



# Infectious Diseases

## Chapter 10

*This chapter provides an overview of selected infectious diseases that are reportable to all Ontario public health units, as required by the Health Protection and Promotion Act.<sup>112</sup> (see also Reportable Diseases in the Appendix to this report.) Infectious diseases can vary in severity from the common cold, to life threatening diseases such as Acquired Immunodeficiency Syndrome (AIDS). Rates of infectious diseases are a good indicator of the health of a population, as they are often correlated with socio-economic and environmental conditions.*

*With the development and increasing availability of new antibiotics and vaccines in the post-World War II era, it was hoped that infectious diseases would no longer pose a major threat to public health. In fact, there have been successes, such as the global eradication of smallpox in 1980 and the near eradication of polio. However, expanded global travel, immigration, and trade have introduced emerging organisms to our environment. Infectious diseases have remained one of the leading causes of death and disability worldwide.*

### Deaths from Selected Infectious Diseases

On average, there were 27 deaths a year due to infectious and parasitic diseases in York Region between 1986 and 1999 (a total of 381 deaths), not including pneumonia and influenza.

Pneumonia and influenza are also important causes of infectious disease deaths, especially among the elderly. All influenza deaths (37) and more than 90% of all pneumococcal deaths (1,126 out of a total of 1,218 deaths) that occurred in York Region between 1986 and 1999 were among those aged 65 years and over.

During the same time period AIDS caused the death of 90 York Region residents.

### Hospitalizations from Selected Infectious Diseases

Infectious and parasitic diseases were the cause of an average of 575 hospitalizations a year in York Region between 1997 and 2001.

During this same time period, there were a total of 4,541 pneumonia hospitalizations, affecting primarily the old and young (nearly 60% were among those age 65 and over, and 20% among children under 15 years of age).

### At a Glance

The number of reported cases of measles in York Region has dropped from 12 in 1996 to 0 in 2001.

In York Region, there were 38 cases of influenza reported in 2001, a decrease from 135 cases in 1999.

Between 1998 and 2001, rates of influenza immunization for staff and residents of Long Term Care Facilities in York Region increased to 85.4% from 36.5% for staff and to 95.8% from 92.2% for residents.

In York Region, between 1996 and 2001, there were on average 465 cases of chlamydia each year. During this time period, the incidence rates of chlamydia were lower in York Region compared to those in Ontario.

Between 1995 and 2001, enteric diseases were the most common cause of outbreaks investigated in York Region.



Influenza was the cause of 78 hospitalizations between 1997 and 2001, and these occurred across all age groups - children under 15 years (39%), youth and adults 15 to 64 (32%), and seniors age 65 and over (30%).

Intestinal infectious diseases also accounted for a high number of hospitalizations over this period. There were 632 admissions for food poisoning and 1,096 hospital admissions for other bacterial diseases.

## Vaccine-Preventable Diseases

The Canadian Paediatric Society and the National Advisory Committee on Immunization strongly promote routine immunizations for children. Vaccination programs are considered to be the most cost-beneficial health intervention. Immunization carried out as recommended provides good basic protection for most children against vaccine-preventable diseases. Ontario provides free routine immunization for children and adults against diphtheria, tetanus, pertussis, polio, measles, mumps, rubella and *Haemophilus influenzae* type b. Hepatitis B vaccine is offered at no cost to Grade 7 students and to individuals who meet the high-risk criteria established by the Ontario Ministry of Health and Long-Term Care. Pneumococcal vaccine is provided free to persons over the age of 65 or who have medical conditions that put them at high risk of complications from pneumonia. In July 2000, the Ministry of Health and Long-Term Care announced a Universal Flu Immunization Campaign that has made influenza vaccine available to all residents of Ontario at no cost.

Regular immunization status reports are an important tool in assessing the efficiency and benefits of immunization programs. The immunization coverage rates (see the accompanying "Did you know?" features) for the Measles/Mumps/Rubella (MMR) vaccine, the Inactivated or Oral Polio Vaccines (IPV/OPV), the Diphtheria/Pertussis/Tetanus (DPT) vaccine, and the *Haemophilus influenzae* type b (Hib) vaccine were obtained from the Immunization Records Information System (IRIS). The IRIS database is intended to maintain and assess immunization records on all children enrolled in licensed day nurseries and schools. Implemented in 1992, IRIS is used by all public health units in Ontario. Proof of immunization against specified diseases is required under the *Immunization of School Pupils Act* for children attending school in Ontario, and coverage rates are calculated by determining the number of children whose immunization status is known to be up-to-date.



