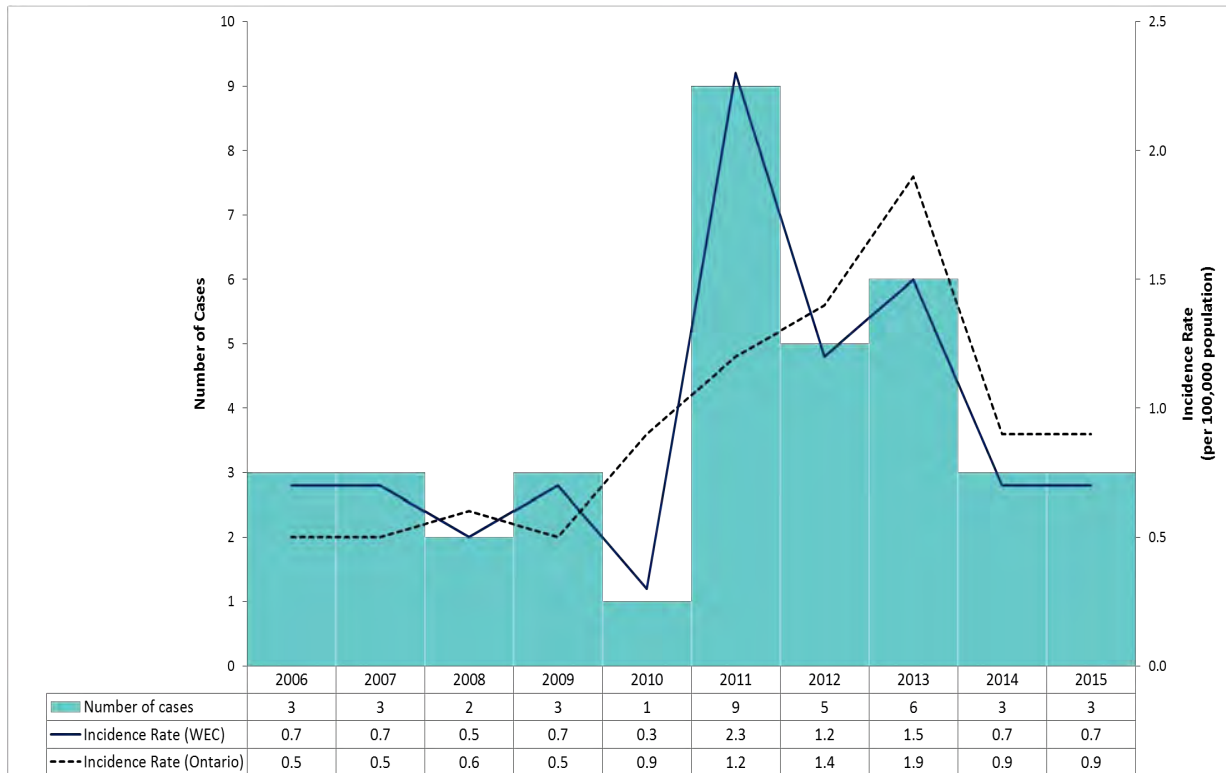
Background

Legionellosis is a disease caused by bacteria from the genus *Legionella*. The disease may present as Pontiac fever or Legionnaires' disease. Pontiac fever is a mild illness characterized by fever that resolves on its own two to five days after onset. Symptoms of Pontiac fever may also include loss of appetite, fatigue, malaise, abdominal pain, and diarrhea. Legionnaires' is a more severe form of the disease and is characterized by mild dry cough that does not produce sputum and pneumonia (which may progress to respiratory failure and death). The *Legionella* bacteria can be found in water sources such as lakes, rivers, streams, cooling towers, water distribution systems, hot tubs, decorative fountains, damp potting soil or compost, and showers. The bacteria can be transmitted to humans when water droplets containing the bacteria are aerosolized and inhaled into the lungs. There are no personal preventions measures for legionellosis, but the risk of the illness can be minimized by avoidance of water sources such as hot-tubs by high risk individuals, and properly maintaining and inspecting water systems to prevent bacterial growth.⁶²⁻⁶⁴

Trends over time

In 2015, there were three confirmed cases of legionellosis reported in Windsor-Essex County, representing an incidence rate of 0.7 cases per 100,000 population (see Figure 62). The rate in Windsor-Essex County for 2015 was comparable to that of Ontario (0.9 cases per 100,000 population). After an increase in rates between 2010 and 2011, the rate in Windsor-Essex County has since decreased to a level comparable to before 2010 (0.7 cases per 100,000 population in 2006).

Figure 62. Trends in confirmed legionellosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

The majority of legionellosis cases between 2011 and 2015 were over 50 years of age (84.6%) and were males (69.2%). In males, rates continued to increase with age, with the highest rates in those older than 70 years (5.3 cases per 100,000 population). A similar trend was observed in females, however, only until 70 years. See Table 36 and Figure 63.

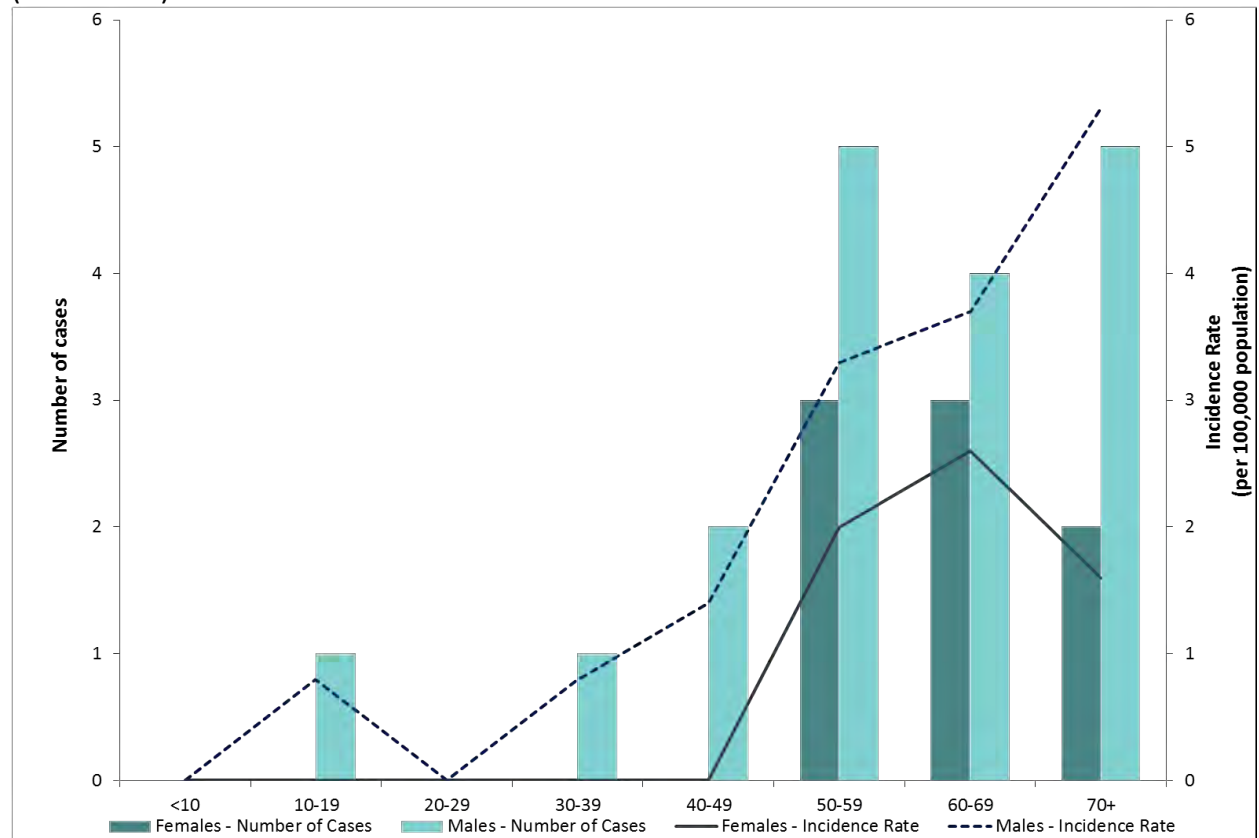
Table 36. Incidence of confirmed legionellosis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<10	0	0.0	0	0.0	0	0.0
10-19	0	0.0	1	0.8	1	0.4
20-29	0	0.0	0	0.0	0	0.0
30-39	0	0.0	1	0.8	1	0.4
40-49	0	0.0	2	1.4	2	0.7
50-59	3	2.0	5	3.3	8	2.7
60-69	3	2.6	4	3.7	7	3.1
70+	2	1.6	5	5.3	7	3.2

