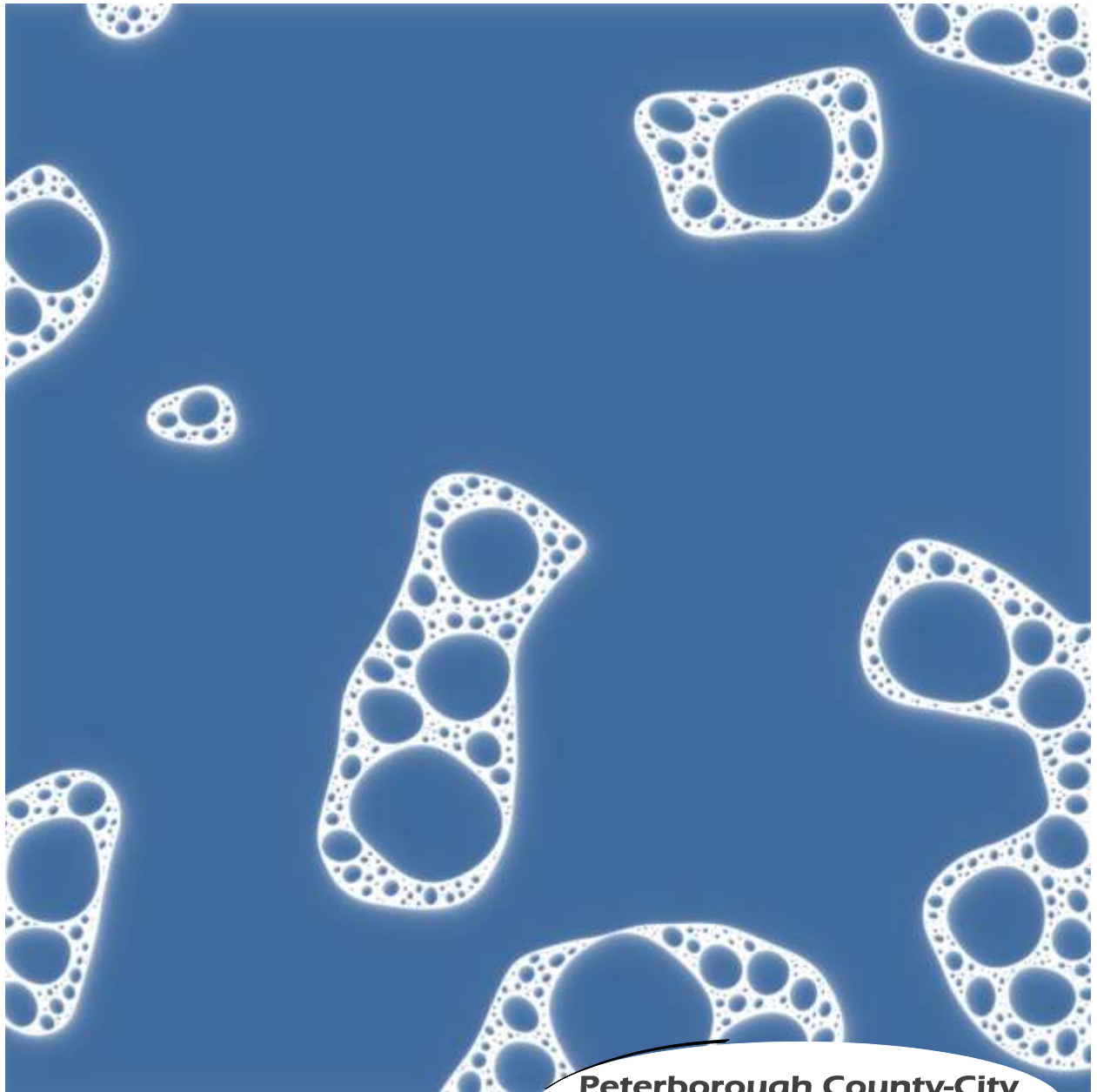


# Reportable Diseases in Peterborough County-City 2010



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## Report Overview and Executive Summary

### Introduction

This Reportable Diseases in Peterborough County and City 2009 report summarizes the incidence of reportable diseases among Peterborough County and City residents during the period from 2005 to 2009; this report primarily focuses on 2009 data and highlights the significance of any changes from the previous year(s).

Infectious diseases are caused by microorganisms (such as bacteria, parasites or viruses) or by the toxins they produce. These diseases are spread by contact with infected persons or contaminated surfaces/articles, animals or insects; consumption of contaminated food or water; or exposure to airborne particles or other environmental sources.

In Ontario, there are over 60 diseases/syndromes designated as reportable under the 1990 Health Protection and Promotion Act. Under this legislation, physicians, laboratories, hospitals, health departments, principals of schools, and superintendents of institutions are required to report these diseases to the local Medical Officer of Health. Reporting of diseases to the Health Unit is important for the follow-up of communicable diseases in order to prevent transmission to others, for the maintenance of surveillance data, and for epidemiologic and program planning purposes. The list of reportable diseases can be found in Appendix A.

### Methods

The data presented in this report was obtained from several Ontario Ministry of Health databases. Peterborough data was retrieved from the Integrated Public Health Information System (iPHIS). Only diseases with an accurate onset date between January 1, 2005 and December 31, 2009 were included in this report. As well as aetiologic agent, age at illness, and gender, exposures source (e.g.: contaminated food) and exposure settings (e.g.: location such as farm, or travel) were also extracted, where available.

### Integrated Public Health Information System (iPHIS)

The Integrated Public Health Information System (iPHIS) is a centralized computer database system used to replace the Reportable Disease Information System (RDIS); it was implemented in PCCHU and in Health Units across Ontario in 2005. All suspect and confirmed reportable diseases are entered into iPHIS. However, specific case definitions, as defined in the Ontario Public Health Standards (OPHS) Infectious Diseases Protocol, have to be met before a disease is considered confirmed. At PCCHU, cases are usually confirmed based on laboratory test results (serology, microbiology cultures, etc.), symptoms and/or exposures. Consistent application of the case definitions ensures that disease rates are comparable provincially.

There may be considerable under-reporting of actual cases for some diseases. For instance, when an infected person has mild clinical symptoms they may not seek medical care and/or laboratory testing may not be performed. Infections such as invasive group A streptococcus (iGAS), which tend to have more severe clinical presentations, are more accurately reflected in surveillance data. Conversely, diseases such as hepatitis B are under-reported because many individuals are asymptomatic. Additionally, diagnoses based on laboratory testing tend to be more accurately reported than those that rely on clinical diagnostic criteria.

The diseases in this report were classified into the following categories:

Food and Waterborne Diseases: Amebiasis; *Campylobacter* enteritis; Cryptosporidium; Cyclospora; Giardiasis; Hepatitis A; Listeriosis; Salmonellosis (non-typhoidal *Salmonella*); Shigellosis; Typhoid fever; Verotoxin-producing *E. coli* (VTEC); and Yersiniosis.