## Measles

Measles is the most contagious of the vaccine-preventable infections. The measles virus is spread by cough and nasal droplets. Common symptoms include a high fever, cough, and rash and complications such as otitis media and pneumonia occur in about 10% of cases.<sup>113</sup> Death, primarily due to respiratory and neurologic complications, occurs in 1 to 3 out of every 1000 cases in the developed world.<sup>114</sup> Nearly one million measles deaths still occur annually in children worldwide. Outbreaks of measles can occur in populations with virtually 100% vaccination rates as a result of the spread of the virus among the small proportion of children who failed to respond to primary vaccination or, less commonly, who lost the vaccine's protection over time. In Ontario, a two-dose vaccination schedule was introduced in 1996 to combat the number of cases of measles that continued to be reported each year. Between 1996 and 2001 the number of reported cases in York Region has dropped from 12 to zero.

## Mumps

Mumps is an acute viral disease characterized by a fever and swelling and tenderness of one or more salivary glands.<sup>115</sup> The mumps virus is transmitted by cough and nasal droplets. Since the introduction of the mumps vaccine in 1969, the incidence of clinical mumps has decreased by more than 99% in Canada.<sup>116</sup> There was less than 1 case of mumps per 100,000 population in York Region from 1996 to 2001. Similarly, there was less than 1 case per 100,000 population in Ontario from 1996 to 1999.

## Rubella

Rubella is a mild viral disease with a rash that sometimes resembles that of measles or scarlet fever. Like mumps and measles, rubella is spread via the respiratory route. Children who contract rubella present few or no symptoms but adults may experience one to five days of low-grade fever, headache, and general malaise. The major objective of vaccination is the prevention of rubella infection in pregnancy, as congenital rubella syndrome (CRS) can result in miscarriage, stillbirth and congenital defects.<sup>117</sup> One case of CRS was reported in Ontario in 1997. From 1996 to 2001, there have been a total of seven cases of rubella in York Region. The incidence rates of rubella have been less than 1 per 100,000 population in both Ontario and York Region between 1996 and 1999.

### *Did You Know?*

In Ontario, the Measles/Mumps/Rubella (MMR) vaccine is administered to children at 12 months of age and again at 18 months or 4 to 6 years.

From 1995 to 2001, York Region's MMR vaccination rate ranged between 91% and 92%.



## Did You Know?

### Diphtheria, Pertussis, Tetanus (DPT) Vaccinations

In Ontario, the DPT vaccine is administered to children at 2, 4, 6 and 18 months of age and again at 4 to 6 years.

York Region's DPT vaccination rate was 82.4% in 2000 and 80.7% in 2001.

To reduce the number of childhood vaccinations, a combined vaccine of diphtheria, pertussis, tetanus, *Haemophilus Influenzae* type b and polio is available.

## Diphtheria

Diphtheria is a bacterial disease that primarily affects the tonsils, pharynx, larynx, nose and sometimes the skin.<sup>118</sup> The number of carriers normally outnumbers those who become ill. Of those that contract diphtheria, approximately 5% to 10% die from the disease, with the highest death rates in the very young and the elderly. The last case of diphtheria reported in Ontario was in 1995.

## Pertussis

Pertussis (whooping cough) is a highly communicable respiratory infection and is most severe among young infants. Hospitalization for pertussis is still common in Canada, and several deaths occur each year, particularly in unimmunized infants. Older children, adolescents, and adults who develop pertussis are an important source of infection for young infants.<sup>119</sup> In York Region, the number of cases of pertussis increased from 22 in 1996 to 54 in 2000, then declined to 22 in 2001. This reflects an increase in the incidence rate from 4 per 100,000 population to 8 per 100,000 population from 1996 to 2000, and a subsequent decrease to 3 per 100,000 population in 2001. The incidence rate of pertussis in Ontario increased from 7 per 100,000 in 1996 to 16 per 100,000 in 1998, then decreased to 10 per 100,000 population in 1999.

## Tetanus

Tetanus is an acute and often-fatal disease caused by an extremely potent neurotoxin produced by the bacterium *Clostridium tetani* in a contaminated wound.<sup>120</sup> Immunization against tetanus is highly effective and is recommended for the entire population. Only one to seven cases of tetanus are reported annually in Canada. No deaths due to tetanus have been recorded since 1995. There was one reported case of tetanus in York Region in 1999. It is recommended that all Canadians receive a primary vaccination in childhood, followed by routine booster doses every 10 years.<sup>121</sup>



## Polio

Poliomyelitis (polio) is caused by a highly contagious poliovirus that is transmitted by the fecal-oral and respiratory routes, and may cause irreversible paralysis in a certain proportion of infected individuals.<sup>122</sup> In 1985, the Pan-American Health Organization adopted a goal of elimination of poliomyelitis from the hemisphere, and the goal was achieved by September 1995.<sup>123</sup> York Region has not had a case of polio reported from 1990 to 2001.