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 63. Incidence of confirmed legionellosis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Seasonality

Legionellosis typically shows an increase in incidence in the warmer months (one case per month from June to September based on the five year average of case counts between 2010 and 2014). In 2015, all three cases were observed between June and July.

Risk Factors

Behavioural Risk Factor

Besides the 'other' risk factor, smoking was the only risk factor reported by more than 50.0% of those asked (62.5%, 15/24 cases). The other risk factor was reported by nine cases (100.0%, 9/9 cases).

Medical Risk Factor

Chronic illness/underlying medical condition was reported by 76.0% of respondents asked about this risk factor (76.0%). Immunocompromisation was reported by 56.3% of cases questioned (56.3%). These were the only medical risk factors besides 'other' that were reported by five or more cases (see Table 37).

Table 37. Medical risk factors reported by confirmed legionellosis cases, Windsor-Essex County (2011-2015)

Risk Factor	Number of cases that reported 'Yes' to risk factor question	Percentage of cases that reported 'Yes'
Chronic illness/underlying medical condition	19	76.0
Immunocompromised	8	56.3
Chronic lung disease	5	41.7
Diabetes	5	35.7
Other	8	100

Note 1: Multiple medical risk factors can be reported for a single case.

Note 2: Only risk factors with at least five respondents that stated 'Yes' are included in this table.

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.

Hospitalization/Deaths

Legionellosis typically leads to hospitalization in the majority of cases. In 2015, all three cases were hospitalized. There were no deaths reported in cases from 2015. From 2011 to 2015, there were four deaths reported in legionellosis cases (15.4%, 4/26 cases).

Tuberculosis

Background

Tuberculosis (TB) is an infectious disease caused by the bacteria from the *Mycobacterium tuberculosis complex*. Tuberculosis usually affects the lung (pulmonary TB), but it may also affect other parts of the body such as the brain, spine, bones, kidneys, and lymph nodes. Pulmonary TB is infectious and people with pulmonary TB infection may spread the disease to others by the release of droplets from the lungs or airways (e.g. through coughing and sneezing,). In those who do get sick (develop active TB disease), symptoms include a cough that lasts more than two weeks, weight loss, weakness, tiredness, fever, night sweats, and loss of appetite. If untreated, death can result in severe cases. About 90% of people who become infected do not develop the disease (do not feel sick, are asymptomatic, and do not spread TB to others). This is also called latent TB infection. Individuals with latent TB are at increased risk of developing active TB disease. Those at highest risk of progressing to active TB include recent contacts of active TB cases, immunocompromised, and new arrivals to Canada.

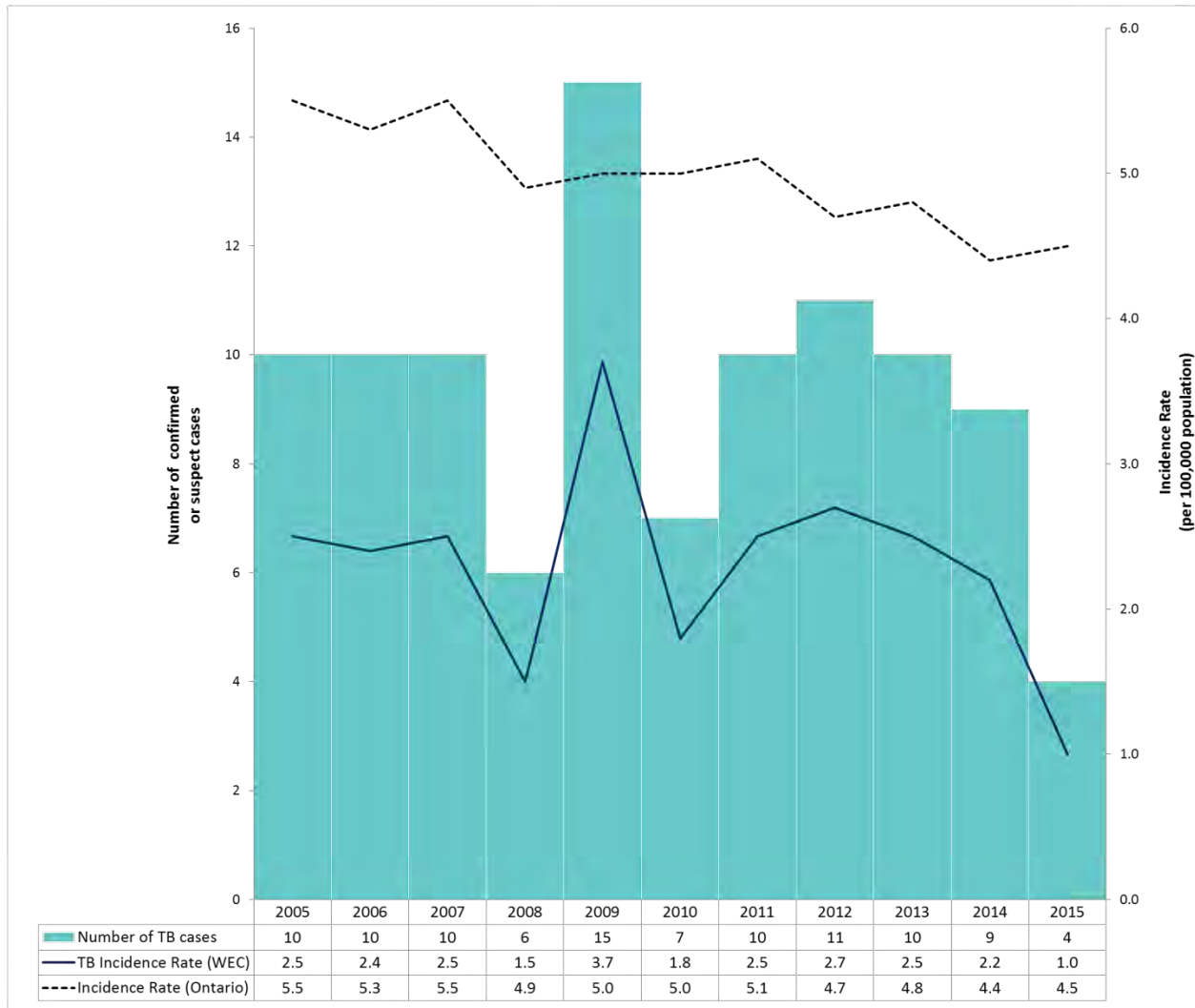
Tuberculosis infection can be diagnosed by Mantoux tuberculin skin test. If a test is positive, this is followed by a medical examination, chest x-ray, and testing of the sputum are performed to determine if the form of TB is active. TB infection can be cured with antibiotic treatment.^{65,66}