Sexually Transmitted Infections and Blood Borne Diseases: Chlamydia; Gonorrhea; Hepatitis B and C; HIV/AIDS; and Syphilis.

Diseases Spread by Direct Contact and Respiratory Routes: Influenza; Meningococcal disease, invasive; Streptococcal infections, Group A invasive (iGAS) and Group B neonatal (GBN); *Streptococcus pneumoniae*, invasive (iPD); Tuberculosis (TB)

Vaccine Preventable Diseases (VPDs): Chickenpox (Varicella Zoster virus); Diphtheria; *Haemophilus Influenza* type b (Hib disease); Measles; Mumps; Pertussis; and Rubella

Vector-borne and Zoonotic Diseases: Lyme disease; Malaria; West Nile Virus (WNV)

#### Other Reportable Diseases

Some of the diseases can/may fall into two or more categories (i.e influenza, hepatitis A, measles, etc.); however, these categories represent the typical or primary transmission route for each organism. In the case of vaccine preventable diseases, these diseases are subject to routine vaccination in Ontario: chickenpox, diphtheria, hepatitis B, Hib disease, human papillomavirus, measles, mumps, pertussis, pneumococcal diseases, poliomyelitis, rubella, tetanus, and infections caused by meningococcal bacterium type C.

## Summary Data Table Report Format

Number of reported cases: Reflects the number of cases with an accurate episode date\* between January 1<sup>st</sup> and December 31<sup>st</sup> of 2009.

5-year mean: The mean yearly case count of a given disease with an accurate episode date between January 1<sup>st</sup> 2005 and December 31<sup>st</sup> 2009.

Incidence rates (per 100,000): The number of all new cases in the reporting period divided by the PCCHU population during that time period, multiplied by 100,000. Population estimates were extracted from IntelliHEALTH data released by the Health Planning Branch at the Ministry of Health and Long-Term Care (MOHLTC).

Gender: The number and percent of cases that are male and female; five-year mean percentage of males and females also provided.

Mean age: Arithmetic mean age of all cases in the reporting period; five-year mean age also provided.

Median age: The age that represents the midpoint for all case ages of the reporting period; five-year median age also provided.

Age range: The ages of the youngest and oldest cases; age range over five years also provided. For cases under one year of age, less than one (<1) will be used.

**Notes:**

Due to the small population size of Peterborough City and County, many diseases are reported infrequently. Due to confidentiality issues, diseases with case counts of five or less will be reported as less than five ( $\leq 5$ ); rates and age/gender data will also be suppressed. Similarly, to ensure confidentiality, where counts by age or gender are less than five, data will be suppressed. Updated provincial case definitions were released on April 28, 2009. As a result of this, some reclassification of iPHIS data was necessary. This is an ongoing process that PCCHU is addressing and may be reflected in case counts over the years.

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## Executive Summary

In 2009 there were a total of 688 cases of reportable communicable diseases reported to the Peterborough County – City Health Unit (PCCHU) for a crude rate of 495.6 infections per 100,000 population. In 2005, there were 542 cases of reportable communicable diseases (395.9/100,000 population) reported to PCCHU; this represents a 26.9% increase in the number of cases between 2009 and 2005 – see Table I.

**Table 1. Number and proportion of communicable diseases by category in PCCHU; 2005-2009**

Category	2009 (n %)		2008 (n %)		2007 (n %)		2006 (n %)		2005 (n %)	
Food and Waterborne	81	12.1%	86	13.2%	91	15.5%	87	17.9%	113	20.9%
STI/BBI	448	66.7%	389	59.5%	334	56.7%	314	64.6%	296	54.6%
Direct and Respiratory	155	23.1%	144	22.0%	121	20.5%	48	9.9%	108	19.9%
Other*	4	0.6%	24	3.7%	13	2.2%	35	7.2%	25	4.6%
<b>Total</b>	<b>688</b>		<b>643</b>		<b>559</b>		<b>484</b>		<b>542</b>	

\* Other includes vaccine preventable diseases, zoonotic diseases, and other rare diseases

Sexually-transmitted infections and blood-borne infections (STI/BBI) represented the largest category of illness at 66.7% of all cases in 2009. This category remains the single biggest contributor to the communicable disease burden in PCCHU due to the large numbers of chlamydial infections; the increasing incidence of chlamydia is also one of the main reasons for the overall increase in communicable disease cases in PCCHU. Young females aged 15 to 24 represent the largest increase in chlamydia cases over this time frame.

With the exception of 2006 when there were few reported cases of influenza, the number of cases of diseases transmitted by direct and respiratory routes has been increasing since 2005. Influenza represents the largest contributor of cases in this category and its increasing incidence (of reported cases) is the main cause of increased cases over the past five years. The pH1N1 influenza virus that caused respiratory infections between June and October (in PCCHU) contributed to the increased incidence of influenza in 2009.

There has been little change in the number of cases due to diseases caused by food and waterborne routes since 2006. In 2009, PCCHU reported the lowest number of vaccine preventable, zoonotic, and rare diseases in PCCHU since 2005.

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## 1. Food and Waterborne Diseases

Foodborne diseases are illnesses acquired through the consumption of contaminated food or illnesses associated with consumption of a food infected by a specific bacterial, parasitic, or viral agent; similarly waterborne diseases are illnesses acquired through the consumption of contaminated water. Transmission of these illnesses can also occur via fecal-oral contact with an infected person. Cases and/or outbreaks are recognized by the occurrence of the illness within a generally short time frame among individuals who have consumed the contaminated substance or have been in contact with an infected person. Foodborne disease outbreaks are among the most common causes of acute illness; however, many outbreaks go unreported and single cases are often difficult to identify unless there is a distinct clinical syndrome and/or the affected individual seeks medical attention.

In 2009 in PCCHU there were 81 reported cases of food and waterborne diseases, representing 12.1% of all reported diseases. The rank, number and proportions of each disease as proportion of all diseases reported to PCCHU in 2009 are listed in Table 1.

**Table 1. Food and Waterborne diseases in PCCHU, 2009**

Rank	Disease	Number of Cases	Proportion of All Cases (%)
1	<i>Campylobacter</i> enteritis	35	5.1
2	Salmonellosis	25	3.6
3	Giardiasis	10	1.5
4	Amebiasis	<5	<1
5	Cryptosporidiosis	<5	<1
6	Listeriosis	<5	<1
7	Cyclosporiasis	<5	<1
8	Hepatitis A	<5	<1
9	Shigellosis	<5	<1

### 1.1 *Campylobacter* enteritis

Campylobacteriosis is caused by the bacteria *Campylobacter jejuni* and, less commonly, *Campylobacter coli*. Symptoms can vary from mild to severe and are characterized by diarrhea, abdominal pain, malaise, fever, and nausea and vomiting. An infected person can pass the infection on throughout the illness, which usually lasts from several days to several weeks. Infection occurs as a result of ingestion of the organism in under-cooked meat, contaminated food or water, or contaminated milk; or poultry. Cattle are common reservoirs. Person-to-person transmission appears uncommon.