## *Haemophilus influenzae* type b

*Haemophilus influenzae* type b (Hib) is a bacterium transmitted by nasal droplets. Before the introduction of the vaccine in Canada in 1988, Hib was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in young children.<sup>124</sup> About 55% to 65% of children infected with Hib develop meningitis. Of those who contract Hib meningitis, about 5% die and another 10% to 15% have permanent neurological consequences. Before the introduction of the vaccine, there were approximately 2,000 cases of Hib disease annually. Since then, the overall incidence has fallen by more than 99%. Since Hib vaccination is only recommended for children under the age of 5 years, the majority of cases now occur in children too old to have received primary immunization. Between 1997 and 2001 there were only 4 cases of Hib reported in York Region - 3 in 1998 and 1 in 2001. Across Ontario, there were 28 reported cases of Hib from 1996 to 1999.

## Hepatitis B

Hepatitis B is a viral infection that affects the liver and can lead to cirrhosis and hepatic cancer. Hepatitis B virus (HBV) is present in, and can be transmitted through, contact with the body fluids of an infected person - blood, semen, vaginal secretions, or saliva. Primary sources of transmission include unprotected sexual intercourse and contact with infected blood through the sharing of contaminated needles or other equipment used for recreational drug use. Perinatal transmission, i.e., transmission from mother to infant, may also occur. Forty-seven acute cases of hepatitis B were reported in York Region between 1996 and 2001, representing an incidence rate of approximately 1 case per 100,000 population in each year. Travel to an endemic country was the most commonly reported primary risk factor among acute hepatitis B cases (11 cases).

### *Did You Know?*

#### Polio Vaccinations

In Ontario, the polio vaccine is administered to children at 2, 4, 6 and 18 months of age and again at 4 to 6 years.

York Region's polio vaccination rate ranged from 83% to 85% from 1995 to 2001.

The highest coverage rate was among 12 year olds (91.1%) and the lowest coverage was among 18 year olds (45.2%).

#### *Haemophilus influenzae* type b (Hib) Vaccinations

In Ontario, the Hib vaccine is only recommended for child under the age of 5 years. It is administered at 2, 4, 6, and 18 months.

York Region's Hib vaccination rate averaged 93.3% from 1995 to 2001.



## Working for You

During the 2001/2002 school year, the Infectious Diseases Control Division of the York Region Health Services Department immunized approximately 8,500 Grade 7 students with two doses each of Hepatitis B vaccine through the Universal Grade 7 Hepatitis B Program.

Individuals with acute HBV infection may become chronic carriers. Chronic carriers are the primary source of HBV infection, and are at an increased risk for developing chronic liver disease or liver cancer in later life.<sup>125</sup> In York Region, there have been 3,762 HBV carriers reported from 1996 to 2001. Of the identified risk factors, travelling to or living in an endemic country accounts for the majority of carriers (2,733). The rate of hepatitis B carriers in York Region has declined from 113 per 100,000 population in 1996 to 86 per 100,000 in 2001.

## Pneumococcal Pneumonia

Pneumococcal pneumonia is the leading cause of invasive bacterial infections, meningitis, bacterial pneumonia, and acute otitis media in children.<sup>126</sup> It is an important cause of death in infants and the elderly. From 1996 to 2001, 62,754 units of pneumococcal vaccine were allocated to York Region for distribution to family physicians, hospitals and long-term care facilities.

## Influenza

Influenza is a highly contagious viral disease of the upper respiratory tract characterized by the sudden onset of cough, fever, nasal congestion, sore throat, and muscle aches. Influenza can lead to pneumonia and death in the elderly, children at high risk, and those with heart and lung problems. The number of deaths in Canada due to influenza or its complications during the flu season (late fall and winter months) varies each year, but is estimated to be approximately 500 to 1,500 each season.<sup>127</sup>

In York Region, there were 38 cases of influenza reported in 2001, a decrease from 42 cases in 2000 and 135 cases in 1999. The majority (79%) of the influenza cases reported in 2001 were in children aged one to 14 years old. The incidence rate of influenza in York Region in 2001 was 4 cases per 100,000 population, a decrease from 6 cases per 100,000 population in 2000, and 20 cases per 100,000 population in 1999. The incidence rates of influenza in Ontario from 1996 to 1999 were higher than those in York Region from 1996 to 1999. Rates of influenza in the population are under-estimated. Influenza is a widespread illness, and only a few cases are diagnosed by laboratory procedures. Only-lab-confirmed cases are reported to public health units.

Influenza vaccine has been shown to prevent illness in approximately 70% to 90% of healthy children and adults. In older adults, the vaccine can prevent pneumonia and hospitalization in about 6 out of 10 people. The vaccine prevents death in about 8 out of 10 older adults.<sup>128</sup>



## Influenza in Long-Term Care Facilities

In long-term care facilities (LTCF) such as Nursing Homes and Homes for the Aged, it is not uncommon for influenza outbreaks to occur and spread rapidly to most or all of the facility's residents and staff. An important measure to prevent such outbreaks is for all staff and residents to receive annual influenza vaccines. The influenza vaccination rate for staff in LTCFs in York Region increased from a low of 36.5% during the 1998-1999 flu season to 85.4% in 2001-2002 (Table 10.1). Similarly, rates of LTCF resident influenza vaccination increased from 92.2% in the 1998-1999 flu season to 95.8% in 2001-2002. (Table 10.2).