Trends over time

Active TB

In 2015, there were four active cases of TB reported in Windsor-Essex County, representing a rate of 1.0 case per 100,000 population (excludes atypical mycobacterial infections). This was the lowest rate observed since 2006 (see Figure 64). Rates of active TB in Windsor-Essex County have been lower than the rates for Ontario for every year between 2006 and 2015. In 2015, the rate in Ontario was 4.5 cases per 100,000 population.

Figure 64. Trends in active tuberculosis cases by episode year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/20.

Ontario Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/20. Distributed by Public Health Ontario through Infectious Disease Query. Accessed: 2016/12/20.

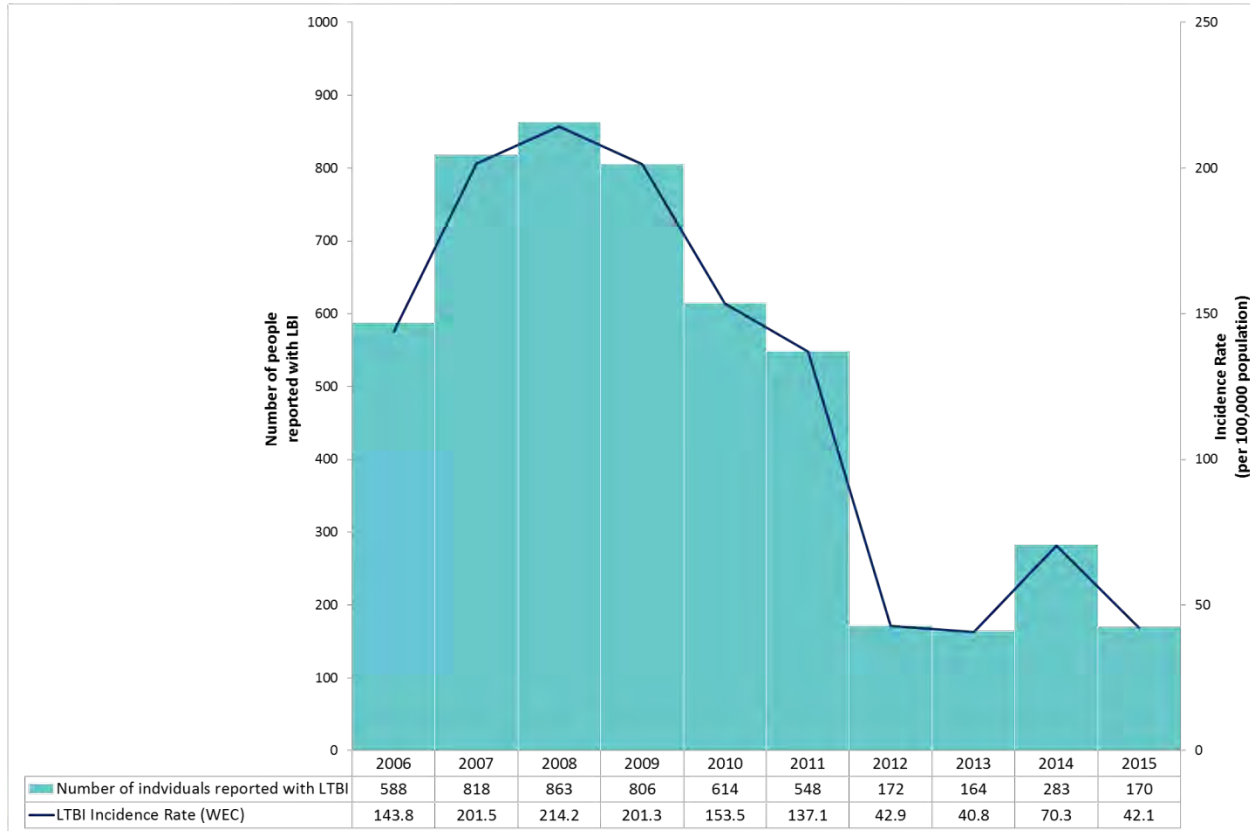
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

LTBI

During the period between 2006 and 2015, reports of LTBI (in individuals not previously identified), have decreased significantly (see Figure 65). After a peak year in 2008, rates of LTBI reports have decreased by 80.3%. In 2015, there were 170 reports of individuals with LTBI in Windsor-Essex County, representing an incidence rate of 42.1 reports of people with LTBI per 100,000 population. It is important to note that LTBI counts and rates in this report are likely an underestimate of the actual incidence in the population. Most individuals with LTBI do not display any symptoms and may not seek medical care. Consequently, they remain unreported

to public health. Details about individuals with LTBI are only reported to public health upon confirmation of a positive TB skin test. These individuals are typically identified by health care practitioners through screening (routine, targeted or immigration) and contact investigations.

Figure 65. Trends in number of people reported with latent tuberculosis infection by reported year, Windsor-Essex County and Ontario (2006-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/06.

Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Age and sex

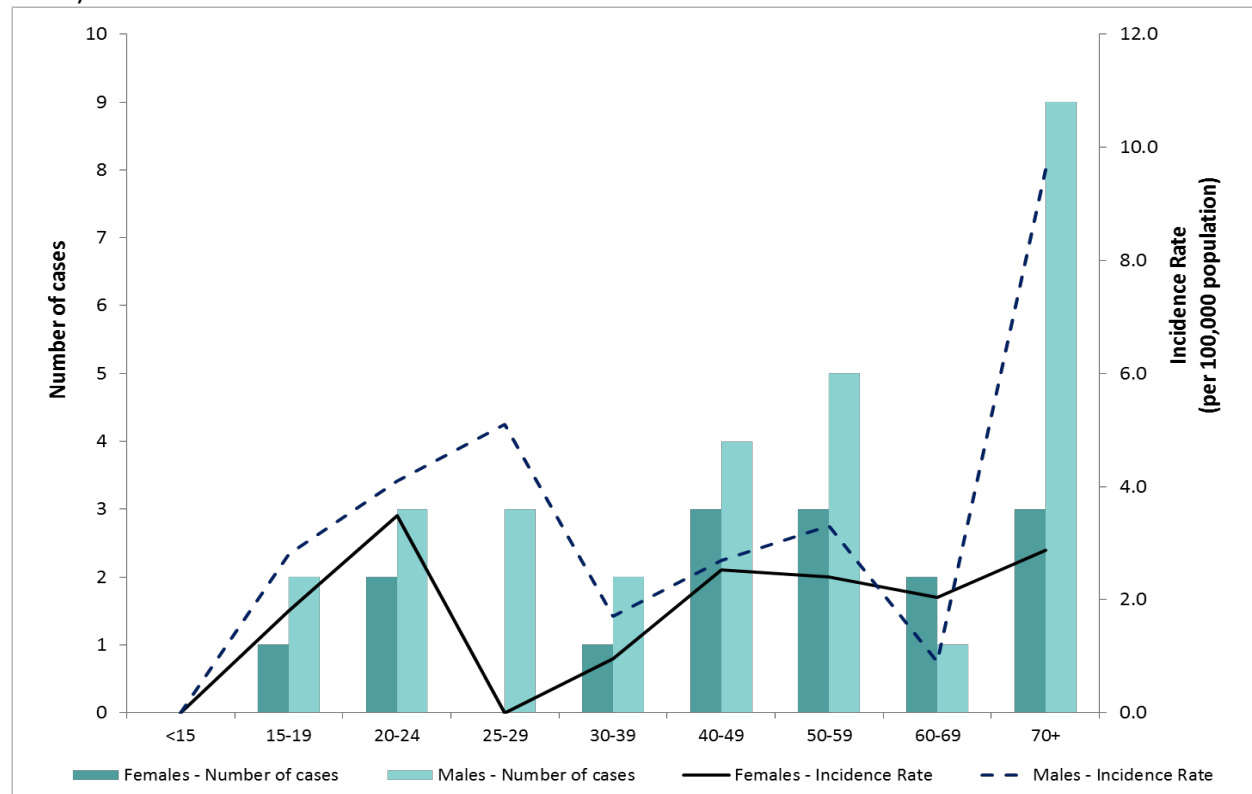
Between 2011 and 2015, males comprised the majority of active TB cases reported in Windsor-Essex County (65.9%, 29/44 cases; see Table 38 and Figure 66). In males, the highest rates were observed in the 70+ years age group (9.6 cases per 100,000 populations). This rate was four times higher than the rate for females in this age group (females: 2.4 cases per 100,000 population). In females, the highest incidence rate was observed in the 20-24 year age group (2.9 cases per 100,000 population).

Table 38. Incidence of active tuberculosis cases by age and sex, Windsor-Essex County (2011-2015)

Age Range (Years)	Female		Male		Overall	
	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)	Cases	Incidence Rate (per 100,000 population)
<15	0	0.0	0	0.0	0	0.0
15-19	1	1.5	2	2.8	3	2.2
20-24	2	2.9	3	4.1	5	3.5
25-29	0	0.0	3	5.1	3	2.5
30-39	1	0.8	2	1.7	3	1.2
40-49	3	2.1	4	2.7	7	2.4
50-59	3	2.0	5	3.3	8	2.7
60-69	2	1.7	1	0.9	3	1.3
70+	3	2.4	9	9.6	12	5.5

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/20.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Figure 66. Incidence of active tuberculosis cases by age and sex, Windsor-Essex County (2011-2015)



WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/19.
Population Data: Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Country of Birth

Active TB

The majority of active TB cases reported between 2011 and 2015 were born outside of Canada (93.2%, 41/44 cases). The top three countries of birth among foreign-born TB cases were China, India, and Vietnam (36.6% of foreign-born TB cases, 15/41 cases). Between 2011 and 2015, there were five active TB cases reported from each of these three countries (see Table 39).

Since Aboriginal persons or persons living on reserves with TB in Ontario fall within the federal jurisdiction of Health Canada, First Nations and Inuit Health Branch (FNIHB), information on these cases may not be consistently reported to the health unit or entered into iPHIS upon notification.

Table 39. Number of individuals with active tuberculosis reported to public health, by place of origin and aboriginal status (if born in Canada), Windsor Essex County (2011-2015)

Origin > Status/Country of Birth	Number of TB cases
Born In Canada	3
Non-Aboriginal	3
Born Outside Canada	41
China	5
Vietnam	5
India	5
Nigeria	4
Sudan	3
Cambodia	3
Other	16
Total	44

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/20.

LTBI

The majority of individuals reported to public health with LTBI were also foreign-born (77.0%, 1030/1337 individuals; see Table 40). Of those foreign-born individuals, a large percent were born in Iraq (10.7%, 110 individuals), China (10.5%, 108 individuals) and India (8.4%, 87 Individuals).

Table 40. Number of individuals with LTBI reported to public health, by place of origin and aboriginal status (if born in Canada), Windsor Essex County (2011-2015)

Origin > Status/Country of Birth	Individuals reported with LTBI
Born In Canada	169
Non-Aboriginal	154
Unknown/Missing Status	15
Born Outside Canada	1030
Iraq	110
China	108
India	87
Philippines	52
Nigeria	34
Pakistan	28
Saudi Arabia	27
Bhutan	26
Vietnam	21
Somalia	21
Bangladesh	21
Thailand	20
Iran	19
Ethiopia	18
United States	18
Croatia	17
Lebanon	17
United Kingdom	14
Albania	13
Romania	12
Mexico	12
United Arab Emirates	12
Nepal	10
Sudan	7
Cambodia	6
Other	274
Country Unknown/Missing	26
Origin Unknown/Missing	138
Total	1337

WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2017/01/05

Risk Factors

Behavioural Risk Factors

The top risk factor reported by active TB cases was prior residence in an endemic area (34 cases). Other risk factors reported by cases include travel to an endemic area (11 cases),

chronic illness/underlying medical condition (nine cases), smoking (five cases), and diabetes (five cases). The 'other' risk factor was reported by seven cases.

Table 41. Risk factors reported by active tuberculosis cases, Windsor-Essex County (2011-2015)

Behavioural Risk Factor	Number of cases that reported 'Yes'
Lived in endemic area	34
Travel to endemic area	11
Chronic illness/underlying medical condition	9
Smoker	5
Diabetes	5
Other	7

Note 1: Risk factors available in iPHIS have been added and inactivated over time. A number of risk factors were added in iPHIS in January 2011. The dates the risk factors were added in iPHIS are not available.

Note 2: Multiple risk factors can be reported for a single case.

Note 3: Only risk factors with at least five respondents are included in this table. The 'unknown' risk factor was excluded.