Campylobacter in PCCHU in 2009 does not appear to be much different than previous years in terms of number of cases and demographic variables (Table 2). The majority of cases (n=31, or 88.6%) were caused by *C. jejuni*; the remainder were caused by *C. coli* (n=1, or 2.8%) or unspecified (n=3, or 8.6%). Most exposure settings and exposure sources were

unknown. Where data was available, exposure settings included community (22.2%), travel (16.7%), other settings (5.6%) and food premises (2.8%); exposure sources (where available) included animal exposure (e.g.: domestic animals, birds/poultry; 19.4%), environmental factors (2.8%), recreational water (2.8%), and other (2.8%). Just under half (48.6%) of the cases resided in Peterborough County; the remaining 37.1% of the cases lived in the City and 14.3% of cases had missing data for place of residence.

**Table 2. *Campylobacter enteritis* Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	35	31.8
Incidence (per 100,00 population)	25.2	23.1
Males	18 (51.4%)	48%
Females	17 (48.6%)	52%
<b>Age at Onset (Years)</b>		
Mean	45.4	44
Median	52	41.5
Range	1 – 87	<1 – 87

## 1.2 Salmonellosis

Salmonellosis is a bacterial infection that manifests itself as a sudden onset of headache, diarrhea, fever, and abdominal cramps and sometimes vomiting. The infection may persist for several days but does not require treatment unless the patient becomes severely dehydrated or the infection spreads from the gastrointestinal tract to the bloodstream or other body sites. There are numerous types of *Salmonella* serotypes that are pathogenic to humans and can be transmitted by ingestion of foods contaminated with the organism including: raw or undercooked beef or poultry; milk and milk products; shellfish; and eggs. Person-to-person transmission can also occur if hands are not properly washed following bathroom use. Outbreaks have also been linked to the consumption of raw fruits and vegetables that were contaminated. Pet turtles, lizards, and snakes are other potential sources of exposure.

Salmonellosis in PCCHU in 2009 was not very different from previous years with the exception of 2005 when there was an outbreak linked to consumption of contaminated bean sprouts resulting in roughly double the number of expected cases (Table 3). Numerous subtypes of *Salmonella* were responsible for salmonellosis in 2009: *S. enteritidis* accounted for 40% of the cases; *S. saintpaul* accounted for 12%; eight percent of cases were caused by *S. braenderup* and a further eight percent by the *S. newport* subtype; the remaining 32% of cases were made up of six separate subtypes or were unspecified. Approximately one third (32%) of cases were attributable to a community setting; travel (24%) and institutional (4%) settings were also implicated. The majority of cases (84%) had no identified exposure source. Birds/poultry, environmental, and other sources were each responsible for one case (4%) each.

**Table 3. Salmonellosis Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	25	27.6
Incidence (per 100,00 population)	18	20.1
Males	12 (48%)	42.8%
Females	13 (52%)	57.2%
<b>Age at Onset (Years)</b>		
Mean	42.1	38.9
Median	47	40
Range	1 - 90	<1 - 90

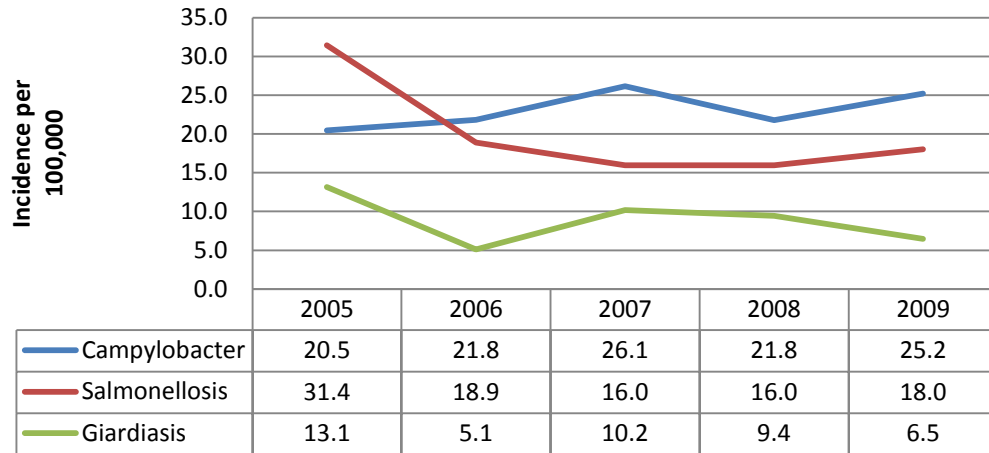
### 1.3 Giardiasis

Giardiasis is an infection of the small intestine caused by the protozoa *Giardia lamblia*, *G. intestinalis* and *G. duodenalis*. Clinically, giardiasis can a) remain asymptomatic; b) bring on acute, self-limiting diarrhea; or c) lead to intestinal symptoms such as chronic diarrhea, abdominal cramps, bloating, fatigue, malabsorption, and weight loss. Humans are the principle reservoir, though beavers and other wild and domestic animals are also reservoirs. Person-to-person transmission occurs by hand-to-mouth transfer of cysts from the feces of an infected individual; localized outbreaks also occur from ingestion of cysts in fecally contaminated drinking and recreational water.

There are typically few giardia cases in PCCHU. In 2009, cases appear to be older than what has occurred historically (Table 4). Little information is available regarding exposures: community settings accounted for 20% of cases; while drinking water was implicated as the exposure source 20% of the time (untreated well water and drinking water at home).

**Table 4. Giardiasis Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	10	12.4
Incidence (per 100,00 population)	6.5	8.9
Males	-	59.7%
Females	-	40.3%
<b>Age at Onset (Years)</b>		
Mean	42.1	39.8
Median	41	36
Range	2 - 74	1 - 87



**Figure 1. Incidence of campylobacter, salmonellosis, and giardiasis in PCCHU, 2005-2009**

## 2. Sexually Transmitted Infections and Blood Borne Diseases

Sexually transmitted infections (STIs) and blood borne infections (BBIs) are diseases caused by infectious agents in body fluids such as semen, vaginal secretions, breast milk, saliva and blood. Transmission occurs primarily from person-to-person through sexual contact. Other routes of transmission include direct entry into the blood via needle use or transfusions and perinatal transmission from mother to infant. In 2009 in PCCHU there were 447 cases of STIs and BBIs. This category represents the largest proportion of communicable diseases reported to PCCHU (64.7%). The rank, number and proportions of each disease are listed in Table 5.