Table 10.1 Staff Influenza Vaccination Rates in Long-Term Care Facilities  
York Region

	1998-1999	1999-2000	2000-2001	2001-2002
Total # of staff in facility	1784	1905	2192	2158
Total # of staff vaccinated	652	1465	1823	1842
Percentage staff vaccinated	36.5%	76.9%	83.2%	85.4%

Source: York Region Health Services Department as reported to the Ontario Ministry of Health and Long-Term Care, 2002.

Table 10.2 Resident Influenza Vaccination Rates in Long-Term Care Facilities  
York Region

	1998-1999	1999-2000	2000-2001	2001-2002
Total # of residents in facility	1668	1867	1906	1921
Total # of residents vaccinated	1538	1730	1786	1841
Percentage residents vaccinated	92.2%	92.7%	93.7%	95.8%

Source: York Region Health Services Department as reported to the Ontario Ministry of Health and Long-Term Care, 2002.

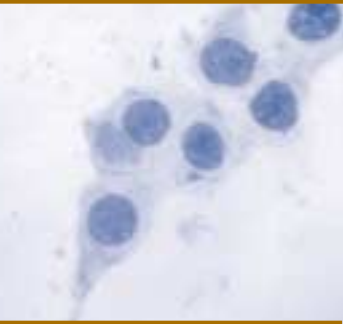
### Did You Know?

In 2001, York Region Health Services Department distributed 229,160 doses of influenza vaccine to local physicians.

Every flu season, the Health Services Department offers flu vaccination clinics where York Region residents can receive the vaccine, free of charge.

## Bacterial Meningitis

Bacterial meningitis (meningococcal meningitis or meningococemia) is an acute and potentially fatal disease. *Neisseria meningitidis* is a leading cause of meningitis (inflammation of the lining of the brain and spinal cord) in young children and an important cause of septicemia, or blood poisoning.<sup>129</sup> It is transmitted through direct contact with respiratory and oral droplets from the nose and throat of infected persons. Cases of meningococcal disease occur year round, but the majority present in the winter months.



Overall, incidence (per 100,000 population) is highest among children under 1 year of age, followed by children 1 to 4 years of age and adolescents 15 to 19 years of age.<sup>130</sup> In 2001, there were 3 cases of bacterial meningitis reported in York Region.

Meningococcal vaccine is available at no cost to household and intimate social contacts (kissing, sharing a toothbrush, etc.) of cases of meningococcal disease.<sup>131</sup>

## Sexually Transmitted Diseases

The number of reported cases of sexually transmitted diseases (STDs) is thought to represent only a fraction of the actual number of infections, since many people who are infected may not have any symptoms and therefore their infections are often not detected.<sup>132</sup>

The incidence of sexually transmitted disease is directly related to personal sexual health practices, specifically with respect to practicing safe sex. The number of cases of sexually transmitted disease in York Region suggests that many people are not taking appropriate precautions to protect themselves from the risk of infection.

## Chlamydia

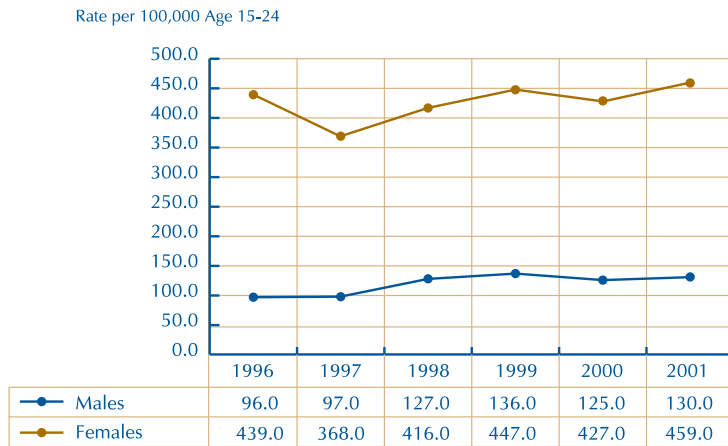
Genital chlamydia is the most prevalent bacterial STD in Canada. Rates are highest among females between age 15 and 24. The disease is preventable and treatable, but approximately 70% of women infected with chlamydia have no symptoms of infection and, as a result, the infection is often not diagnosed. Untreated chlamydia infections in females can lead to pelvic inflammatory disease, ectopic pregnancy, and/or infertility.<sup>133</sup>

There were, on average, 465 reported cases of chlamydia each year in York Region between 1996 and 2001. The incidence rate of chlamydia in York Region increased from 59.5 per 100,000 population in 1996 to 75 per 100,000 population in 2001. The incidence rates of chlamydia were lower in York Region compared to the provincial rates (from 1996 to 1999).