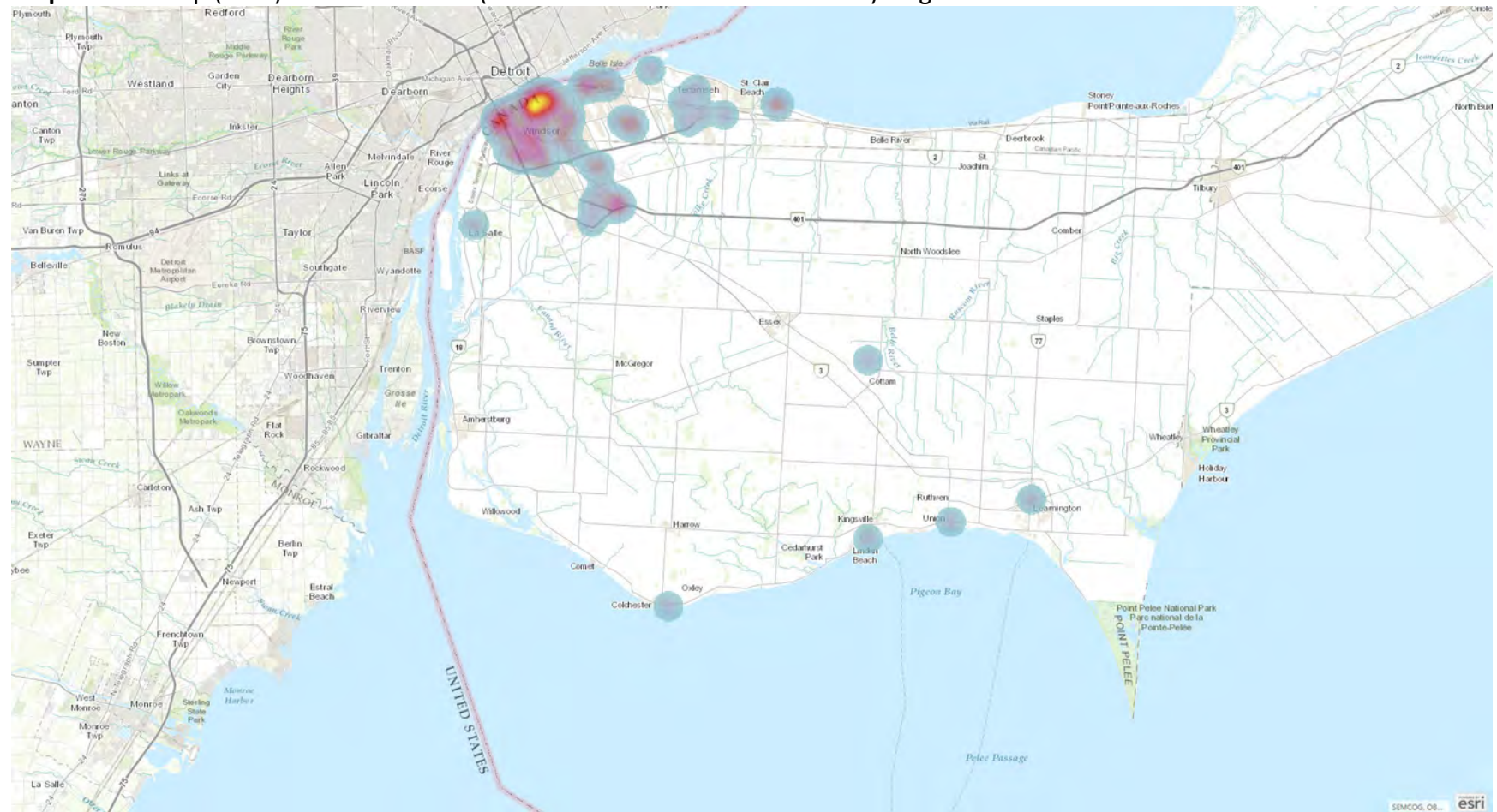
WEC Case Data: MOHLTC, integrated Public Health Information System (iPHIS) database. Extracted: 2016/12/20.

Deaths

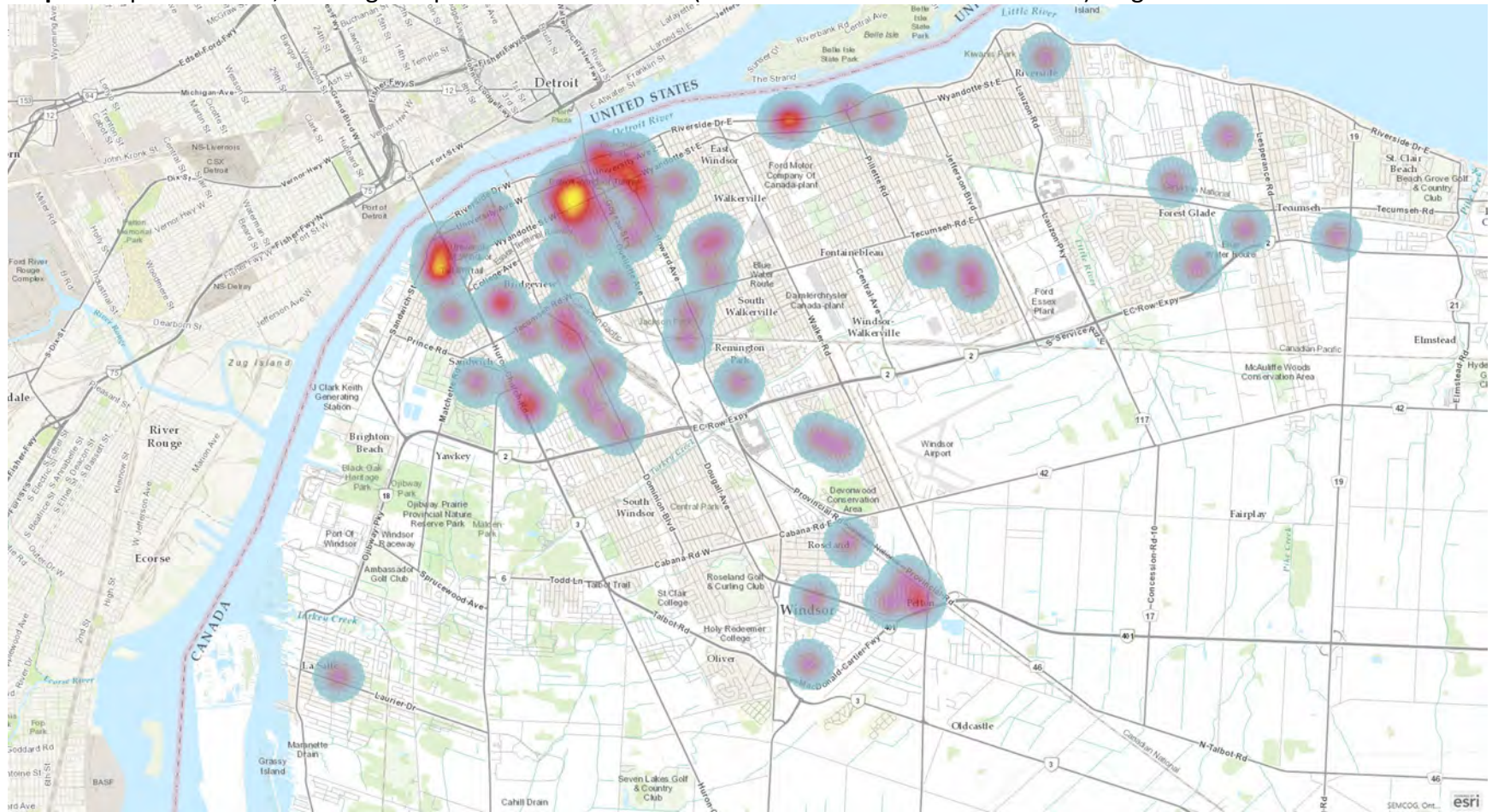
Of active TB cases diagnosed between 2011 and 2015, 18.1% were reported as fatal (8/44 cases).