**Table 5. STIs and BBIs in PCCHU, 2009**

Rank	Disease	Number of Cases	Proportion of All Cases (%)
1	Chlamydia	368	53.5
2	Hepatitis C	53	7.7
3	Gonorrhea	18	2.6
4	Syphilis (all)	5	<1
5	Hepatitis B	<5	<1
6	HIV/AIDS	<5	<1

### 2.1 Chlamydia

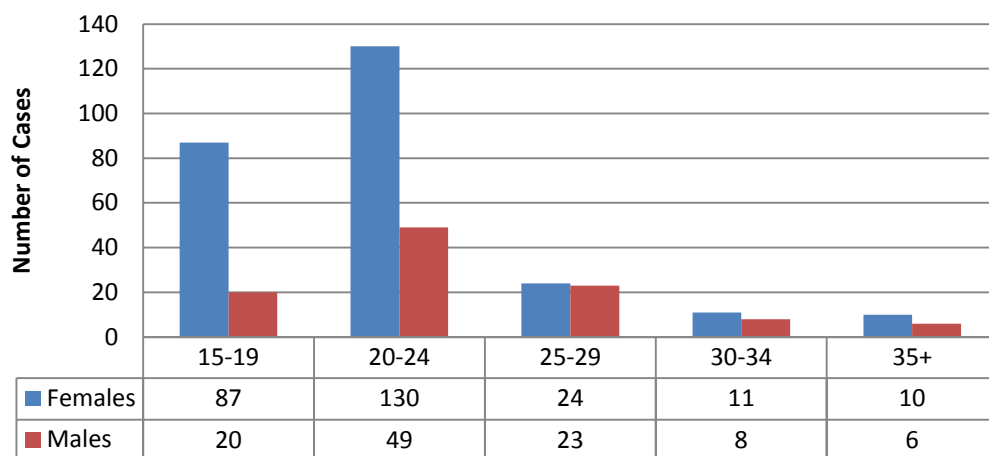
Chlamydia is the most widespread bacterial STI in Canada and is most common among teenagers and young adults. It is transmitted through vaginal, anal and oral sex and can also be transmitted from mother to child during childbirth. In women, symptoms can include: vaginal discharge; burning sensation when urinating; pain in the lower abdomen, sometimes with fever and chills; pain during intercourse; and vaginal bleeding between periods or after intercourse. Approximately 70% of infected females have no symptoms and when left untreated can lead to pelvic inflammatory disease (PID) in women. PID effects include abdominal pain, fever, internal abscesses and long-lasting pelvic pain; effects also include scarring of the fallopian tubes, which can cause infertility and increase the chance of potentially life-threatening ectopic or tubal pregnancies. Symptoms of chlamydial infection in men can include: discharge from the penis; burning sensation when urinating; burning or itching at the opening of the penis; and pain and/or swelling in the testicles. Approximately 50% of infected males exhibit no symptoms; lack of treatment in man can lead to scarring of the urethra, making urination difficult and occasionally causing infertility. Although rare, both sexes are at risk of a type of arthritis known as Reiter's Syndrome - an inflammation and swelling caused by the spread of the infection through the bloodstream into the joints.

In the Peterborough area, chlamydia is the most frequently reported communicable disease, making up 53.5% of all reportable diseases and the large majority of STI/BBIs (81.5%) in 2009. Chlamydia rates have been increasing in PCCHU – see Table 6: since 2005

the number of chlamydia cases in the Peterborough area has increased over 35%, though this may be a result of better testing and screening. Chlamydia rates are highest among young adults: among males, 86.8% of all cases were among those between the ages of 15 and 29 years of age; among females, 82.8% of all cases were among those between 15 and 24 years of age (Figure 2).

**Table 6. Chlamydia Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	368	287
<b>Incidence (per 100,00 population)</b>	265.1	208.5
Males	106 (28.8%)	31.4%
Females	262 (71.2%)	68.6%
<b>Age at Onset (Years)</b>		
Mean	22.6	22.3
Median	21	21
Range	15 - 52	13 - 58



**Figure 2. Number of cases of chlamydia by age and gender in PCCHU, 2009**

## 2.2 Hepatitis C

Hepatitis C is a chronic disease of the liver caused by the hepatitis C virus (HCV). Only 25% of people who acquire hepatitis C develop acute symptoms within the first six months, while 70-80% of people progress to chronic infection. These individuals become carriers of the virus and potentially transmit the infection to others. For those who experience symptoms, the most commonly reported include fatigue, lethargy, reduced appetite, sore muscles and joints, nausea, abdominal pain or jaundice. Individuals who progress to chronic hepatitis C can develop cirrhosis, leading to severe liver damage; a small number of people may get liver cancer. Transmission is primarily through contact with the blood of an infected person, but may also occur perinatally or through sexual contact, though these

routes appear less common. High-risk groups for infection include injection drug users, health care workers, hemodialysis patients, and recipients of blood products or transfusions before 1992.

Hepatitis C rates in PCCHU have been declining since 2005, however in 2009 there were approximately 13.7% more cases than the five year average (2005-2009) – see Figure 3. In addition, males are beginning to represent a greater proportion of cases (Table 7); between 2005 and 2009, males have represented 50%, 54.6%, 68.85, 59.5%, and 62.3% of the case load by year. The majority (75.5%) of cases diagnosed are between the ages of 30 and 54 years of age, likely due to the chronic nature of the disease.

**Table 7. Hepatitis C Summary Data for PCCHU**

	<b>2009</b>	<b>5-yr Mean (2005-2009)</b>
<b>Number of Reported Cases</b>	53	46.4
<b>Incidence (per 100,00 population)</b>	38.2	33.7
Males	33 (62.3%)	59%
Females	20 (37.7%)	41%
<b>Age at Onset (Years)</b>		
Mean	42.7	42.9
Median	45	45
Range	<1 – 78	<1 – 82

## 2.3 Gonorrhea

Gonorrhea is a bacterial STI caused by *Neisseria gonorrhoea* and differs in men and women in course, severity, and ease of recognition. In men, infection is presents as acute purulent urethral discharge within two to seven days after exposure. In females, infection is often asymptomatic, though some women experience vaginal discharge and vaginal bleeding after intercourse. Transmission occurs through sexual contact and an infected individual can continue to transmit the disease for months if left untreated. Gonorrhea is treatable often with a single dose of antibiotics; however, some 32 strains of the bacteria have become resistant to standard antibiotics. Treating patients with gonorrhea will become more difficult if resistant strains continue to increase. If left untreated, gonorrhea can cause serious complications including pelvic inflammatory disease in women and infertility for both sexes.

After some years of increasing incidence in PCCHU, there was a reduction of cases of gonorrhea in 2009 (Figure 3), however, the number of cases was still greater than the five year mean (Table 8). Male and female cases have been generally equally represented in PCCHU since 2005.