Rates of chlamydia were approximately three to four times higher among York Region females age 15 to 24 than among males in the same age category (Figure 10.1). The incidence rate for chlamydia among York Region females age 15 and 24 years increased to 459 cases per 100,000 population in 2001 from approximately 368 cases per 100,000 population in 1997.



Figure 10.1 Chlamydia Rates by Gender, Ages 15-24  
York Region, 1996-2001



Source: Reportable Disease Information System (RDIS), York Region Health Services Department, 2002.

## Gonorrhoea

There were, on average, 61 cases of gonorrhoea each year in York Region between 1996 and 2001. The incidence rate of gonorrhoea was approximately 9 per 100,000 population per year from 1996 to 2001. The incidence rates of gonorrhoea for York Region from 1996 to 1999 were approximately half of the Ontario rates for the same period.

## Syphilis

There were approximately 1 to 2 cases of syphilis (all types) per 100,000 population in York Region from 1996 to 2001, representing a high of 14 cases in 1998 to a low of 8 cases in 1997. By comparison, there were approximately 2 to 3 cases of syphilis per 100,000 population per year in Ontario from 1996 to 1999. Tertiary syphilis results in neurological problems, and is very rarely seen in modern times. There was one case of tertiary syphilis in York Region reported in 1996.





## Acquired Immunodeficiency Syndrome (AIDS)

Acquired Immunodeficiency Syndrome is a major cause of infectious disease deaths. Between 1986 and 1999, AIDS accounted for 25% of all deaths attributed to infectious diseases (excluding pneumonia and influenza) in York Region.

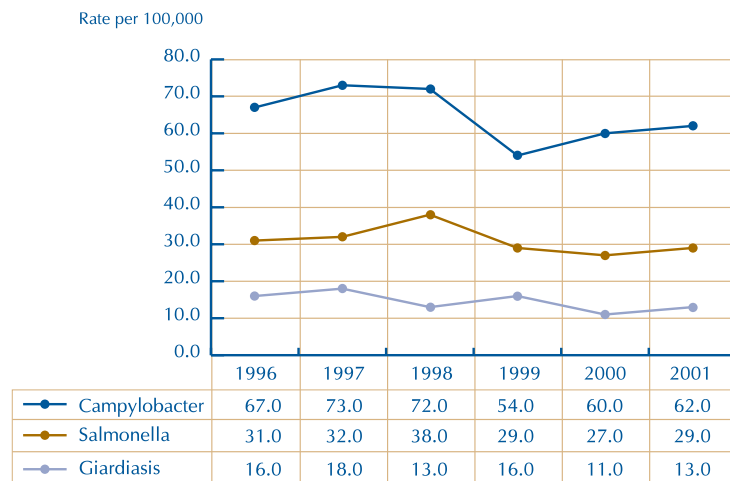
The incidence rate for AIDS in York Region between 1996 and 2001 was less than 1 case per 100,000 population. In Ontario from 1996 to 1999 the AIDS incidence rate ranged from 1 to 3 cases per 100,000 population.

In York Region between 1996 and 2001, sexual relations with a partner of the opposite sex was the most commonly reported risk factor (39%), followed by sexual relations with a partner of the same sex (33%) and living in or visiting an endemic area (17%).

## Enteric Illnesses

Enteric illnesses are caused by a group of bacteria, viruses, and parasites that cause intestinal infections. These diseases are spread through the fecal-oral route, which means that transmission occurs as a result of consuming fecally-contaminated water or food. Transmission usually results because of incomplete cooking of contaminated food, inappropriate food storage, or cross-contamination of food (by the transfer of organisms from contaminated raw food to prepared food). Rates of the most common enteric illnesses in York Region are presented in Figure 10.2.

Figure 10.2 Rates of Selected Types of Enteric Illness  
York Region, 1996-2001



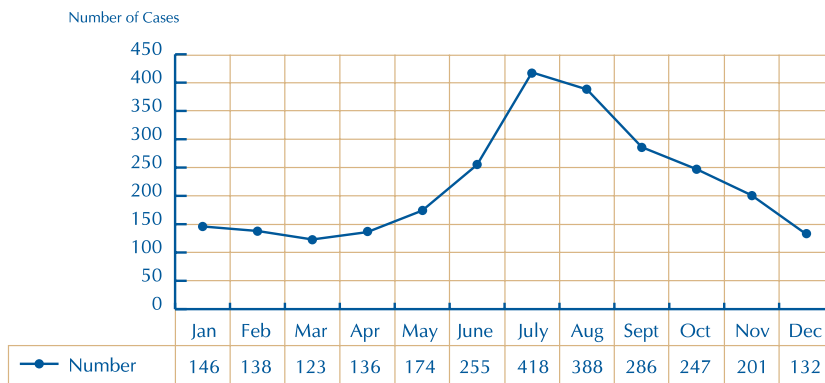
Source: Reportable Disease Information System (RDIS),  
York Region Health Services Department, 2002.