Geographic Distribution

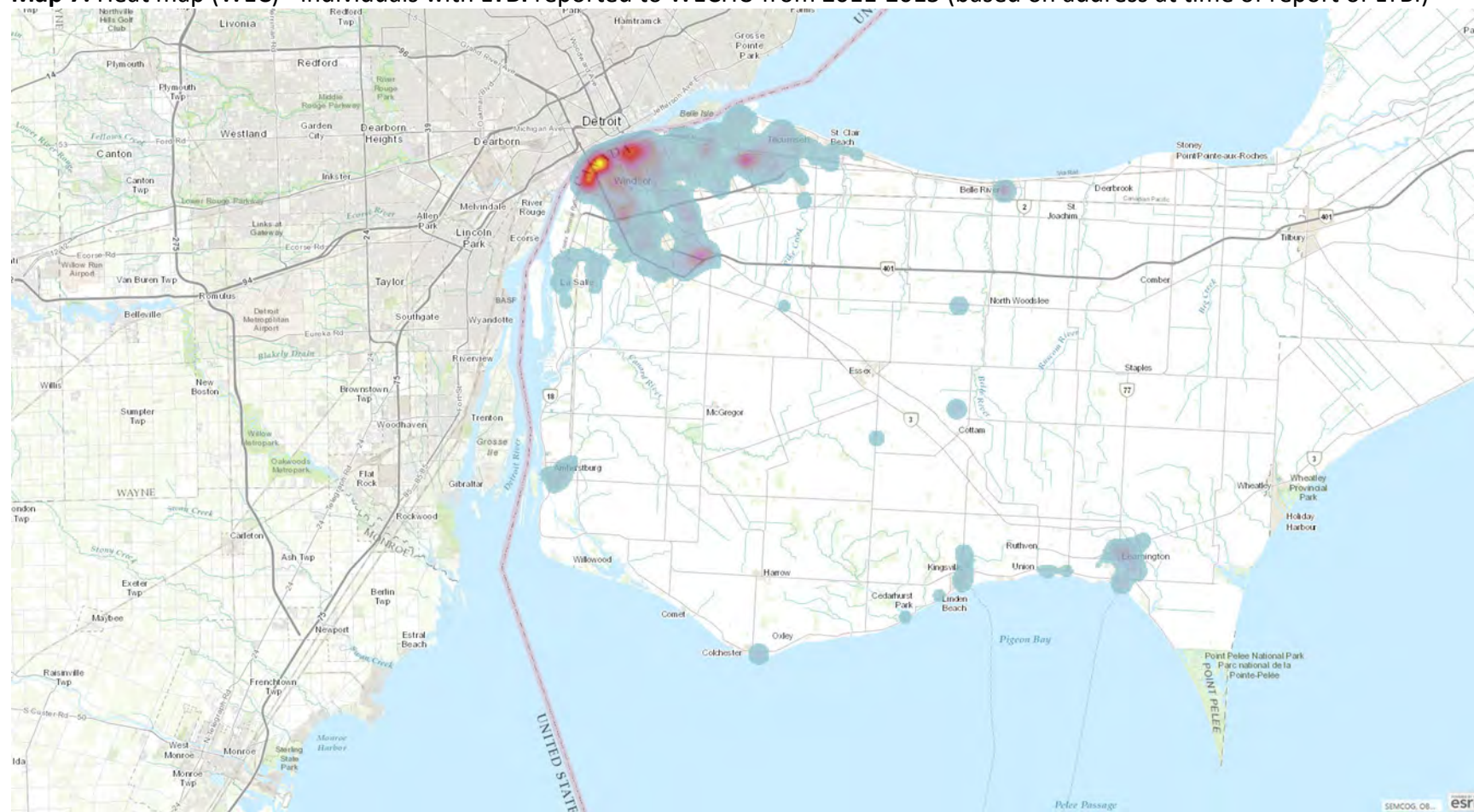
Map 5. Heat Map (WEC) - active TB cases (based on address at time of illness) diagnosed in WEC from 2006-2015