**Table 8. Gonorrhoea Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	18	17
Incidence (per 100,00 population)	13	12.3
Males	8 (44.4%)	44.7%
Females	10 (55.6%)	55.3%
<b>Age at Onset (Years)</b>		
Mean	25.5	27.3
Median	23	24
Range	15 - 48	12 - 69

## 2.3 Syphilis

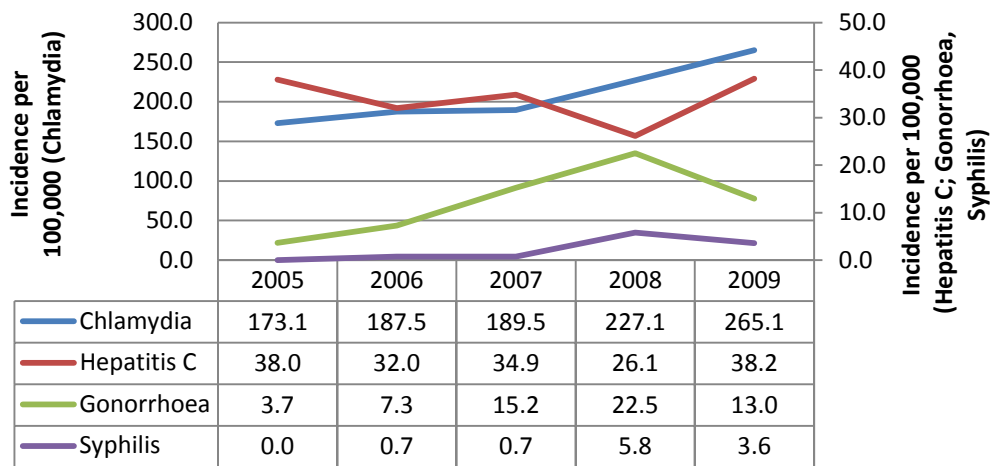
Syphilis is a STI caused by the organism *Treponema pallidum* and is transmitted through oral, genital or anal sex with an infected person. A pregnant woman with syphilis can also pass it on to her unborn child, sometimes causing birth defects or death. Less commonly, it can be transmitted through injection drug use or through broken skin on the body. If untreated, the infection progresses through five stages: primary, secondary, early latent (asymptomatic syphilis  $\leq$  1 year), late latent (asymptomatic syphilis  $>$  1 year) and tertiary syphilis. Infectious syphilis refers to the primary, secondary and early latent stages. In primary syphilis, a painless open sore or ulcer appears at the site where the bacteria first entered the body, usually the genital area, throat or anus. Symptoms can occur within a few weeks or a couple of months after infection. The presence of genital ulcers, as occurs in primary syphilis, has been estimated to increase the transmission of HIV three- to five-fold. Without treatment, the infection remains and progresses to secondary syphilis; symptoms of secondary syphilis can include: patchy hair loss; a rash on the soles of the feet, the palms of the hands or elsewhere on the body; fever; swollen glands; and muscle and joint pain. Tertiary syphilis involves the cardiovascular, neurological and musculoskeletal systems.

In PCCHU, cases of syphilis included: late latent; non-infectious neurosyphilis; and unspecified. Due to the small number of cases, limited details are to be released about case demographics.

While not a large burden in PCCHU (Table 9), there have been significant increases in the number of syphilis cases in Ontario following an outbreak in 2002. The number of cases in Ontario had been increasing gradually following the outbreak (on the order of ten percent per year), until 2009, when there was a 70% increase in the number of cases from the previous year. The majority (96%) of cases in Ontario in 2009 were male and 85% of the cases had been identified as men who have sex with men (MSM); in addition, 43% of the cases were also co-infected with HIV.

**Table 9. Syphilis Summary Data for PCCHU**

	<b>2009</b>	<b>5-yr Mean (2005-2009)</b>
<b>Number of Reported Cases</b>	5	3
<b>Incidence (per 100,00 population)</b>	3.6	2.2
Males	-	66.7%
Females	-	33.3%
<b>Age at Onset (Years)</b>		
Mean	58.8	50.3
Median	59	49
Range	37 - 81	20 - 86



**Figure 3. Incidence of chlamydia, hepatitis C, gonorrhoea, and syphilis in PCCHU, 2005-2009**

### 3. Diseases Spread by Direct Contact and Respiratory Routes

These are diseases caused by infectious agents transmitted through direct contact or airborne spread; transmission occurs via droplet contact – coughing or sneezing, or airborne transmissions, where the microorganism remains in the air for long periods of time. For the purpose of this report, this section refers to: influenza; meningococcal disease, invasive; streptococcal infections, group A invasive (iGAS) and group B neonatal (GBN); *Streptococcus pneumoniae*, invasive (iPD); and tuberculosis (TB). Other diseases that may also be spread through this mode of transmission (e.g.: chickenpox, measles, etc.) are included in other sections. In 2009 in PCCHU there were 155 cases of reportable diseases spread by direct contact or respiratory routes, representing less than one quarter (22.4%) of the all reported diseases. The rank, number and proportions of each disease are listed in Table 10.

**Table 10. Direct Contact and Respiratory diseases in PCCHU, 2009**

Rank	Disease	Number of Cases	Proportion of All Cases (%)
1	Influenza	123	17.9
2	Streptococcus pneumonia, invasive (SPi)	20	2.9
3	Group A streptococcal disease, invasive (iGAS)	9	1.3
4	Tuberculosis	<5	<1

#### 3.1 Influenza

Influenza is a respiratory infection caused by the influenza virus; slightly different strains circulate every year, resulting in predictable influenza ‘seasons’ that usually take place during winter months. Influenza typically starts with a headache, chills and cough, followed rapidly by fever, loss of appetite, muscle aches and fatigue, running nose, sneezing, watery eyes and throat irritation. Nausea, vomiting and diarrhea may also occur, especially in children. Most people recover from influenza within a week or ten days, however, some individuals – those over 65 years of age and adults and children with chronic conditions, such as diabetes and cancer – are at greater risk of more severe complications, such as pneumonia. Between 2,000 and 8,000 Canadians can die of influenza and its complications annually depending on the severity of the season and/or the match between the seasonal vaccine and the circulating strain.

The influenza season in the time frame of this report (September 1<sup>st</sup> 2008 to August 31<sup>st</sup> 2009) includes the introduction of the novel influenza A strain (pH1N1) and the first and wave of the H1N1 pandemic; the second wave of the pandemic began in early September of 2009. In late April 2009, pH1N1 influenza was confirmed among cases of influenza-like-illness that were first reported in Mexico and North America. By June of 2009, widespread transmission led the World Health Organization (WHO) to declare a Phase 6 Global

Pandemic. Due to the atypical influenza experience in 2009, it is difficult to compare 2009 influenza statistics to previous years. Furthermore, most influenza illness is not reported nor validated through testing, so it is impossible to draw conclusions about the extent or nature of influenza illness in Peterborough based on available data. There does appear to be an increasing incidence of influenza between 2005 and 2009 in PCCHU; it is unknown why influenza incidence in 2006 was uncharacteristically low (Figure 5).