## Campylobacter Infections

*Campylobacter* is the most commonly reported bacterial infection in York Region. It is associated with the ingestion of undercooked poultry and pork, contaminated food, water or milk or through cross-contamination from cutting boards.<sup>134</sup> In 2001, there were 483 *Campylobacter* infections reported in York Region. The average incidence rate of *Campylobacter* in York Region from 1996 to 2001 was 64 cases per 100,000 population (Figure 10.2).

Figure 10.3 Reported *Campylobacter* Cases in York Region by Month 1996 to 2001 Combined.



Source: Reportable Disease Information System (RDIS), York Region Health Services Department, 2002.

The incidence rates of *Campylobacter* were lower in Ontario compared to York Region from 1996 to 1999. There is a definite seasonal trend, with most *Campylobacter* infections occurring in the summer months (Figure 10.3).

## Salmonellosis

Salmonellosis, another bacterial infection, is the second most commonly reported enteric disease. Human infection may occur through the ingestion of food contaminated by feces from animals or an infected person. This food may include raw and undercooked eggs and egg products, raw milk and raw milk products, contaminated water, and contaminated meat and meat products or poultry and poultry products.<sup>135</sup> In 2001 there were 222 salmonellosis cases in York Region. The incidence rates of salmonellosis in York Region have ranged from 27 to 38 cases per 100,000 population from 1996 to 2001 (Figure 10.2). As with *Campylobacter*, the rates of salmonellosis were lower in Ontario than in York Region from 1996 to 1999.





## Giardiasis

Giardiasis is an enteric infection caused by a protozoan parasite and is the third most commonly reported enteric disease in York Region. Those most susceptible are children who attend day care centres as well as individuals who travel to the Canadian wilderness and to developing countries. Person-to-person transmission occurs by hand-to-mouth transfer of cysts from the feces of an infected individual or by ingesting cysts in fecally-contaminated drinking or recreational water.<sup>136</sup> The number of giardiasis cases in York Region ranged from 84 to 113 per year between 1996 and 2001. Most of the cases were found in children between the ages of one and five, and were associated with attendance at daycare centres. The incidence rates of giardiasis in York Region from 1996 to 2001 ranged from 11 to 18 per 100,000 population (Figure 10.2). The rates of giardiasis were higher in Ontario (from 1996 to 1999) than in York Region.

## Verotoxin-Producing *Escherichia coli* (VTEC)

Verotoxin-producing *Escherichia coli* (VTEC) O157:H7 is a bacterium that produces a toxin that causes severe diarrhea and can cause more serious illnesses such as hemolytic-uremic syndrome (HUS), a leading cause of kidney failure. VTEC is sometimes referred to as "Hamburger Disease" because of its association with the consumption of undercooked beef but transmission may also occur through fecally-contaminated water.<sup>137</sup> Between 1996 and 2001, there were an average of 32 reported cases of VTEC each year in York Region.

## Hepatitis A

Hepatitis A is a viral disease that mainly affects the liver. The disease can be mild, lasting one to two weeks, or severe, lasting several months.<sup>138</sup> Transmission is person-to-person, resulting from fecal contamination and oral ingestion. Hepatitis A cases reported in York Region decreased from 23 in 1996 to 8 in 2001. Incidence rates of Hepatitis A in York Region ranged from 1 to 4 cases per 100,000 population from 1996 to 2001. The rates of Hepatitis A were similar in Ontario for the years 1996 to 1999.

There have been several outbreaks in which Hepatitis A vaccine has been used successfully to control the transmission of the virus in communities. These have included three Canadian outbreaks - in Kitchener-Waterloo in 1997, in Montreal in 1997-98 and on Vancouver Island in 1995-96.<sup>139</sup> In the event of an outbreak, Hepatitis A vaccine is available at no cost.



## Other Infectious Diseases

### Tuberculosis

Tuberculosis (TB) is a bacterial infection that primarily affects the lungs but can affect any organ system in the body. According to the World Health Organization, more than 8 million people become ill with TB each year and 2 million die.<sup>140</sup> Recent increases in the incidence of TB in Canada can be attributed to the spread of HIV infection (which increases susceptibility to TB), growing emergence of drug-resistant strains of the organism, and shifting immigration patterns. In Canada in 1996, close to 63% of cases occurred among the foreign born and approximately 16% occurred among Aboriginal peoples.<sup>141</sup>

In York Region, the incidence rate of TB from 1996 to 2001 ranged from 5 to 8 per 100,000 population. Between 54% and 67% of those diagnosed with TB were born in India, Hong Kong, China, or the Philippines. Pulmonary tuberculosis accounted for 41% to 65% of the cases of TB in York Region from 1996 to 2001. This is consistent with Ontario data.

York Region TB rates were highest among people age 65 years and over, with an incidence rate of 18.5 cases per 100,000 population in that age category.