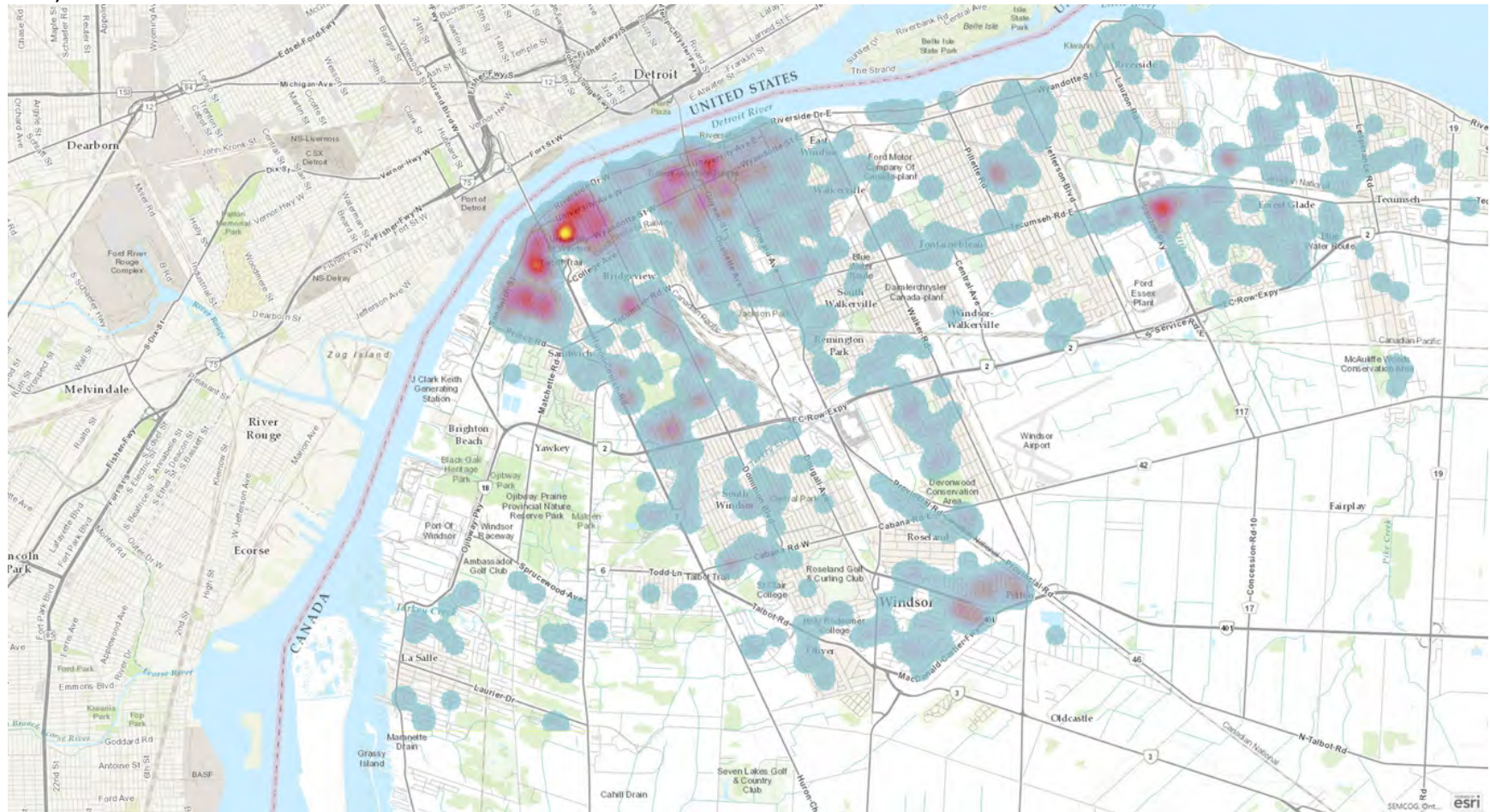
Map 6. Map of Windsor, showing hotspots of active TB cases (based on address at time of illness) diagnosed in WEC from 2006-2015



Map 7. Heat map (WEC) - individuals with LTBI reported to WECHU from 2011-2015 (based on address at time of report of LTBI)



Map 8. Heat map (Windsor) - of individuals with **LTBI** reported to WECHU from 2011-2015 (based on address at time of report of LTBI)



References

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Appendix A: Glossary

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.

Classification: Case classification refers to the classification of disease based on the provincial case definitions at the time of illness (e.g. confirmed, probable, suspect).

Incidence rates: An incidence rate is the rate at which new outcomes (case of disease), occur in a specified time in a defined population that is at risk of experiencing the outcome. The incidence rates reported in this report are crude incidence rates, meaning they have not been adjusted to reflect the age and sex distribution of a reference population. Incidence rates in this report are reported in the units 'per 100,000 population'.

Diagnosing Health Unit: The health unit that first reported the case to the MOHLTC. It is usually where the case resided when they were first identified. The diagnosing health unit is not necessarily the location of exposure to infection.

Disease: The reportable disease that caused the infection.

Diagnosis Date: The date the individual was diagnosed with the disease.

Disposition: A description of the most recent ranking of the case status.

Episode Date: An estimate of the illness onset date.

Risk factors: A risk factors represents a behaviour, activity or characteristic that may be a possible source of illness. Disease acquisition cannot be attributed to risk factor information (i.e. risk factor information does not demonstrate a causal link). Multiple risk factors can be identified for a single case.

Serotype: The aetiologic or causative agent that caused the infection.

Appendix B: Data Sources

Windsor-Essex County Health Unit reportable disease data:

Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database. Extracted on various dates: 2016/09/19; 2016/10/07 (IPD); 2016/11/23 (Varicella); 2016/11/25 (CDI); 2016/12/13 (Influenza); 2016/12/20 (TB); 2017/01/09 (Encephalitis and Meningitis).

Ontario reportable disease data:

Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database. Extracted: 2016/09/16. Distributed by Public Health Ontario through Infectious Diseases Query. Accessed: 2016/09/19.

Population estimates:

Statistics Canada. Table 109-5335: Estimates of population (2011 Census and administrative data). CANSIM database. Accessed: 2016/09/19.

Appendix C: iPHIS Data Extraction Criteria

- Case ID was used as the unique identifier to identify cases of most diseases. For active tuberculosis and LTBI's Episode ID and Client ID were used as the unique identifier, respectively.
- Only cases for which the Diagnosing Health Unit was reported as "Windsor-Essex County Health Unit" were included.
- Only cases with a Diagnosis Date (for tuberculosis) or Episode Date (for all other diseases) from January 1st, 2006 to December 31st, 2015 were included. For Influenza, cases from September 1st, 2006 to August 31st, 2016 were included.
- Cases for which the Disposition Description was reported as "*ENTERED IN ERROR*", "*DOES NOT MEET DEFINITION*", "*DUPLICATE-DO NOT USE*" or any variation on these values were excluded.
- For most reportable diseases, only cases with a Classification of "*Confirmed*" were included.
- For Lyme disease, mumps, pertussis, amebiasis, IMD, and West Nile Virus (WNV) illness, "*Confirmed*" and "*Probable*" cases were included.
- For Tuberculosis, in addition to "*Confirmed*" cases, cases with a classification of "*Suspect*" were also included.
- Atypical mycobacterial infection cases of tuberculosis were excluded.
- The diseases grouping "*Encephalitis and Meningitis*" include primary viral and unspecified encephalitis, bacterial, viral and other meningitis, and encephalitis/meningitis.

Appendix D: Measures

Case counts

This measure refers to the number of confirmed (and/or probable, suspect cases) of a disease reported for a group within a specified time period. For tuberculosis, only active cases are included in the reporting of counts. For influenza, cases are counted in the surveillance season within which they occurred (September 1 to August 31), rather than by calendar year.

Crude incidence rate

An incidence rate is the rate at which new outcomes (case of disease), occur in a specified time in a defined population that is at risk of experiencing the outcome. The incidence rates reported in this report are crude incidence rates, meaning they have not been adjusted to reflect the age and sex distribution of a reference population. Incidence rates in this report are reported in the units *'per 100,000 population'*.

Formula: (Number of cases in a specified time period and population / Total number of people in that population during the same time period) * 100,000

Hospitalizations

Cases were identified as hospitalized if an admission start date was available. Hospitalization data is prone to under-reporting (see Data Notes and Caveats, Under-reporting and Missing Data).

Deaths

For most diseases (except tuberculosis and *clostridium difficile* infection), a case is counted as having died as a result of the disease when an outcome of "FATAL" is reported at the case level, and when the only cause of death entered is not "REPORTABLE DISEASE WAS UNRELATED TO CAUSE OF DEATH." Death data is prone to under-reporting (see Data Notes and Caveats, Under-reporting and Missing Data).