The Peterborough area experienced a short localized epidemic of pH1N1 that was first reported in June of 2009 and peaked in October; there were no confirmed pH1N1 cases reported after November. In total, there were 51 laboratory-confirmed cases of pH1N1 between April 1, 2009 and December 1, 2009, or 36.8 cases per 100,000 population (Table 11). This represents just under half (41.5%) of all influenza cases in 2009. Ages of cases ranged from less than one to 58 years old; nearly half (n=22, or 43.1%) of cases occurred in persons less than 15 years of age. Males and females were affected nearly equally at 54.9% and 45.1%, respectively. Just over half (n=29, or 56.9%) of the laboratory confirmed cases required hospitalization, with an average length of stay of 5.5 days (median = 2.5 days). Fewer than five confirmed cases required ventilation, and there were less than five deaths among cases. A large scale immunization program was initiated in the winter of 2009 resulting in approximately 50,000 people immunized, or roughly 36% of the Peterborough County and City population.

**Table 11. pH1N1 Summary Data for PCCHU**

<b>Number of Reported Cases</b>	<b>51</b>
Incidence (per 100,00 population)	36.8
Males	28 (54.9%)*
Females	23 (45.1%)*
<b>Age at Onset (Years)</b>	
Mean	25.8*
Median	22*
Range	<1 - 58*

\*of pH1N1 reported cases

There appear to be few other circulating influenza strains in 2009 – see Table 12: there were ten cases of influenza B; six laboratory-confirmed cases of H3N2; and three isolates were indeterminate, untypeable or other subtypes. In nearly half (43.1%) of all PCCHU specimens, no subtype was available or they were not subtyped. Testing for pH1N1 influenza was generally limited to severe cases presenting to a hospital Emergency Department or admissions to the Intensive Care Unit. In addition, the MOHLTC asked those who could manage their illness to stay home; therefore it is likely that the full extent of the 2009 influenza season was much greater than the number of reported cases indicates. Overall, incidence of influenza (all subtypes) was nearly equal among males and females; however, younger males were disproportionately affected compared to their older counterparts (64.9% of males were under 30 years of age). In females, only 46.1% of the cases were under the age of 30) – Figure 4. Table 13 presents summary data for all influenza subtypes combined.

**Table 12. Circulating influenza strains in PCCHU, 2009**

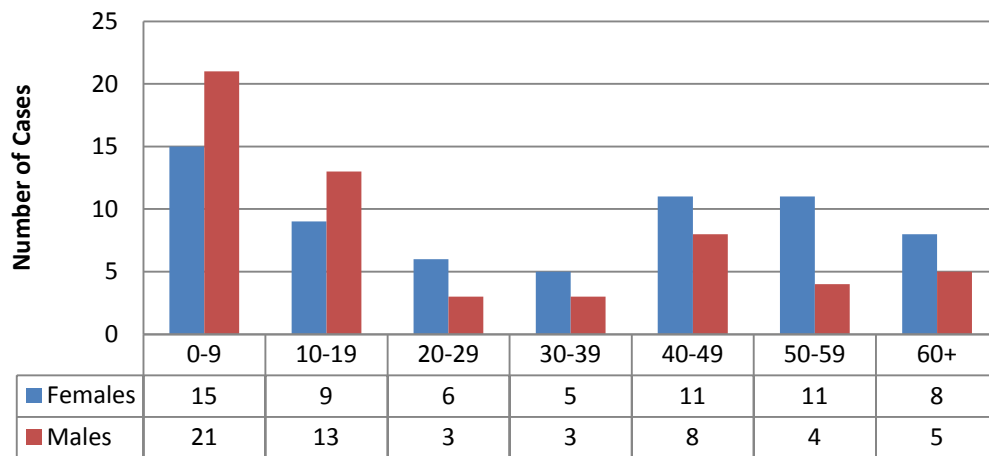
	Influenza A				Influenza B	Total (cumulative)
	pH1N1	NS*	Other†	H3		
PCCHU	51 (41.5%)	53 (43.1%)	3 (2.4%)	6 (4.9%)	10 (8.3%)	123

\*no subtype/not subtyped

† included indeterminate, untypeable and other subtypes

**Table 13. Influenza (total) Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	123	88.8
Incidence (per 100,00 population)	88.6	64.4
Males	57 (46.3%)	40.8%
Females	65 (52.8%)	59.2%
<b>Age at Onset (Years)</b>		
Mean	31.3	46.4
Median	24.5	44
Range	<1 - 90	<1 - 105



**Figure 4. Number of cases of influenza (all) by age and gender in PCCHU, 2009**

\*n=1 male unknown age

### 3.2 Streptococcus pneumonia, invasive

Pneumococcal disease is defined as infections that are caused by the bacterium *Streptococcus pneumoniae* (*S. pneumoniae*) also known as pneumococcus. The most common types of pneumococcal infections include middle ear infections (otitis media), sinus infections, lung infections (pneumonia), blood stream infections (bacteremia), and

meningitis; these infections are considered to be "invasive" when the bacteria is present in a normally sterile site (i.e.: blood). Invasive pneumococcal disease (iPD) most often presents as bacteremic pneumonia, meningitis and other clinical manifestations such as endocarditis or septic arthritis. Symptoms of pneumonia may include: a sudden onset with shaking chills, fever, shortness of breath or rapid breathing, chest pain and a productive cough. Meningitis presents with high fever, headache and stiff neck, which can develop over several hours or in one to two days. Other symptoms include nausea, vomiting, discomfort with bright lights, confusion and sleepiness.

Pneumococci are ubiquitous, their only reservoir is humans, and these bacteria usually colonize in the upper respiratory tract of healthy persons (carriers). Transmission occurs mostly through the spread of respiratory droplets from the nose or mouth, by direct oral contact or indirectly through articles freshly soiled with respiratory discharges from infected persons. The risk of disease is highest in persons 65 years of age and older, children less than 2 years of age, and those persons with certain medical conditions that put them at increased risk for invasive pneumococcal disease.

There was little change in iPD trends in PCCHU in 2009 (Figure 5): the number of cases is relatively stable between 13 and 20 cases; older individuals and females are affected more often (Table 14).