Drug-resistant TB is becoming a major public health problem in large U.S. cities. All regions in Ontario, including York Region, are now reporting some cases of drug-resistant TB.

### Hepatitis C

Hepatitis C is a viral disease that affects the liver. Hepatitis C infection presents initially with mild flu-like symptoms. Persistent infection occurs in 75% to 85% of infected persons; 60% to 70% of chronically-infected patients develop chronic hepatitis, and 10% to 20% develop cirrhosis, which may lead to liver cancer.<sup>142</sup> Hepatitis C is spread through direct blood-to-blood contact. Risk factors for transmission include sharing contaminated injection drug-related equipment, getting a tattoo or body piercing with unsterile equipment, sharing a toothbrush or razor with someone who is infected with Hepatitis C, receiving a blood transfusion or blood products prior to 1992, or being born to a mother who has Hepatitis C.<sup>143</sup> There were on average 311 cases of Hepatitis C each year in York Region between 1996 and 2001. Incidence rates of Hepatitis C in York Region have declined from 69 per 100,000 population in 1996 to 36 per 100,000 population in 2001. The incidence rates of Hepatitis C in Ontario from 1996 to 1999 were higher than in York Region.

### *Working For You*

In 2001, York Region Health Services Department Health Protection Division inspected 254 tattoo, acupuncture, electrolysis and body/ear piercing establishments.

The purpose of these inspections is to ensure that infection control practices are implemented to prevent the spread of bloodborne infections, including Hepatitis B, Hepatitis C and HIV/AIDS.





## Invasive Group A Streptococcal Disease

Group A Streptococcus (GAS) is a bacterium that causes a variety of illnesses ranging from common mild infections such as sore throats and skin infections, to less common, severe infections such as scarlet fever, otitis media, and pneumonia. In rare cases, GAS can become invasive and can cause necrotizing fasciitis ("flesh eating disease"), rheumatic fever, or toxic shock-like syndrome.<sup>144</sup> Only invasive GAS is reportable in Ontario. There were on average 15 cases of invasive GAS each year in York Region from 1996 to 2001.

## Rabies

Rabies is a fatal viral disease. The rabies virus is spread from an infected animal to a human or another animal by contact with virus-laden saliva through a bite or break in the skin. Human cases of rabies are rare. The most recent reported Canadian case was in Quebec in August 2000, and was suspected to have been caused by a bat bite. To date, there have been no confirmed cases of human rabies in York Region. There were 756 biting incidents reported to York Region Health Services Department in 2001, and it was determined that it was advisable to administer the rabies vaccine to 79 people.

Between 1990 and 2001, there were 62 animals in York Region that were found to have rabies. Most of these infected animal species were red foxes (30 animals) and the striped skunk (17).<sup>145</sup> In 2001 and 2002 (to September), three bats were confirmed positive for rabies. Rabies vaccination is mandatory for all domestic dogs and cats in York Region.

## Outbreaks

An outbreak is defined as an increase in illness that exceeds the normal rate in a given area at a given time.<sup>146</sup> An outbreak can occur in numerous settings ranging from the home, daycare centres, hospitals, long-term care facilities, restaurants and the workplace or school. In York Region, between the years of 1995 to 2001, there were 317 outbreaks in long-term care facilities. This is double the number of outbreaks that occurred in household settings (Table 10.3).



Table 10.3 Number of Infectious Disease Outbreaks By Setting  
York Region, 1995 to 2001

	Household	Child Care Facility	Hospital	Long-Term Care Facilities	Restuarant	Workplace/School	Total
1995	46	9	2	22	4	0	83
1996	12	12	2	33	4	6	69
1997	5	3	0	28	3	3	42
1998	17	4	3	60	3	6	93
1999	17	12	0	71	7	1	108
2000	36	6	0	53	3	0	98
2001	20	5	0	50	5	4	84
Total	153	51	7	317	29	20	577

Source: Reportable Disease Information System (RDIS), York Region Health Services Department, 2002.

Outbreaks can also be classified into disease groups:

- vaccine preventable diseases (VPD),
- influenza,
- respiratory (except influenza),
- enteric, and
- Group A Streptococcal disease (GAS).

The greatest number of outbreaks that occurred in York Region between 1995 and 2001 were enteric in nature (320) (Table 10.4). The most notable result seen in Table 10.4 is the large decline in influenza outbreaks from 1999 to 2001. In 1999 there were 16 influenza outbreaks as compared to 1 in 2001. One of the contributing factors in this decrease is thought to be the availability and promotion of Ontario's Universal Influenza Vaccination program.

Table 10.4 Number of Infectious Disease Outbreaks By Disease Group  
York Region, 1995 to 2001

	VPD	Influenza	Respiratory (except influenza)	Enteric	GAS	Total
1995	21	6	10	63	0	100
1996	7	3	19	40	0	69
1997	0	4	15	22	1	42
1998	2	11	25	37	1	76
1999	1	16	34	52	1	104
2000	1	5	34	55	0	95
2001	2	1	38	51	0	92
Total	34	46	175	320	3	578

Source: Reportable Disease Information System (RDIS), York Region Health Services Department, 2002.