For tuberculosis, any case with a death date is counted as fatal, except when the cause of death entered is "REPORTABLE DISEASE WAS UNRELATED TO CAUSE OF DEATH." Tuberculosis cases that have become fatal after the date of data extraction will not be reflected in the death count.

For cases of *clostridium difficile* infection associated with outbreaks in public hospitals, all reported deaths are counted (all-cause mortality). Thus, the disease may not always be the related to the cause of death.

Appendix E: Data Notes and Caveats*

Reportable Diseases

In Ontario, the Regulation 559/91 pursuant to the Health Protection and Promotion Act (HPPA), R.S.O 1990 specifies the list of diseases that are reportable to public health. Health care providers, laboratories, and other parties such as school principals are required to report disease information to the public health unit.

Under-reporting and Missing Data

The data only represent case information reported to public health and recorded in the Integrated Public Health Information System (iPHIS), a disease reporting system. As a result, cases and case details are subject to varying degrees of under-reporting due to a variety of factors, such as disease awareness, medical care seeking behaviors, changes in laboratory testing, clinical practice, severity of illness and reporting behaviours. The extent of under-reporting for individual reportable diseases has not been fully assessed in Ontario.

The reporting of case details such as risk factors, immunization status, serotype is dependent on factors such as ability to follow-up with the case (e.g. case may not be reachable), incomplete entry into iPHIS, and the occurrence of outcomes after the follow-up has already occurred. The under-reporting of such information is known to occur. If it occurs in high proportions it may result in non-representative interpretations or conclusions.

Hospitalization and death data are also under-reported in iPHIS. The level of reporting is affected by the severity of illness and outcomes, and the timing of the occurrence. More severe outcomes, and occurrence of the outcome soon after symptom onset or before completion of the investigation is associated with less under-reporting.

Potential changes to data

iPHIS allows ongoing updates to data previously entered. As a result, data extracted from iPHIS represent a snap shot of the database at the time of extraction and may differ from previous or subsequent reports.

Case Definitions

Changes to provincial surveillance case definitions and disease classifications have occurred over the years. Cases are classified in iPHIS according to the MOHLTC surveillance case definitions used at the time the case was identified. Please note that the case definitions available online as part of the Infectious Diseases Protocol represent the most recent definitions ([available online](#)).

* Adapted from the 2014 Reportable Disease Trends Report published by PHO

Duplicates

The potential for duplicates exists because duplicate sets were not identified and excluded unless they were resolved at either the local or provincial level prior to data extraction from iPHIS

Risk Factors

Risk factors represent a behaviour, activity or characteristic that may be a possible source of illness. Multiple risk factors can be identified for a single case. Disease acquisition cannot be attributed to risk factor information (i.e. risk factor information does not demonstrate a causal link).

Diagnosing Health Unit

Diagnosing Health Unit is the health unit that first reported the case to the MOHLTC (where the case resided when they were first identified). The diagnosing health unit is not necessarily the location of exposure to infection.

Re-infections and co-infections

It is assumed that cases of reportable disease representing re-infections are entered into iPHIS after consideration of factors such as time between episodes and the incubation period of the disease of interest. Consequently, someone with more than one episode of a reportable disease may contribute more than once case to the total case count for a specific period. Co-infections (infection with two different aetiologic agents at the same time) are also entered as separate episodes, and may result in more than once case for a single person.

Small counts

For diseases with small case counts, the differences in crude incidence rates should be interpreted with caution.

Appendix F: List of reportable diseases

Enteric Diseases

- 1) Amebiasis^A
- 2) Anthrax
- 3) Botulism
- 4) Brucellosis
- 5) *Campylobacter* enteritis
- 6) Cholera
- 7) *Clostridium difficile* infection (CDI) outbreaks in public hospitals
- 8) Cryptosporidiosis
- 9) Cyclosporiasis
- 10) Food poisoning, all causes
- 11) Giardiasis, except asymptomatic cases
- 12) Hantavirus pulmonary syndrome
- 13) Hepatitis A
- 14) Institutional outbreaks of gastroenteritis^B
- 15) Listeriosis
- 16) Paratyphoid Fever
- 17) Paralytic Shellfish Poisoning
- 18) Plague
- 19) Psittacosis/Ornithosis
- 20) Q Fever
- 21) Salmonellosis
- 22) Shigellosis
- 23) Trichinosis
- 24) Tularemia
- 25) Typhoid Fever
- 26) Verotoxin-producing *E. coli* infection (VTEC) indicator conditions, including Haemolytic Uraemic Syndrome (HUS)
- 27) Yellow Fever
- 28) Yersiniosis

Sexually-transmitted and blood-borne infections^B

- 29) Acquired Immunodeficiency Syndrome (AIDS)
- 30) Chancroid
- 31) Chlamydia trachomatis infections
- 32) Gonorrhoea
- 33) Group B Streptococcal disease, neonatal
- 34) Hepatitis, viral,
 - a) Hepatitis B
 - b) Hepatitis C
- 35) Ophthalmia neonatorum
- 36) Syphilis

Vaccine Preventable Diseases

- 37) Acute Flaccid Paralysis
- 38) Diphtheria
- 39) Influenza
- 40) Invasive *Haemophilus influenzae* type b (Hib) disease
- 41) Invasive meningococcal disease (IMD)^A
- 42) Invasive pneumococcal disease (IPD)
- 43) Measles
- 44) Mumps^A
- 45) Pertussis (Whooping Cough)^A
- 46) Poliomyelitis, acute
- 47) Rubella
- 48) Rubella, congenital syndrome
- 49) Smallpox
- 50) Tetanus
- 51) Varicella (chickenpox)

^AProbable cases were also analysed for these diseases, in addition to confirmed cases

^BReportable diseases not covered in this report

^CSuspect cases were also analysed for these diseases, in addition to confirmed cases

Vector-borne and zoonotic diseases

- 52) Lyme Disease^A
- 53) Malaria
- 54) Rabies
- 55) West Nile Virus Illness^A

Other Diseases or Events

- 56) Adverse Events Following Immunization^B
- 57) Transmissible spongiform encephalopathy, including:
 - a) Creutzfeldt-Jakob Disease, all types
- 58) Encephalitis, including,
 - a) Primary, viral
 - b) Post-infectious
 - c) Vaccine-related
 - d) Subacute sclerosing panencephalitis
 - e) Unspecified
- 59) Invasive Group A Streptococcal disease (iGAS)
- 60) Hemorrhagic fevers, including,
 - a) Ebola virus disease
 - b) Marburg virus disease
 - c) Other viral causes
- 61) Lassa Fever
- 62) Legionellosis
- 63) Leprosy
- 64) Meningitis, acute,
 - a) Bacterial
 - b) viral
 - c) other
- 65) Tuberculosis^C
- 66) Severe Acute Respiratory Syndrome
- 67) Respiratory infection outbreaks in institutions^B

^AProbable cases were also analysed for these diseases, in addition to confirmed cases

^BReportable diseases not covered in this report

^CSuspect cases were also analysed for these diseases, in addition to confirmed cases



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