**Table 14. iPD Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	20	17.8
Incidence (per 100,00 population)	14.4	12.9
Males	8 (40%)	46.1%
Females	12 (60%)	53.9%
<b>Age at Onset (Years)</b>		
Mean	59	58.4
Median	65.5	63
Range	2 – 94	1 – 95

### 3.3 Group A streptococcal disease, invasive (iGAS)

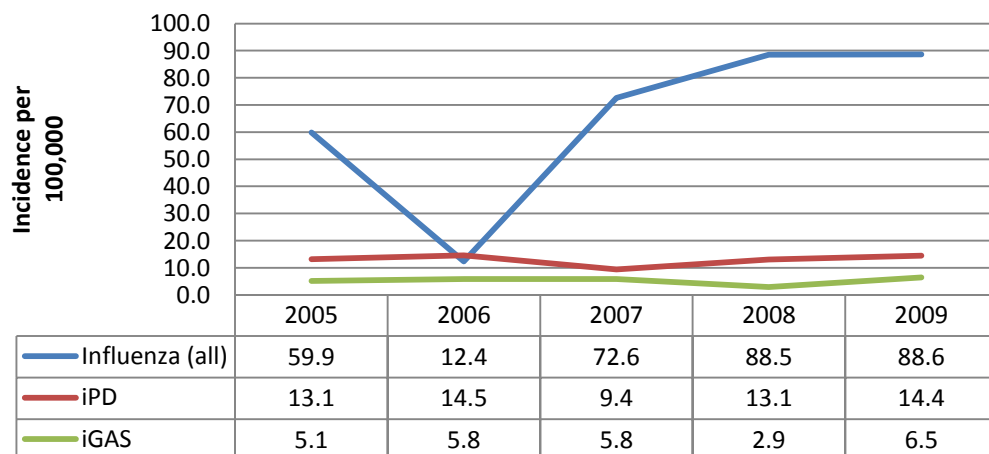
Invasive Group A streptococcal (iGAS) disease is caused by *Streptococcus pyogenes* (*S. pyogenes*). The most common clinical presentations for iGAS are skin or soft tissue infections, bacteremia, pneumonia, streptococcal toxic shock syndrome (STSS) and necrotizing fasciitis (NF) – or “flesh eating disease”. *S. pyogenes* may colonize the throat of individuals (carriers) without causing symptoms and may be passed from person to person. Transmission generally occurs from person to person most commonly by: droplet spread when an infected individual coughs or sneezes; direct or indirect contact of the oral or nasal mucus membranes with infectious respiratory secretions; and sharing of contaminated needles.

Symptoms of the onset of iGAS may be non-specific and include pain, swelling, fever, chills, influenza-like symptoms, generalized muscle aches, generalized macular rash, nausea, vomiting, diarrhea, malaise or joint pain. Symptoms of NF include fever and a red painful swelling of tissue, which spreads rapidly; death may occur in 12 to 24 hours. NF, while less severe than STSS, has a mortality rate of about 20%. Symptoms of STSS include infection of the primary site of iGAS and/or NF, plus hypotension, adult respiratory distress syndrome, renal impairment, rapid onset of shock and multi-organ failure; STSS has a mortality rate of up to 81%. Susceptibility to iGAS increased among individuals with underlying conditions including HIV infection, cancer, heart disease, diabetes, lung disease and alcohol abuse. Older individuals, persons with chronic diseases, persons in institutions and pregnant women also appear to be at higher risk of iGAS.

Incidence of iGAS is generally low in PCCHU (Table 15); since 2005 there have been 36 cases of iGAS and just over half the cases (n=20, or 55.6%) have been under the age of 55, with most cases being between 30 and 39 years of age. Males and females are generally represented equally.

**Table 15. iGAS Summary Data for PCCHU**

	2009	5-yr Mean (2005-2009)
<b>Number of Reported Cases</b>	9	7.2
<b>Incidence (per 100,00 population)</b>	6.5	5.2
Males	-	50%
Females	-	50%
<b>Age at Onset (Years)</b>		
Mean	49	45.3
Median	44	37.5
Range	<1 - 85	<1 - 95



**Figure 5. Incidence of influenza (all), iPD< and iGAS in PCCHU, 2005-2009**

#### 4. Vaccine Preventable Diseases (VPD); Vector-borne and Zoonotic Diseases; Other Reportable Diseases

In 2009 in PCCHU, there were few VPDs, vector-borne, zoonotic, or other/rare reportable communicable diseases. Included are updates on the following diseases: chickenpox, encephalitis/meningitis, and Lyme disease.

Vaccine preventable diseases (VPD) are those communicable diseases that can be prevented by routine vaccination. As a result, these diseases are rarely seen except sporadic outbreaks in unimmunized populations or individuals who are not up to date with respect to their vaccination schedule (Appendix B). Up-to-date diphtheria, tetanus, polio, measles, mumps, and rubella vaccinations are required in order for children to attend Ontario schools; *haemophilus influenzae* type B and pertussis immunizations are required for day care.

Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice-versa is classified as a zoonosis; this can include infections from bacteria, viruses, fungi, parasites, or other agents such the prion responsible for variant Creutzfeldt-Jakob Disease (vCJD). Vector-borne diseases are transmitted to humans and animals through blood-feeding arthropods, such as mosquitoes, ticks and fleas; examples include Lyme disease and malaria. A list of vector-borne diseases of potential interest in Canada is presented in Appendix C.

Other or rare reportable diseases may be transmitted by any of other aforementioned sections, however, their incidence is generally extremely low that they are considered separately; examples include rabies and plague.

In PCCHU there were less than five cases of Lyme disease and encephalitis/meningitis in 2009; there were also fewer than 5 cases of laboratory confirmed cases chickenpox requiring follow-up with a public health nurse in 2009. These diseases are rarely reported in PCCHU; between 2005 and 2009, there were 12 cases of laboratory-confirmed chicken pox requiring follow-up, 28 cases of encephalitis/meningitis, and fewer than five cases of Lyme disease. Table 16 presents summary data for chickenpox and encephalitis/meningitis.

**Table 16. Chickenpox and Encephalitis/Meningitis Summary Data for PCCHU**

	5-yr Mean (2005-2009)	
	Chickenpox	Encephalitis/Meningitis
Number of Reported Cases	2.4	6
Incidence (per 100,00 population)	1.74	4.1
Males	58.3%	35.7%
Females	41.7%	56.7%
<b>Age at Onset (Years)</b>		
Mean	38.3	34.8
Median	30	34
Range	<1 - 81	<1 - 88

There were no reported cases of the following diseases in PCCHU in 2009: anthrax; botulism; brucellosis; chancroid; cholera; cytomegalovirus infection, congenital; diphtheria; group B Streptococcal infections, neonatal; Haemophilus influenzae b disease, invasive; hemorrhagic fevers; hepatitis D; herpes, neonatal; Lassa fever; legionellosis; leprosy; malaria; measles; meningococcal disease, invasive; mumps; ophthalmia neonatorum; paratyphoid fever; pertussis; plague; poliomyelitis, acute; psittacosis/ornithosis; Q fever; rabies; rubella; rubella, congenital syndrome; tetanus; trichinosis; tularemia; typhoid fever; verotoxin-producing *E. coli* infection; yellow fever; yersiniosis.