## Emerging Infections

When the incidence of an infectious disease has increased among humans in the past two decades, or threatens to increase in the near future, the infection becomes known as an "emerging" infection.<sup>147</sup> These infections include previously unrecognized infections (for example, Creutzfeldt-Jakob Disease and variant CJD), new infections resulting from the changes in or evolution of existing organisms (for example, ESBL-producing bacteria), known infections spreading to new geographic areas or populations (for example, West Nile Virus), and old infections re-emerging as a threat to public health as a result of antimicrobial resistance or breakdowns in public health measures (for example, tuberculosis).

## Extended-Spectrum Beta-Lactamase (ESBL) - producing Bacteria

Extended-Spectrum Beta-Lactamase (ESBL) is an enzyme that may be produced by bacteria commonly found in the human digestive system, including *E. coli*, *Klebsiella*, and *Serratia* species. ESBL-producing bacteria are a concern since the enzyme can break down many common antibiotics, including all penicillins and cephalosporins, making them ineffective.<sup>148</sup> ESBL-producing bacteria have been present in Europe and the United States for some time. It is only recently that ESBL-producing bacteria have been detected in Canada.

ESBL-producing bacteria do not usually cause illness in healthy individuals. Those infected without illness are referred to as "colonized." Treatment is not recommended for colonized individuals. Using antibiotics to treat ESBL-colonized individuals may lead to increased antibiotic resistance.

Beginning in July 2000, an outbreak of ESBL-producing *E. coli* affected several long-term care facilities in the Durham, York and Toronto Regions of Ontario.<sup>149</sup> In York Region, 102 cases were detected in one long-term care facility. Measures adopted to control the spread of the outbreak included infection control practices such as improved hand washing as well as enhanced environmental cleaning. The number of colonized residents has steadily decreased.



## West Nile Virus

West Nile Virus (WNV) is a mosquito-borne virus, named after the West Nile region of Uganda where it first appeared in 1937. Mosquitoes can transmit the virus to humans after becoming infected by feeding on the blood of birds that carry the virus. WNV cannot be transmitted from person-to-person nor from an infected bird to a human. WNV infection is asymptomatic in the majority of cases, although some people may experience mild flu-like symptoms. Certain people, including the elderly and those with weakened immune systems, are at greater risk for serious health consequences such as encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord).<sup>150</sup>

Across Ontario in 2002 (to December 31), 281 birds, 70 horses and 129 humans have been confirmed positive with the West Nile Virus. There are an additional 37 horses and 191 humans with probable infections. Unfortunately, one of the individuals confirmed to have West Nile Virus has died of the virus and another six people with laboratory-confirmed WNV have died but the cause(s) of death have not yet been determined.<sup>151</sup>

As of December 31, 2002, West Nile Virus has been identified in a number of York Region municipalities (Table 10.5).

Table 10.5 West Nile Virus Statistics  
York Region, as of December 31, 2002

Municipality	Birds Confirmed Positive 2001	Birds Confirmed Positive 2002	Location of Birds	Mosquito Pools Positive 2002	Location of Mosquito Pools	Horses Positive 2002	Human Cases 2002
Aurora	0	0		1	Yonge St./ St. John's Sideroad	1	
East Gwillimbury	0	2	Holland Landing Kennedy Road/Davis Drive	1	Holland Landing Kennedy Road/Davis Drive	1	
Georgina	1	0		1	Keswick	0	
King	0	0		0		1	
Markham	20	3	Thornhill Thornhill Markham	4	Thornhill Thornhill	0	
Newmarket	0	0		0		1	
Richmond Hill	0	1	Richmond Hill	2	Oak Ridges Richmond Hill	0	
Vaughan	3	2	Thornhill Thornhill	0		0	
Whitchurch Stouffville	1	0		0		0	
Total	25	8		9		4	6 1 confirmed 5 probable

Source: York Region Health Services Department, Health Protection Division, 2002.

## Working for You

A West Nile Virus Contingency Plan has been developed by York Region Health Services Department in conjunction with area municipalities and key stakeholders.

York Region Health Services Department is participating in province-wide bird surveillance programs in conjunction with other public health units and governments. York Region residents have been advised to report any dead or dying crows to the Health Services Department.



*This chapter has discussed infectious diseases in York Region - both longstanding diseases and newer, emerging ones such as West Nile Virus - and some preventive measures, such as vaccines. As noted at the beginning of this chapter, rates of infectious disease are often correlated with socio-economic conditions, which are discussed more fully in Chapter 2 (Our Social Environment). In Chapter 5 (Lifestyle Behaviour and Health) there is information about sexual health practices in York Region. Rates of sexually transmitted infectious diseases are closely associated with the adoption of safe sex practices.*