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

<ul style="list-style-type: none"> <li>* Acquired Immunodeficiency Syndrome (AIDS)</li> <li>Amebiasis</li> <li>* Anthrax</li> <li>* Botulism</li> <li>Brucellosis</li> <li>Campylobacter enteritis</li> <li>Chancroid</li> <li>Chickenpox (Varicella)</li> <li>Chlamydia trachomatis infections</li> <li>* Cholera</li> <li>Cryptosporidiosis</li> <li>Cytomegalovirus infection, congenital</li> <li>* Diphtheria</li> <li>Encephalitis, including: <ul style="list-style-type: none"> <li>i Primary, viral</li> <li>ii Post-infectious</li> <li>iii Vaccine-related</li> <li>iv Subacute sclerosing panencephalitis</li> <li>v Unspecified</li> </ul> </li> <li>* Food poisoning, all causes</li> <li>* Gastroenteritis, institutional outbreaks</li> <li>Giardiasis, except asymptomatic cases</li> <li>Gonorrhea</li> <li>* Group A Streptococcal infections, invasive</li> <li>Group B Streptococcal infections, neonatal</li> <li>* Haemophilus influenzae b disease, invasive</li> <li>* Hemorrhagic fevers, including: <ul style="list-style-type: none"> <li>i Ebola virus disease</li> <li>ii Marburg virus disease</li> <li>iii Other viral causes</li> </ul> </li> <li>Hepatitis, viral <ul style="list-style-type: none"> <li>* i Hepatitis A</li> <li>ii Hepatitis B</li> <li>iii Hepatitis C</li> <li>iv Hepatitis D (Delta hepatitis)</li> </ul> </li> <li>Herpes, neonatal</li> <li>Influenza</li> </ul>	<ul style="list-style-type: none"> <li>* Lassa Fever</li> <li>Legionellosis</li> <li>Leprosy</li> <li>Listeriosis</li> <li>Lyme Disease</li> <li>Malaria</li> <li>* Measles</li> <li>Meningitis, acute <ul style="list-style-type: none"> <li>* i bacterial</li> <li>ii viral</li> <li>iii other</li> </ul> </li> <li>* Meningococcal disease, invasive</li> <li>Mumps</li> <li>Ophthalmia neonatorum</li> <li>* Paratyphoid Fever</li> <li>Pertussis (Whooping Cough)</li> <li>* Plague</li> <li>* Poliomyelitis, acute</li> <li>Psittacosis/Ornithosis</li> <li>Q Fever</li> <li>* Rabies</li> <li>Rubella</li> <li>Rubella, congenital syndrome</li> <li>Salmonellosis</li> <li>* Shigellosis</li> <li>Syphilis</li> <li>Tetanus</li> <li>Trichinosis</li> <li>Tuberculosis</li> <li>Tularemia</li> <li>* Typhoid Fever</li> <li>* Verotoxin-producing E. Coli infection</li> <li>indicator conditions including: <ul style="list-style-type: none"> <li>Hemolytic Uremic Syndrome (HUS)</li> </ul> </li> <li>* Yellow Fever</li> <li>Yersiniosis</li> </ul>
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Source: Ontario Ministry of Health, 1996

**Appendix B. Publicly Funded Immunization Schedules for Ontario, as of January 2009**

Vaccine	Infants and Pre-School Children						School-Aged Children				Adults
	Age (months)						Age (years)				
	2	4	6	12	15*	18	4-6	Grd. 7	Grd. 8 Females	14-16	Every 10 yrs
DTaP-IPV-Hib	■	■	■			■	■				
Pneu-C-7	■	■	■		■						
MMR				■		■					
Men-C				■		OR		†	OR	(■)‡	
Var					■	OR	(■)§				
HB								†			
HPV									†		
Tdap										■	
Td											■

( ) Indicates dose may not be required, based on age and/or immunization history.

\***Alternative schedules** if 15-month immunization visit not possible: **12-month visit** – give Pneu-C-7, MMR, Men-C, Var; **18-month visit** – give DTaP-IPV-Hib, MMR;

†Administered through school-based program;

‡15- to 19-year-olds who have not been immunized;

§ Var for unimmunized, susceptible 5-year-olds.

■ required for school entry

**Vaccine Antigen Abbreviations:**

**DTaP** = diphtheria, tetanus and acellular pertussis for children under 7 years of age;

**IPV** = inactivated poliovirus;

**Hib** = *haemophilus influenzae* type B;

**Pneu-C-7** = pneumococcal 7-valent conjugate;

**MMR** = measles, mumps and rubella;

**Men-C** = meningococcal C conjugate;

**Var** = varicella zoster;

**HB** = Hepatitis B;

**Tdap** = diphtheria, tetanus and acellular pertussis adult/adolescent formulation;

**Td** = tetanus and diphtheria adult type formulation;

**HPV** = Human papillomavirus;

**Pneu-P-23** = pneumococcal polysaccharide vaccine;

**Men-C-ACWY** = meningococcal A, C, W-135, Y quadrivalent conjugate

## Appendix C. Arthropod-borne diseases of potential interest to Canadians

Disease	Microbial category	Arthropod host	Distribution
Lyme disease	Bacterial	Tick	Southern Ontario, British Columbia, sporadic elsewhere, imported cases
Relapsing fever	Bacterial	Tick	British Columbia
Tularemia*	Bacterial	Tick	Canada wide
Plague	Bacterial	Flea	Western Canada
Bartonella*	Bacterial	Louse, flea	Potentially Canada-wide <sup>‡</sup>
Q fever*	Rickettsial	Tick	Canada-wide
Rocky Mountain spotted fever	Rickettsial	Tick	British Columbia, Alberta, Saskatchewan, Ontario, Nova Scotia
Human granulocytic ehrlichiosis	Rickettsial	Tick	Potentially in Canada <sup>‡</sup> , imported
Endemic (murine) typhus	Rickettsial	Flea	Potentially Canada-wide <sup>‡</sup>
California encephalitis	Viral	Mosquito	Canada-wide
Western equine encephalitis	Viral	Mosquito	Western Canada
Eastern equine encephalitis	Viral	Mosquito	Quebec, Ontario
Powassan encephalitis	Viral	Tick	Ontario, Quebec, New Brunswick
Colorado tick fever	Viral	Tick	Alberta, British Columbia
St Louis encephalitis	Viral	Mosquito	Ontario, Quebec, Manitoba, Saskatchewan
Cache Valley	Viral	Mosquito	Ontario, Manitoba, Saskatchewan, Alberta
Dengue	Viral	Mosquito	Imported
Exotic arboviral infections	Viral	Mosquito, tick, sandfly	Imported
Malaria	Parasitic	Mosquito	Imported

\*The disease may have an arthropod-borne association, but it is not necessarily the main means of transmission to humans;

<sup>‡</sup>Reflects speculation by H. Artsob

From: Paediatr Child Health. 2000 May-Jun; 5(4): 206-212.